REMEDIAL INVESTIGATION REPORT FOR PARCEL 57

FORT MONMOUTH, OCEANPORT, MONMOUTH COUNTY, NEW JERSEY

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New Jersey Department of Environmental Protection
Site Remediation Program

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Document:

- "Remedial Investigation Report for Parcel 57, Fort Monmouth, Oceanport, Monmouth County, New Jersey" (July 2020)

PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

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This certification shall be signed by the person responsible for conducting the remediation who is submitting this notification in accordance with Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, including all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

Signature: William R Colvin Date: 13 July 2020

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1.0 OVERVIEW

This Remedial Investigation (RI) Report was prepared in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 U.S.C. 9601 et. seq.), National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300 and, to the extent possible, to consider the substantive remedial requirements of New Jersey Administrative Code (N.J.A.C.) 7:26E Technical Requirements for Site Remediation (TRSR) when remediation is required. The U.S. Army is the lead agency for Fort Monmouth (FTMM) in accordance with CERCLA, Executive Order 12580, and the Defense Environmental Restoration Program (DERP 10 U.S.C. 2701). The New Jersey Department of Environmental Protection (NJDEP) is the state support agency under the NCP.

This RI Report is based on data collected during the 2007 investigation, data collected by the Army in 2010/2011, and data collected for the 2015/2016 investigation.

1.1 Objectives

The objectives of this RI are to provide an overview of historical information; characterize the nature and extent of site-related contamination; and evaluate the potential risk to human health and the environment (40 CFR 300.430(a)(2)).

The Supplemental Environmental Condition of Property (ECP) Phase II SI field work performed in 2015/2016 addressed NJDEP comments on the previous 2007 Site Investigation (SI; U.S. Army, 2008) (**Appendix A, Correspondence 1 and 2**). Additional soil sampling for target polycyclic aromatic hydrocarbons (PAHs) in Parcel 57 was performed during the 2015/2016 investigation to delineate the horizontal and vertical extent of target PAHs. Soil samples were also analyzed for polychlorinated biphenyls (PCBs) along the former railroad tracks in accordance with NJDEP comments. Two new monitoring wells were installed along the northern site boundary and multiple wells were sampled to further assess metal exceedances of the NJDEP Ground Water Quality Criteria (GWQC) in groundwater. Proposed 2015/2016 investigation activities were documented in the ECP Work Plan (WP) (Parsons, 2015a) and the ECP Parcel 57 Round 2 WP Addendum (Parsons, 2016) which were reviewed by NJDEP (**Appendix A, Correspondences 3 and 5**). This work was completed in accordance with 40 CFR 300.430(d)(1).

1.2 Site Description

Parcel 57 is located in the south-central portion of the Main Post (**Figure 1**). A coal storage area and fuel unloading area formerly existed along the former railroad corridor in the vicinity of Buildings 800, 801, and 1007 (US Army, 2008). FTMM real property records indicate that the T-805 coal storage concrete slab was constructed in 1945 and was replaced by new construction in 1977. The concrete pad was 96 feet (ft) wide by 563 ft long. Coal piles are visible in aerial photographs taken in 1947 but are no longer visible in photographs from 1969 and 1974 (**Appendix C**). The aerial photographs indicate coal storage was formerly on the elongated concrete pad and on an adjoining area to the northwest of the pad as well as an adjoining area southeast of the pad (**Figure 2**).

Multiple fuel oil underground storage tanks (USTs), a bulk fuel oil aboveground storage tank (AST), and several structures related to fuel storage or transfer were once present at or near Parcel 57 as shown on a historical 1956 engineering drawing of the site (**Figure 2**). The 250,000-gallon bulk fuel oil AST was located at adjacent Installation Restoration Program (IRP) site FTMM-66 to the east of Parcel 57. Former gasoline USTs were located at adjacent IRP site FTMM-64 to the southeast, as well as a pipeline to a fuel

loading/unloading pump house area along the southern spur of the former railroad tracks. The status of former USTs is summarized on **Table 1**.

2.0 PREVIOUS INVESTIGATIONS

Petroleum-contaminated soils were encountered during construction of the Commissary (Building 1007) in January 1997. The estimated area of contamination within Parcel 57 is shown on **Figure 3**. The discharge was reported to NJDEP, and case number 97-1-11-0938-02 was assigned (**Appendix C**). Approximately 4,000 cubic yards of petroleum-contaminated soil were removed from Parcel 57 in 1997. A removal action report prepared by the FTMM Directorate of Public Works Environmental Office is presented in **Appendix C**.

Soil and groundwater samples were collected during the 2007 investigation to determine if there was a release of contamination due to the former coal storage area. Multiple PAHs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene were detected at concentrations exceeding the NJDEP Residential Direct Contact Soil Remediation Standard (RDCSRS) in soil samples collected below the asphalt pavement. Soil sampling results for volatile organic compounds (VOCs) and metals were compared to NJDEP Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) in the SI (U.S. Army, 2008). There were no exceedances of the RDCSRS and no additional soil sampling for VOCs or metals was recommended. NJDEP (2008, 2012) commented that delineation of PAHs and additional information regarding sources (such as asphalt pavement) was required, as well as PCB analysis for soils along the former railroad tracks. An excerpt of the 2008 SI Report concerning Parcel 57 is provided in **Appendix C**. Only the SI soil sample locations with PAH exceedances were re-sampled as part of the 2015/2016 investigation described in Section 4.0 of this RI Report.

In February 2010, soil at seven locations was sampled by the Army and analyzed for PAHs and, in some cases, these sample results exceeded the RDCSRS and Impact to Groundwater Soil Screening Levels (IGW SL).

Groundwater samples collected from five temporary wells during the 2007 investigation were analyzed for VOCs, semi-volatile organic compounds (SVOCs), and metals. After eliminating naturally occurring metal constituents commonly associated with local soil (aluminum, iron, manganese, and sodium), five metals (beryllium, cadmium, cobalt, lead, and nickel) that exceeded their respective NJDEP GWQC were identified as constituents of concern (COCs) in Parcel 57 groundwater (U.S. Army, 2008). In 2010/2011, three additional temporary wells (PAR57-GW-57-TMP-A-5, PAR57-GW-57-TMP-A-7, PAR57-GW-57-TMP-A-9) were installed and sampled by the Army, and concentrations of beryllium, cadmium, and lead in unfiltered samples exceeded their respective GWQC. Concentrations of these metals were non-detect or less than their GWQC in the corresponding filtered samples. Two permanent wells were installed and sampled by the Army in 2010 (800MW01 and 800MW02). Sample results were either non-detect or less than the GWQC for VOCs, SVOCs (including PAHs), and metals with the exception of aluminum, arsenic, iron, and manganese which exceeded their GWQC in well 800MW02. In August 2012, NJDEP requested additional information and rationale to support the Army's attribution of metal GWQC exceedances to naturally occurring background conditions (**Correspondence 2** in **Appendix A**). The Army's response to this request is described in Section 4.4 of this report.

While the 2010/2011 metal results indicate that metals are not likely to be associated with a release at Parcel 57, additional groundwater sampling from permanent wells for metals analysis was performed as part of the 2015/2016 investigation.

3.0 PHYSICAL CHARACTERISTICS OF THE SITE

3.1 Surface Features

Parcel 57 is located in the central portion of the MP (**Figure 1**) and is bounded on the north by Anson Avenue, the west by Todd Avenue, the south by Alexander Avenue, and the east by Murphy Drive (**Figure 3**). A substantial portion of the Parcel 57 vicinity is currently covered by Buildings 800, 801, 1005, 1007, and 1010, and portions of Building 1000 and 1002 (**Figure 3**). Asphalt pavement for parking areas and roads covers approximately half of the parcel and a relatively small portion of the parcel (less than 10 percent) consists of landscaped areas. The ground surface topography at Parcel 57 is generally flat. There are no surface water features at Parcel 57, and surface water runoff drains into storm drain inlets and eventually enters Husky Brook to the north.

3.2 Geology and Hydrogeology

The soil at Parcel 57 consists primarily of sand with some silt to at least six ft below ground surface (bgs). In some borings, deeper soils below six ft bgs consist of olive green sandy clays, indicating glauconitic materials. Soil boring and monitoring well logs and forms from the 2015/2016 investigation are provided in **Appendix B**. The depth to groundwater at Parcel 57 typically ranged from approximately 5 to 11 ft bgs. Groundwater is expected to flow north, northeast, and northwest toward Husky Brook Creek and Oceanport Creek based on wells at Parcel 57 and neighboring IRP Sites FTMM-64 and FTMM-66 (**Figure 4).** Indications of fill (concrete, wood, coal, and asphalt) were observed in several borings during the 2015/2016 investigation at varying depths from the ground surface to 7.5 ft bgs.

3.3 Land Use

The site is currently unoccupied. Future land use includes low-to-medium-density residential housing and some supporting retail, office, and civic/institutional uses (education-medical campus) (Fort Monmouth Economic Revitalization Authority [FMERA], 2018).

4.0 REMEDIAL INVESTIGATION RESULTS

The data and results of the 2007, 2010/2011, and 2015/2016 investigations constitute the RI results for Parcel 57.

Soil boring logs, well construction and development details, and groundwater sampling forms from the 2015/2016 investigation are included in **Appendix B.** Laboratory analytical reports and tables including all data results are included in electronic form in **Appendix D** and data validation reports are included in electronic form in **Appendix E**. Laboratory analytical results for soil were compared to NJDEP RDCSRS, NRDCSRS, and IGW SLs. Vanadium was compared to an NJDEP Alternative Soil Remediation Standard (ARS) (**Appendix F)**. Groundwater concentrations were compared to NJDEP GWQC. Soil and groundwater analytical results were also compared to U.S. Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs).

Table 2 includes a sample and analytical summary of the 2010/2011 and 2015/2016 investigations. Data from the 2007 investigation are presented in the 2008 SI Report and summarized on Table 3.14-2 in **Appendix C** of this RI Report. Sample locations are shown on **Figure 5**. **Tables 3** and **4** show the soil sampling results for detected analytes as well as the selected NJDEP (**Table 3**) and USEPA (**Table 4**) comparison criteria.

4.1 Soil Results for PCBs and EPH

A total of 23 soil samples were collected for PCB analysis in 13 borings during the 2015/2016 investigation. The PCBs Aroclor-1254 and Aroclor-1260 were detected at one of the eight sampling locations (PAR-57-SS-04) along the former railroad track (**Tables 3 and 4**, **Figure 6**) at concentrations greater than the NJDEP RDCSRS for total PCBs (0.2 milligrams per kilogram [mg/kg]) and/or the USEPA Residential RSL (0.12 mg/kg and 0.24 mg/kg, respectively). Concentrations of Aroclor-1254 and/or Aroclor-1260 also exceeded the USEPA Groundwater Protection RSLs (0.002 mg/kg and 0.0055 mg/kg, respectively) at all three sampled depth intervals at PAR-57-SS-04 as well as at 0.5-1 ft. bgs at three locations: PAR-57-SS-37, -38, and -40. Five step-out borings were sampled in 2016 to delineate PCBs within the NJDEP RDCSRS and the USEPA Residential RSL (**Tables 3** and **4**, **Figure 6**).

The Army performed an interim removal action via excavation in July 2016 (**Appendix G**). The final dimensions of the excavation were 7.6 ft. (east-west direction) by 5.5 ft. (north-south direction) by 5 ft. deep centered on PAR-57-SS-04. A confirmation sample was collected from the bottom of the excavation and analyzed for PCBs and extractable petroleum hydrocarbons (EPH). PCBs were not detected in the confirmation sample. EPH was detected at 120 mg/kg, which, for non-No. 2 /fuel oil discharged (Category 2), is less than NJDEP's 1,700 mg/kg lowest possible health-based value as defined in NJDEP's EPH Protocol. The excavation was backfilled with dense gravel aggregate, compacted with the excavator bucket, and the surface was patched with asphalt.

4.2 Soil Results for PAHs

In addition to the 15 soil borings analyzed for PAHs in 2007 and six soil borings analyzed for PAHs in 2010, a total of 71 samples (including three field duplicates) from 27 soil borings were analyzed for PAHs in the 2015/2016 investigation. Target PAH analytes included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Additional care was taken by the field sampling crew to prevent the incorporation of the existing asphalt pavement or underlying base material into the soil samples for laboratory analyses.

Soil sampling results for PAHs obtained for the 2007, 2010, and 2015/2016 investigations were compared to current September 2017 NJDEP criteria in **Table 3** and to USEPA criteria in **Table 4**, and results of the comparison to the 2017 NJDEP criteria are shown on **Figure 7** and to USEPA RSLs on **Figure 8**. In summary, PAHs were detected at 44 of 55 soil boring locations (**Tables 3** and **4**). Benzo(a)pyrene was the most prevalent PAH in Parcel 57 soil samples and exceeded the 2017 NJDEP and USEPA comparison criteria in most samples.

It should be noted that in September 2017 the NJDEP revised the RDCSRS and NRDCSRS for the carcinogenic PAHs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene, and the updated toxicity criteria resulted in higher cleanup levels. Therefore, as detailed below, some exceedances identified in reports prior to 2017, are no longer exceedances of the updated NJDEP RDCSRS criteria.

4.2.1 Exceedances of Comparison Criteria

Concentrations of the following PAHs exceeded their current NJDEP RDCSRS and/or USEPA Residential RSL in at least one of the soil samples collected in the 2007, 2010, and 2015/2016 investigations (**Tables 3, 4,** and **5**): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. PAH exceedances of the current NJDEP RDCSRS or the USEPA Residential RSL ranged in depth from 0.0 to 8.0 ft below the base of the asphalt pavement and underlying granular base material.

Concentrations of the following PAHs exceeded their current NJDEP IGW SL and/or USEPA Groundwater Protection RSL in at least one of the soil samples collected in the 2007, 2010, and 2015/2016 investigations(**Tables 3, 4,** and **5**): acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, and pyrene.

Exceedances were delineated to the NJDEP RDCSRS. PAH exceedances in soil have been delineated horizontally within Parcel 57 (**Figure 7**). PAHs in soil have been delineated vertically within Parcel 57 with the deepest exceedance occurring at 5.5-6.0 ft bgs in sample PAR-57-SS-09, which is bounded by co-located sample P57-A1-A in which no PAHs were detected at 6.5-7.0 ft bgs (**Table 3**).

4.2.2 Constituents of Potential Concern (COPCs)

PAH COPCs in soil were identified by comparing the maximum detected concentration of each analyte to the USEPA Residential RSL (TR = 1 x 10^{-6} and THQ = 0.1) as detailed in the Risk Assessment Work Plan (Parsons, 2015b). The PAH COPCs in soil at Parcel 57 include (**Table 5**): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

4.2.3 Potential Sources of PAHs in Soil

Based on the results of the 2010 and 2015/2016 soil sampling, the former coal storage area is a likely primary source of PAHs in soil at Parcel 57. However, PAHs were also found to be ubiquitous across Parcel 57 and the surrounding area and not only present in the former coal storage area.

Boring logs (**Appendix B**) indicate that coal fragments were encountered in borings advanced near the former coal storage area footprint at depths ranging up to approximately 6 ft below the base of the current asphalt pavement. These borings with coal fragments include PAR-57-SS-09, SS-13, SS-16, SS-17, SS-18, and SS-24. In addition, asphalt fragments were encountered in two borings (PAR-57-SS-14 and SS-21) at depths ranging up to approximately three ft below the base of the current asphalt pavement. Coal and (to a lesser extent) asphalt in fill material are likely sources of PAHs at Parcel 57. A railroad tie was also encountered in one additional boring (PAR-57-SS-20) advanced north of the former coal storage area at a depth of approximately 2 to 2.5 ft below the base of the asphalt pavement. PAHs are found in creosote which is used in preserving railroad ties (HSDB, 2018). These observations indicate that there are potential sources of PAHs in soil fill at multiple locations within and outside of the former coal storage area.

Benzo(a)pyrene was also detected in surface soil (0 to 1 ft bgs) near the southwestern parcel boundary (PAR-57-SS -29) at a concentration greater than the current RDCSRS. In this case, the presence of fill, coal, or asphalt fragments was not noted in the soil boring and therefore the attribution of PAHs to the former coal storage area is not as clear. Therefore, PAHs are also present in surficial soils at Parcel 57 that may not be related to the former coal storage area. Other sources of PAHs could be asphalt pavement (present at most of the sampling locations), fill material, or other ubiquitous anthropogenic sources such as deposition of airborne PAHs resulting from fossil fuel combustion. To address the unacceptable risks associated with PAHs in soils a Time Critical Removal Action (40 CFR 300.415(b)(2)) was performed to address contaminants of concern above the NJDEP Soil Clean Up Criteria. Please see Section 7 and Appendix I.

4.3 Soil Results for Metals

In the 2007 investigation, 15 soil borings were analyzed for metals. These results were compared to NJDEP criteria or an ARS (in the case of vanadium) in **Table 3** and to USEPA criteria in **Table 4**; results

of the comparison to USEPA RSLs are shown on **Figure 9**. There is not a figure for comparison to NJDEP criteria because there are no exceedances of NJDEP criteria (or an ARS). Metals were detected at all soil boring locations (**Tables 3** and **4**).

4.3.1 Exceedances of Comparison Criteria

Vanadium is the only metal with detected concentrations greater than the NJDEP RDCSRS. These exceedances are present in two locations (P57-A2 at 5.5-6 ft bgs and P57-B5 at 6.5-7 ft bgs) (**Table 3**). The NJDEP RDCSRS for vanadium is based on a provisional reference dose (RfD). However, the USEPA no longer uses the provisional RfD. The current RSL is based on an RfD that is based on the vanadium pentoxide RfD that is presented in the Integrated Risk Information System (USEPA, 2017a). Therefore, an ARS of 390 mg/kg, based on the current USEPA RSL was used for vanadium (**Appendix F**).

Vanadium concentrations at Parcel 57 are within the range found in glauconitic soils in the New Jersey Coastal Plain. Dooley (2001) analyzed 113 glauconitic (whole) soil samples from the Coastal Plain and found that the vanadium concentration ranged from 1.7 parts per million (ppm) to 707 ppm with a 62 ± 102 ppm mean. The maximum concentration of vanadium at Parcel 57 was 91.4 mg/kg, which is well within the range encountered by Dooley (2001). Based on the data, vanadium concentrations at Parcel 57 appear to be largely or wholly related to background conditions expected for an area with glauconitic soils, and do not appear to indicate a release.

Concentrations of the following metals exceeded their current USEPA Residential RSL in at least one of the soil samples collected in 2007 (**Table 4**): arsenic, cobalt, and vanadium. It should be noted that detections of arsenic and vanadium do not exceed the background values determined by the 1995 background investigation performed by Weston (Weston, 1995) (**Table 5**). Metal exceedances of the NJDEP RDCSRS or the USEPA Residential RSL ranged in depth from 0.0 to 8.0 ft bgs.

Concentrations of the following metals exceeded their current NJDEP IGW SL and/or USEPA Groundwater Protection RSL in at least one of the soil samples collected in the 2007 investigation (**Tables 3** and **4**): arsenic, beryllium, cadmium, cobalt, mercury, nickel, vanadium, and zinc.

4.3.2 Constituents of Potential Concern (COPCs)

Metal COPCs in soil were identified by comparing the maximum detected concentration of each analyte to the USEPA Residential RSL (TR = 1 x 10^{-6} and THQ = 0.1). Results that are B flagged are considered not-detected as detailed in the Risk Assessment Work Plan (Parsons, 2015b). The metal COPCs in soil include (**Table 5**): arsenic, cobalt, and vanadium. Although the background concentrations were not used to screen COPCs, it should be noted that the maximum detected concentrations of arsenic and vanadium do not exceed the Main Post background values established during the 1995 background investigation (Weston, 1995).

4.3.3 Potential Sources of Metals in Soil

Based on the results of the soil sampling, the former coal storage area is a likely primary source of metals in soil at Parcel 57. However, metals were also found to be ubiquitous across Parcel 57 and surrounding areas, and not only present in the former coal storage area. Additionally, there are indications of fill such as pieces of concrete, wood, coal, coal ash, or asphalt.

4.4 Groundwater Results

As described in Section 2.0, NJDEP requested additional information and rationale to support the Army's attribution of metal GWQC exceedances to naturally occurring background conditions (**Appendix A, Correspondence 2**). Review of the site history has not identified any other specific potential sources of metals contamination at Parcel 57 other than coal storage piles.

During the 2015/2016 investigation, permanent monitoring wells PAR-57-MW01 and PAR-57-MW02 were installed (to a depth of 20 ft bgs) at the locations of two former temporary well locations installed for the 2010/2011 investigations. Groundwater samples were collected from the two new wells, existing wells 800MW01 and 800MW02, and upgradient wells 886MW02 and 812MW14. All samples were collected using the low-flow, minimal disturbance method, and were analyzed for total (unfiltered) and dissolved (filtered) TAL metals, which included the specific analytes that exceeded GWQC in previous samples. Total and dissolved concentrations of select metals exceeded NJDEP GWQC and/or USEPA Tapwater RSLs in Parcel 57 groundwater (**Table 6**). As discussed above in Section 3.0, previous groundwater samples were non-detect or less than the GWQC for SVOCs (including PAHs) and VOCs.

4.4.1 Exceedances of NJDEP Comparison Criteria

The following is a summary of total and dissolved exceedances of the NJDEP GWQC for each monitoring well, which is also presented in **Figure 10**. Evaluation of metals exceedances in groundwater has included multiple rounds of sampling and analysis, collection of total (unfiltered) and dissolved (filtered) samples, and evaluation of upgradient wells (**Figure 10**).

Total (Unfiltered) Results

- Well 800MW01, located cross-gradient of the coal storage area, indicated PAH exceedances in soil, exceeded the criteria for aluminum and iron in total (unfiltered) samples.
- Well 800MW02, which is generally downgradient of the coal storage area, exceeded the criteria for arsenic, aluminum, iron, and manganese in total (unfiltered) samples.
- Well PAR-57-GW-MW01, located within the historical coal storage area, exceeded the criteria for aluminum, arsenic, iron, and manganese in total (unfiltered) samples.
- Well PAR-57-GW-MW02, also located within the historical coal storage area, exceeded the criteria for multiple analytes in total (unfiltered) samples, including aluminum, arsenic, beryllium, cadmium, cobalt, iron, manganese, nickel, and sodium.
- Well 866MW02, which is upgradient of the coal storage area, exceeded the criteria for aluminum, cadmium, iron, lead, and manganese in total (unfiltered) samples.
- Well 812MW14, which is upgradient of the coal storage area, exceeded the criteria for aluminum, arsenic, beryllium, iron, lead, and manganese in the total (unfiltered) sample.

Dissolved (Filtered) Results

- Well 800MW01 exceeded the criteria for arsenic in dissolved (filtered) samples.
- Well 800MW02 exceeded the criteria for manganese in dissolved (filtered) samples.
- Well PAR-57-GW-MW01 exceeded criteria for arsenic, iron and manganese in dissolved (filtered) samples.
- Well PAR-57-GW-MW02 exceeded the criteria for multiple analytes in dissolved (filtered) samples, including aluminum, arsenic, beryllium, cadmium, cobalt, iron, manganese, nickel, and sodium.
- Well 866MW02 exceeded criteria for iron and manganese in dissolved (filtered) samples.

- Well 812MW14 did not exceed any criteria in the dissolved (filtered) sample.

None of the detections of aluminum, arsenic, and iron in groundwater exceeded the background values reported in the 1995 background investigation (Weston, 1995) (**Table 7**).

A comparison of total (unfiltered) and dissolved (filtered) analyses suggests that groundwater sample turbidity has caused select metal exceedances at wells 800MW02 (aluminum and iron), PAR-57-GW-MW01 (aluminum), 866MW02 (aluminum, cadmium, and lead), and 812MW14 (aluminum, arsenic, beryllium, iron, lead and manganese). Therefore, GWQC exceedances for multiple analytes are attributed to groundwater sample turbidity, rather than a groundwater contamination source at Parcel 57. Dissolved iron and manganese were also detected at concentrations exceeding the GWQC in upgradient well 886MW02, and therefore iron and manganese are also not attributed to a Parcel 57 source.

Previous studies have documented the presence of elevated naturally-occurring metal concentrations (e.g., arsenic and beryllium) in glauconitic soils such as those present within the New Jersey Coastal Plain physiographic province (Dooley, 2001; U.S. Geological Survey [USGS], 1984). As indicated on the geologic logs in **Appendix B**, glauconitic soil was encountered during drilling of monitoring wells PAR-57-MW01 (3 to nearly 19 ft bgs) and PAR-57-MW02 (4 to 12 ft bgs); note that the geologic log for PAR-57-GW-MW02 is labeled as FTMM-57-SS-24. Therefore, dissolved arsenic and beryllium exceedances at these two wells are attributed to glauconite in soil.

Multiple dissolved metals were detected in groundwater at well PAR-57-GW-MW02 at concentrations greater than the NJDEP GWQC, as verified in two rounds of sampling. The GWQC exceedances at this well could be attributed to naturally occurring metals in the soil. The aluminum detections do not exceed the background values determined by the 1995 background investigation (Weston, 1995) (**Table 7**). Well PAR-57-GW-MW02 was installed in an area historically used for coal storage. Potential sources of metals at this one well include naturally occurring glauconitic soils, releases from the historical coal storage area, fill material, or an upgradient source. Also, the predominance of the exceedances were in one sample from one well which could represent an anomaly. Metals were further evaluated as Constituents of Potential Concern (COPCs) for the risk assessment. To address the unacceptable risk associated with contaminants migrating to groundwater, a Time Critical Removal Action (40 CFR 300.415(b)(2)) was performed to address contaminants of concern above the NJDEP Soil Clean Up Criteria. Please see Section 7 and Appendix I.

4.4.2 Exceedances of USEPA Comparison Criteria and Selection of COPCs

COPCs in groundwater are identified by comparing the maximum detected concentrations of samples collected from permanent monitoring wells to the USEPA Tapwater RSLs (TR = $1x10^{-6}$ and THQ = 0.1) (USEPA, 2017b). Detected analytes that exceed the Tapwater RSLs are then assessed more holistically to determine whether exceedances are representative of site-related contamination or are due to other factors such as turbidity or upgradient sources as detailed in the Risk Assessment Work Plan (Parsons, 2015b).

Analytes that exceed the USEPA Tapwater RSLs in Parcel 57 wells (800MW01, 800MW02, PAR-57-MW01, and PAR-57-GW-MW02) include: aluminum, arsenic, beryllium, cadmium, cobalt, iron, manganese, nickel, selenium, sodium, vanadium, and zinc (**Figure 11** and **Tables 6** and **7**).

It should be noted that detections of aluminum, arsenic, iron, selenium, and vanadium in groundwater do not exceed the background values reported in the 1995 background investigation (Weston, 1995) (**Table 7**).

Iron and sodium are classified as essential human nutrients and therefore are not selected as COPCs in groundwater.

Selenium only exceeds the USEPA Tapwater RSL (10 µg/L) in one sample (PAR-57-GW-MW01-12.5 and dissolved at 15 J µg/L), and in all groundwater data is only detected twice (during one sampling event, in one well) out of 41 samples, including temporary and permanent wells. The exceedance of selenium is anomalous and not representative of the vast majority of the data. Therefore, selenium is not selected as a COPC in groundwater.

A comparison of total (unfiltered) and dissolved (filtered) analyses suggests that groundwater sample turbidity has caused a vanadium exceedance at PAR-57-GW-MW02. Therefore, this vanadium exceedance can be attributed to groundwater sample turbidity, rather than a groundwater contamination source at Parcel 57 and vanadium is not selected as a COPC in groundwater.

Dissolved cobalt and manganese were also detected at concentrations exceeding the USEPA Tapwater RSLs in upgradient well 886MW02. Therefore, cobalt and manganese are also not attributed to a Parcel 57 source and are not selected as COPCs in groundwater.

Previous studies have documented the presence of elevated naturally-occurring metal concentrations (e.g., arsenic and beryllium) in glauconitic soils, and glauconitic soil was encountered during drilling of monitoring wells at Parcel 57. Therefore, dissolved arsenic and beryllium exceedances are likely attributed to glauconite in soil and are not selected as COPCs in groundwater.

The analytes that exceed the USEPA Tapwater RSLs that cannot be attributed to sample turbidity, upgradient sources, or glauconitic soils and are selected as COPCs in groundwater include aluminum, cadmium, nickel, and zinc. Although the background concentrations were not used to screen COPCs, it should be noted that the maximum detected concentration of aluminum in groundwater does not exceed the background value reported in the 1995 background investigation (Weston, 1995) (**Table 7**).

5.0 CONTAMINANT FATE AND TRANSPORT

Potential migration routes for contaminants detected in soil include the following:

- Dissolution of soluble residual contamination in soil into infiltrating precipitation that percolates through the vadose zone to the water table; and
- Volatilization into soil gas and/or the atmosphere.

The primary migration route for contaminants detected in groundwater at Parcel 57 is lateral migration of contaminants dissolved in groundwater. Following is a description of contaminant fate and transport for analytes and media where COPCs were identified in Section 4.

5.1 SVOCs in Soil

The SVOCs identified as COPCs in soil (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene) are PAHs having 18 to 22 carbon atoms (i.e., C18-C22). As hydrocarbons approach a size of approximately 15 to 20 carbon atoms, their vapor pressures and water solubilities become negligible, and partitioning to air or dissolution in water is unimportant (American Petroleum Institute [API], 2011). API generally classifies petroleum substances in the C9 to C25 range as “not readily biodegradable” because their biodegradation rates are typically slower than lighter, more volatile fuels, such as gasoline or jet fuel. Therefore, PAHs such as those listed above are

expected to be relatively persistent in vadose zone soil at Parcel 57 and are expected to be relatively immobile and will not readily leach to groundwater.

5.2 Metals in Soil

Metals are subject to various transformation processes in soil. For example, metals can exist in the environment in several valence forms, and they can also exist as organometallic compounds that have a metal-carbon bond. Metal transformation processes, such as metal methylation, occur through interactions with other chemicals and biota in the environment. In general, however, metals are elements that have limited mobility in the environment, and therefore are expected to be relatively persistent in vadose zone soil at Parcel 57.

5.3 Metals in Groundwater

In general, metals in groundwater are sorbed to aquifer matrix particles or retained in solution without significant biotic or abiotic transformation, and they are expected to be relatively persistent in shallow groundwater at Parcel 57.

Metals in groundwater will likely be moderately to highly sorbed to aquifer matrix materials and thus have more limited mobility than VOCs, but their mobility in groundwater is dependent on too many metal- and site-specific factors to predict with confidence. NJDEP (2003) found that New Jersey soils typically have high iron concentrations. Glauconitic soils have iron-rich clay minerals (Dooley, 2001); these soils are common at FTMM and potentially may enhance sorption of metals to the soil matrix in the saturated zone.

6.0 HUMAN HEALTH RISK ASSESSMENT

An evaluation of the potential risk resulting from human exposure to contaminants in soil and groundwater was conducted as part of this RILR (**Appendix H**) and in accordance with 40 CFR 300.430(d)(4). The human health risk assessment (HHRA) evaluates the exposure of current and/or future unlimited use and unrestricted exposure (UU/UE) receptors (the scenario protective of residential, school, medical, and administrative users), outdoor workers, utility workers, and recreational users to COPCs in soil through dermal contact, incidental ingestion, and inhalation of particulates. The HHRA evaluates the exposure of current and/or future UU/UE receptors and utility workers to COPCs in groundwater through ingestion as potable water (UU/UE receptors only), dermal contact, and incidental ingestion. The HHRA used an exposure point concentration based on the maximum detected concentration or the 95 percent upper confidence limit on the mean (95% UCL) for soil, and the maximum detected concentration from any well for groundwater.

Five approximately 0.5-acre (i.e. the size of a residential lot) exposure areas, based on areas at the site with the highest concentrations of COPCs that would be most likely to pose an unacceptable risk, were evaluated for the UU/UE receptor exposed to soil. The remaining receptors were assumed to access the entire site. For groundwater, each well location was considered a separate exposure point, because it is assumed each well is an individual potential source of drinking water.

The cumulative carcinogenic risks and noncarcinogenic hazards estimated for the receptors at the site are as follows (**Tables H.2.124** and **H.2.125** of **Appendix H**):

- UU/UE receptors exposed to surface soil, combined surface and subsurface soil, outdoor air, and potable groundwater: The cumulative carcinogenic risks in surface soil and combined surface and subsurface soil are less than or equal to the cumulative risk goal of 1×10^{-4} in

every exposure area. The HIs for surface soil are less than or equal to 1 for all exposure areas, except for the child receptor in exposure area 1. The HI for the UU/UE child receptor in exposure area 1 is 2, which is greater than 1. The individual HQs are all less than 1. Since the total HI was greater than 1, the hazards were separated by target organ. The segregated HIs were less than or equal to 1 for the target organs (see **Table H.2.21** of **Appendix H**). The HIs for combined surface and subsurface soil for both child and adult UU/UE receptors are less than or equal to 1 for all exposure areas.

The cumulative carcinogenic risk for UU/UE receptors exposed to groundwater was not calculated because none of the COPCs in groundwater are carcinogenic. The cumulative noncarcinogenic HI for UU/UE receptors exposed to groundwater is estimated to be 5 for the child receptor (HI_{child}) and 3 for the adult receptor (HI_{adult}). The main contributors to these hazard estimates are ingestion of cadmium and nickel ($HI_{child} = 2$ for both, and $HI_{adult} = 1$ for both). All of the maximum concentrations come from one sample at well PAR-57-MW02.

Since the total HI_{adult} of 3 was greater than 1 for groundwater, the hazards were separated by target organ. For HI_{adult}, the individual HQs are all less than or equal to 1. The segregated HIs were less than or equal to 1 for the target organs.

Similarly, since the total HI_{child} was greater than 1 for groundwater, the hazards were separated by target organ. The segregated HIs were less than or equal to 1 for the four target organs/systems: blood, central nervous system, immune system, and respiratory system. However, the segregated HI for body weight/whole body was 2, driven by exposure to nickel, and for urinary was 2, driven by exposure to cadmium. For the target organs and systems with HIs greater than the benchmark level of concern of 1, noncarcinogenic effects are theoretically possible.

However, as discussed in the uncertainties section in **Appendix H**, the use of the maximum detected concentration introduces uncertainty into the risk assessment, since the use of one analytical result likely does not accurately represent the concentration of the constituent that a receptor would be exposed throughout the exposure duration. In cases where the analyte is infrequently detected, the use of the maximum concentration likely overestimates the actual EPC, resulting in an overestimate of the risk. In cases with few total samples, as is the case with the groundwater samples collected at this site, the use of the maximum detected concentration can either over- or underestimate the EPC depending on the distribution of the actual concentrations in the medium of concern. In the case of groundwater at this site, the site-wide maximum concentrations all come from one sample event, at one sample depth, in one well. The results from this unfiltered sample are not consistent with the observations from other sample events, at the same depth in the same well, nor are they consistent with results obtained from the same sample event in the same well at a different depth. This inconsistency indicates that the concentrations used in the risk calculations may not be representative of true site conditions and likely overestimate the potential risk.

- Utility workers exposed to surface soil, combined surface and subsurface soil, and groundwater: The cumulative carcinogenic risk for surface soil of 9×10^{-8}, and for combined surface and subsurface soil of 1×10^{-7} are less than the cumulative risk goal of 1×10^{-4}. The HI for utility workers is less than 1 for surface soil (HI=0.02), combined surface and subsurface soil (HI=0.03), and for groundwater (HI = 0.01).

- Outdoor workers exposed to surface soil: The cumulative carcinogenic risk for soil of 6×10^{-6} is less than the cumulative risk goal of 1×10^{-4}. The HI for outdoor workers is less than 1 for soil (HI=0.08).
- Recreational users exposed to surface soil: The cumulative carcinogenic risk for soil of 2×10^{-6} is less than the cumulative risk goal of 1×10^{-4}. The recreational user HI_{adl} (adolescent) for soil is 0.02 and the HI_{adult} is 0.01, which are less than 1.

In conclusion, the estimated carcinogenic risks for all receptors exposed to soil and groundwater are less than or equal to the carcinogenic cumulative risk goal of 1×10^{-4}. The estimated cumulative hazards are less than 1, the benchmark of concern, for all receptors exposed to soil and groundwater except for the child UU/UE receptor exposed to surface soil at exposure area 1 and the UU/UE adult and child receptors exposed to groundwater. However, when these hazards are evaluated further based on target organs, the segregated HIs are generally less than 1. Although the segregated HIs for the child UU/UE receptor exposed to groundwater slightly exceed 1 for two target organ systems, these exceedances are based on results from one sample that are not representative of true site conditions, especially over time, and the hazard for this well (PAR-57-MW02) is likely overestimated. Therefore, based on the results of this risk assessment, no unacceptable risks or hazards are anticipated to current or future receptors.

Uncertainties may result in overestimated risks/hazards. Most notably, onsite groundwater is not currently used as a potable drinking water source so the risk/hazard estimates herein, particularly those associated with the UU/UE scenario, may be overestimated. The estimated risks/hazards associated with potable groundwater would apply only if a well was installed for potable water.

7.0 TIME CRITICAL REMOVAL ACTION

In October 2019 the Army implemented a Time Critical Removal Action (TCRA) for Parcel 57 in accordance with CERCLA and 40 CFR 300.415(b)(2) of the NCP (U.S. Army, 2018). The TCRA was performed to remove unacceptable levels of PAH contamination in soil, to accelerate the property transfer for beneficial reuse, and to remove the environmental liability at this parcel. The purpose of the TCRA was to meet residential soil standards and therefore support UU/UE for Parcel 57. Because the primary purpose of the TCRA was to accelerate property transfer, there was no endangerment determination.

Removal action activities included site preparation, excavation of PAH-contaminated soil, collection of post-excavation soil samples, offsite transportation and disposal, and site restoration. The results of the TCRA are presented in a Remedial Action Completion Report – Action Memorandum (RACR) in Appendix I, which is being provided for public comment jointly with this RI.

8.0 SUMMARY AND CONCLUSIONS

8.1 PCBs in Soil

In July 2016, the Army performed an interim PCB removal action with soil excavation and offsite disposal. PCB contamination was removed at Parcel 57 and the results of confirmation sampling confirm that there is no impact to residential or industrial receptors. Therefore, the Army has determined that no further action with regard to PCBs in soil is warranted.

8.2 PAHs and Metals in Soil

PAHs and metals have been detected in soil across much of Parcel 57 at concentrations exceeding NJDEP RDCSRS and NRDCSRS and USEPA Residential and Industrial RSLs. The observations of coal fragments and occurrence of PAHs and metals in subsurface soils suggests that the former coal storage

area, which was located near the northern edge of Parcel 57, was a likely source of the PAHs and metals. However, the widespread occurrence of PAHs and metals in soil indicates that some occurrences located more distant (that is, to the south) of the former coal storage area may not be related to historical coal storage at all, but instead may be due to other sources such as asphalt pavement (present at most of the sampling locations), fill material, glauconitic soils, or other ubiquitous anthropogenic sources such as deposition of PAHs resulting from fossil fuel combustion. The HHRA concluded that there is not an unacceptable risk to human health from PAHs or metals in soil. Further, a TCRA was performed to remove PAH contamination in soil to support UU/UE for Parcel 57. Therefore, the Army has determined that no further action is warranted under CERCLA.

8.3 VOCs, SVOCs, and Metals in Groundwater

SVOCs including PAHs, and VOCs were non-detect or were less than the GWQC and RSLs. Therefore, no SVOCs (including PAHs) or VOCs were identified as COCs. Potential sources of metals at well PAR-57-MW02 could include a release from historical coal storage piles, from fill material within this area, or from an upgradient source within the adjacent FTMM-66 vicinity. The HHRA concluded that risks to human health from metals in groundwater are within acceptable ranges for current and future intended land use. Therefore, the Army has determined that no further action with regard to VOCs, SVOCs (including PAHs), and metals in groundwater is warranted under CERCLA.

8.4 Conclusions

The HHRA concluded that risks to human health from soil and groundwater are within acceptable ranges for UU/UE. The Army has determined that unacceptable risks under CERCLA are not present at Parcel 57. A TCRA was performed to remove PAH contaminated soil above NJDEP RDCSRS. The results of the TCRA supports UU/UE of Parcel 57 which accelerates property transfer for beneficial reuse and removes long-term environmental liability at this parcel. The Army has determined that there are no unacceptable risks under CERCLA at Parcel 57 and that No Further Action (NFA) is warranted at Parcel 57. The NFA will be submitted for public comment as the preferred remedial alternative and formally selected in a No Further Action Decision Document.

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FIGURES

Figure 1 - Parcel 57 Location

Figure 2 - Historical Site Features

Figure 3 - Previous Remediation Areas

Figure 4 - Groundwater Contour

Figure 5 - Site Layout and Sampling Locations

Figure 6 - Comparison of 2010, 2015, and 2016 Soil Results for PCBs to NJDEP Direct Contact Standards

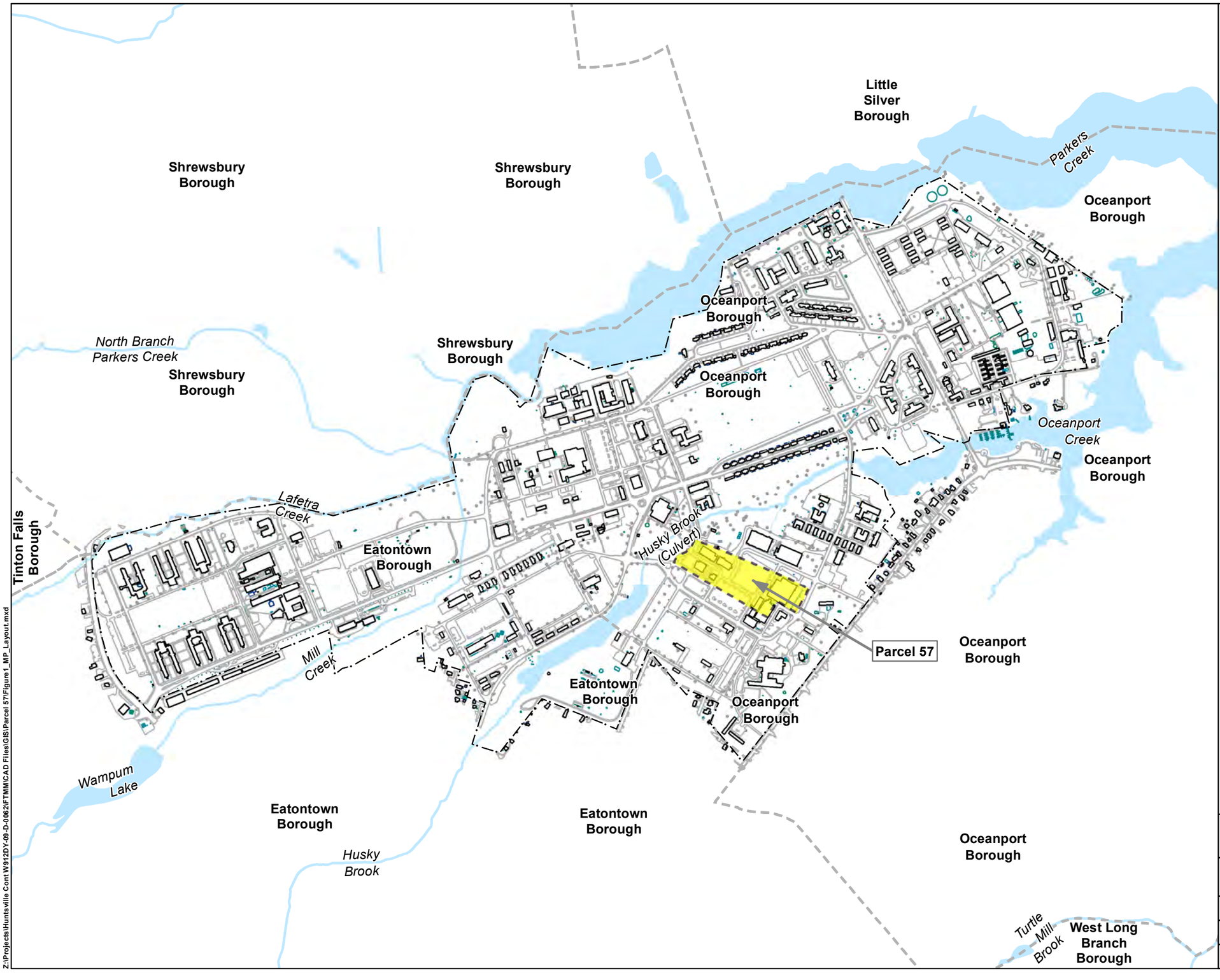
Figure 7 - Comparison of Soil Results for PAHs to NJDEP Direct Contact Standards

Figure 8 - Comparison of Soil Results for PAHs to USEPA RSLs

Figure 9 - Comparison of Soil Results for Metals to USEPA RSLs

Figure 10 - Groundwater Exceedances of NJDEP Criteria

Figure 11 - Groundwater Exceedances of USEPA Tap Water RSLs



LEGEND:

- Parcel Boundary
- Municipal Boundary
- Installation Boundary
- Surface Water Feature

N

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

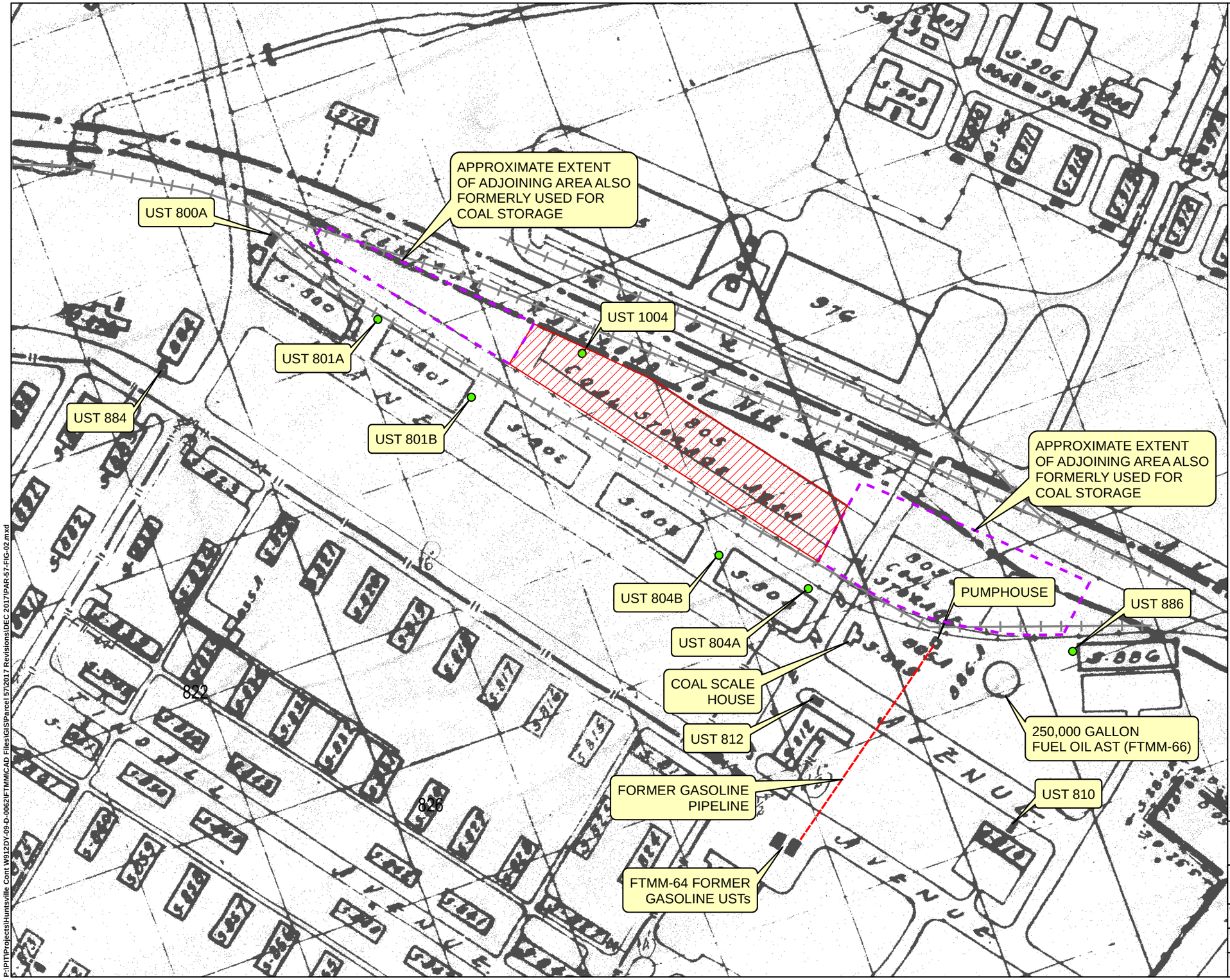
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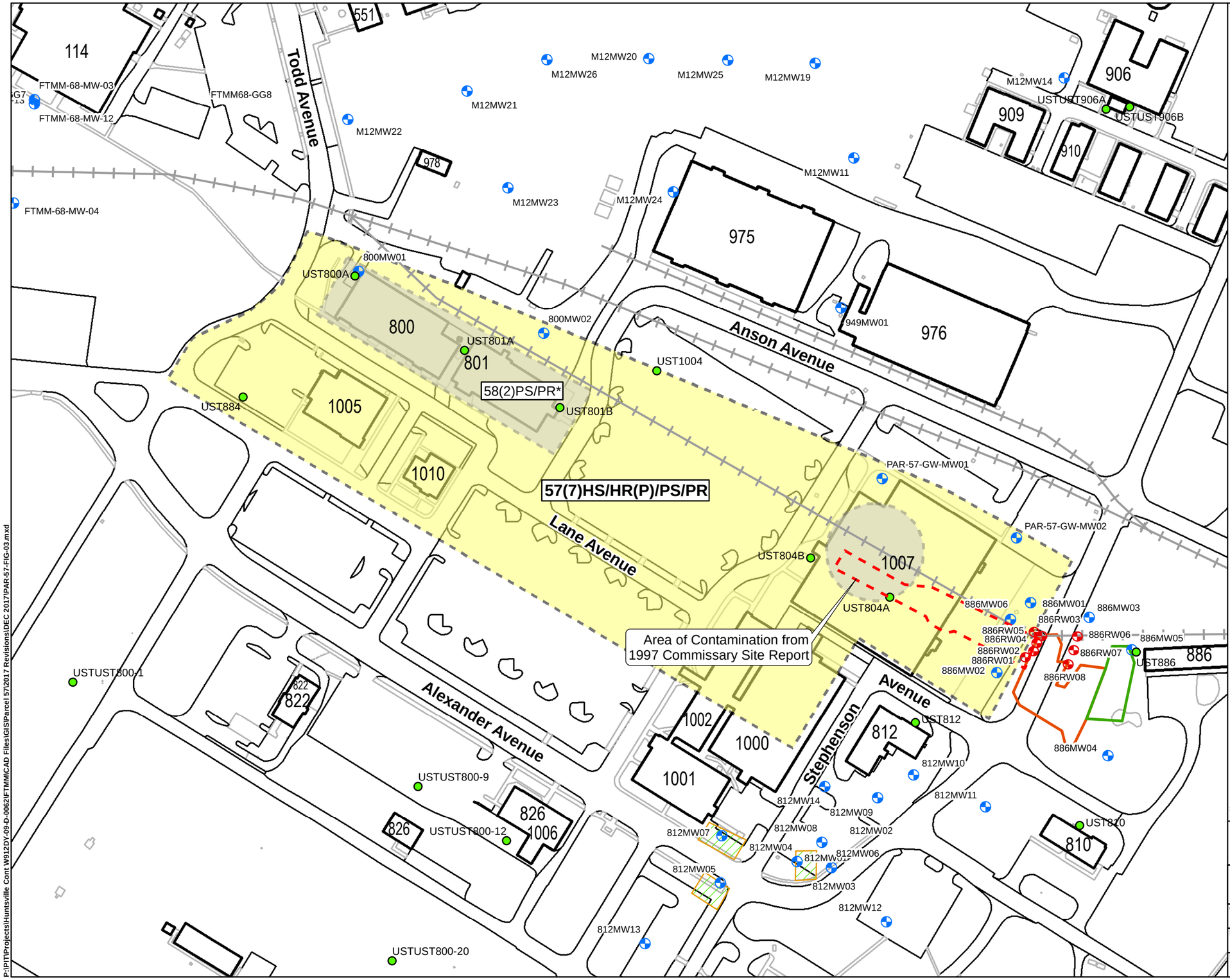
PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey

PARCEL 57 LOCATION

CREATED BY: RR	REVIEWED BY: RF
DATE: MAY. 2017	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-01000	FILE: Figure1_MP_Layout.mxd

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APPROXIMATE EXTENT OF ADJOINING AREA ALSO FORMERLY USED FOR COAL STORAGE
UST 800A
UST 1004
UST 801A
UST 884
UST 801B
APPROXIMATE EXTENT OF ADJOINING AREA ALSO FORMERLY USED FOR COAL STORAGE
UST 804B
PUMPHOUSE
UST 886
UST 804A
COAL SCALE HOUSE
250,000 GALLON FUEL OIL AST (FTMM-66)
UST 812
FORMER GASOLINE PIPELINE
UST 810
FTMM-64 FORMER GASOLINE USTs
822
826
97G
974
S-906
S-800
S-801
S-805
S-804
S-803
S-806
S-807
S-813
S-814
S-815
S-816
S-817
S-818
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S-855
S-856
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S-862
S-863
S-864
S-865
S-866



LEGEND:

- Shallow Monitoring Well
- Recovery Well
- Former UST Location
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Parcel 57 Boundary
- FTMM-66 Phase 1 Excavation
- FTMM-66 Phase 2 Excavation
- FTMM-64 HRC Injection Area

N

1 inch = 150 feet

0 75 150 300 Feet

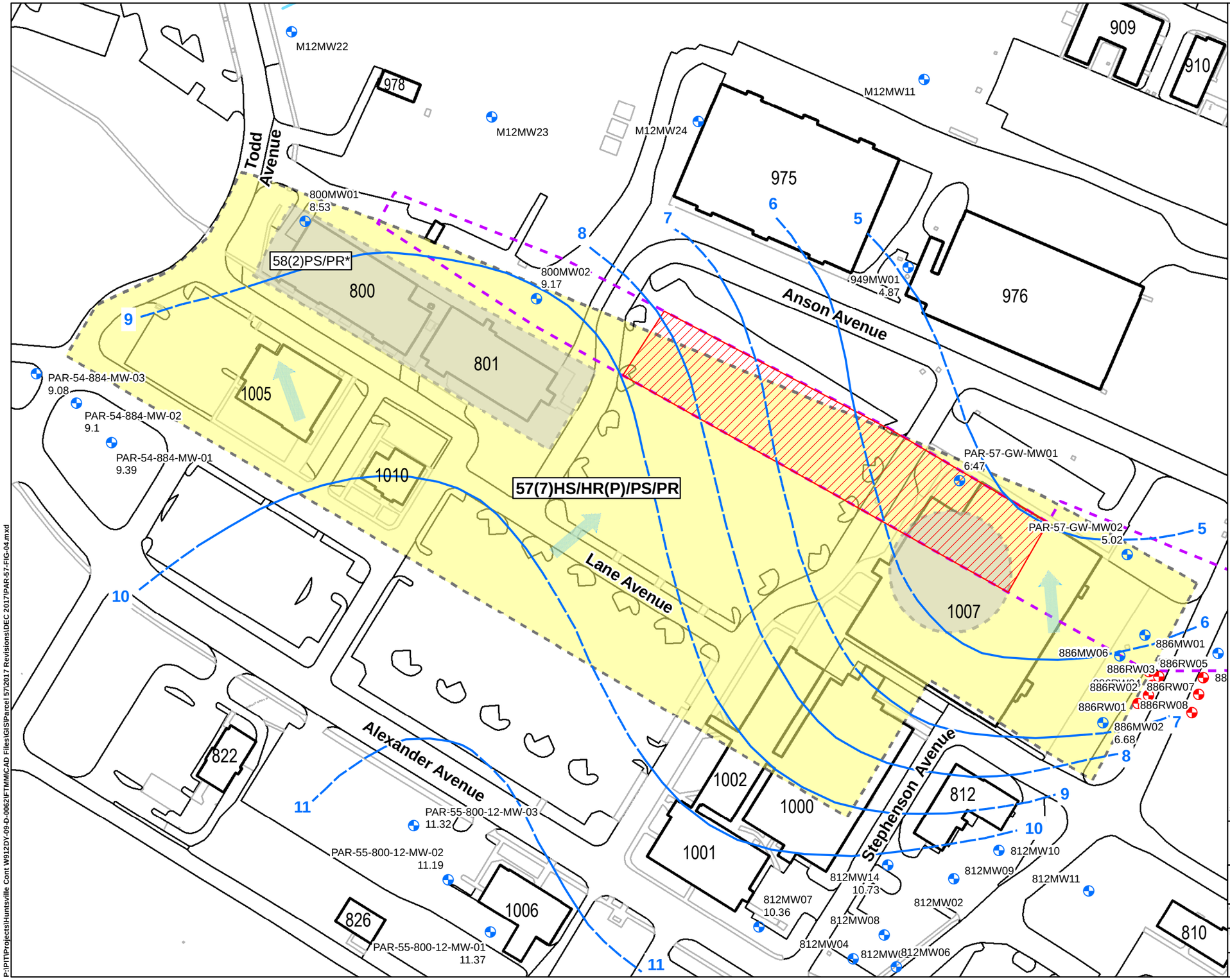
Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

PARSONS 401 Diamond Drive NW, Huntsville AL	**Fort Monmouth** **New Jersey**

PREVIOUS REMEDIATION AREAS

CREATED BY: RR	REVIEWED BY: SS
DATE: JAN. 2018	FIGURE NUMBER: FIGURE 3
PROJECT NUMBER: 748810-06018	FILE: PAR-57-FIG-03.mxd

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LEGEND:

- Shallow Monitoring Well (various dates)
- Recovery Well
- Parcel 57 Boundary
- Approximate Extent of Former Coal Storage Area
- Former Concrete Coal Storage Pad
- Potentiometric Surface Elevation Contour
- Inferred Potentiometric Surface Elevation Contour
- Inferred Groundwater Flow Direction

N

1 inch = 120 feet

0 60 120 240 Feet

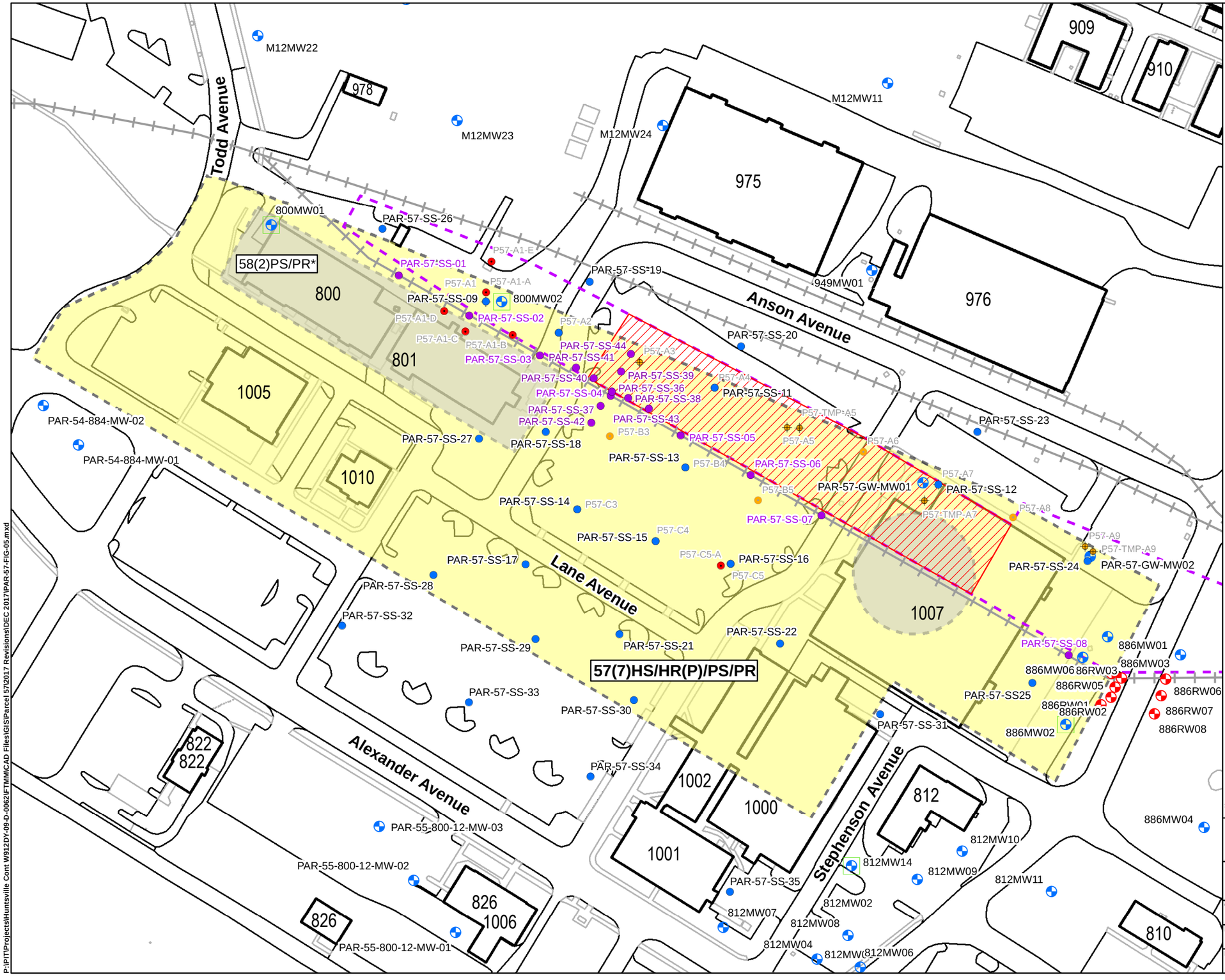
Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

PARSONS 401 Diamond Drive NW, Huntsville AL	**Fort Monmouth** **New Jersey**

PARCEL 57 GROUNDWATER CONTOURS - JANUARY 15, 2018

CREATED BY: RR	REVIEWED BY: JC
DATE: JAN. 2018	FIGURE NUMBER: FIGURE 4
PROJECT NUMBER: 748810-06018	FILE: PAR-57-FIG-04.mxd

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LEGEND:

- Soil Boring for PCB Analysis
- Soil Boring for PAH Analysis
- Historical Soil Sample Location (2007)
- Historical Soil Sample and Temporary 2" Monitoring Well Location (2007 or 2010)
- Soil Sample Location (2010) for PAH
- Groundwater Sample for Metal Analysis
- Shallow Monitoring Well (various dates)
- Recovery Well
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Parcel 57 Boundary
- Approximate Extent of Former Coal Storage Area
- Former Concrete Coal Storage

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description
  - HS – Hazardous Substance Storage
  - HR – Hazardous Substance Release
  - PS – Petroleum Storage
  - PR – Petroleum Release
  - (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 120 feet

0 60 120 240 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

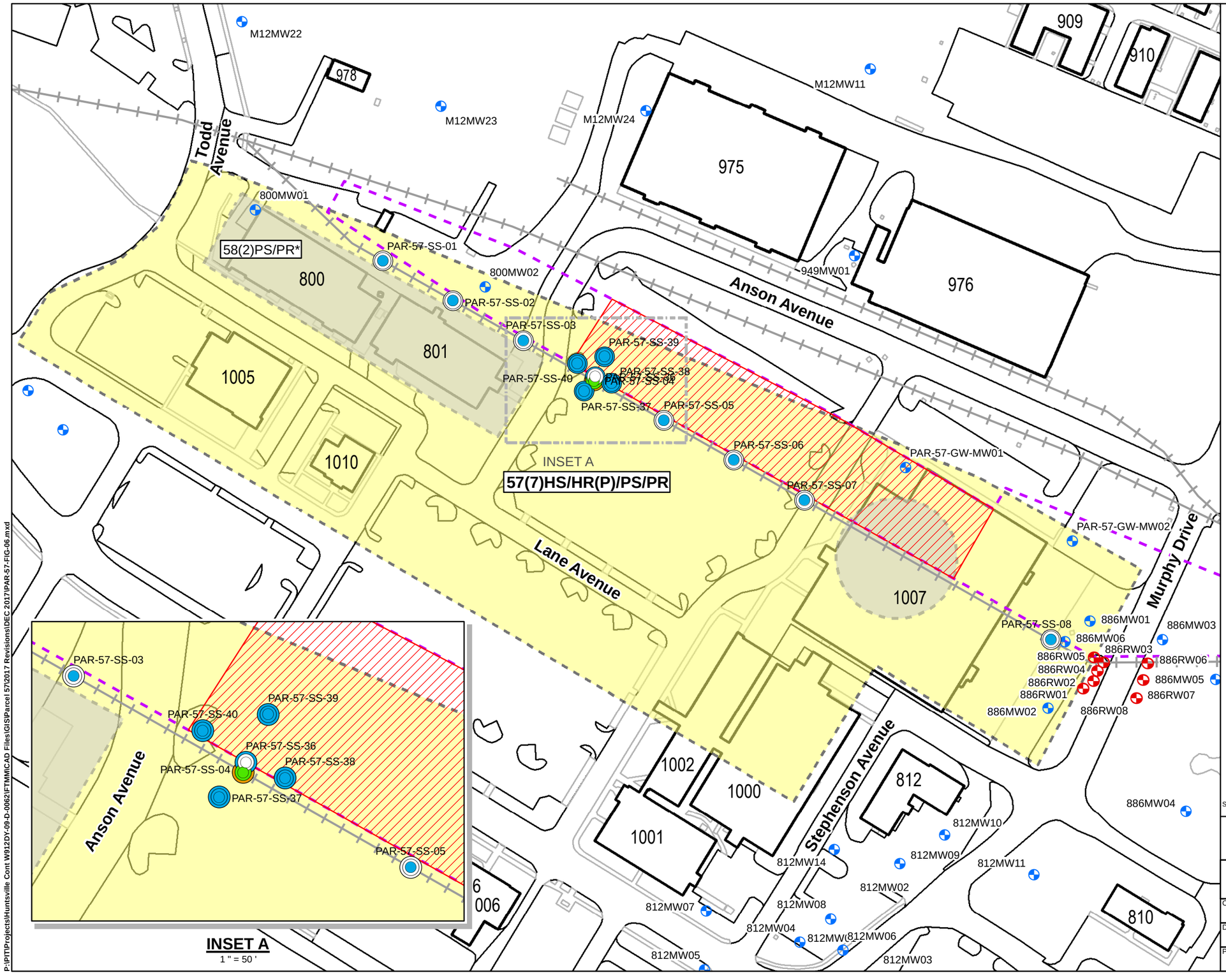
P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMMICAD Files\GIS\Parcel 57\2017 Revisions\DEC 2017\PAR-57-FIG-05.mxd

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

SITE LAYOUT AND SAMPLING LOCATIONS

CREATED BY: RR	REVIEWED BY: RF
DATE: JAN. 2018	FIGURE NUMBER: FIGURE 5
PROJECT NUMBER: 748810-06018	FILE: PAR-57-FIG-05.mxd



LEGEND:

- Shallow Monitoring Well
- Recovery Well
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Parcel 57 Boundary
- Approximate Extent of Former Coal Storage Area
- Former Concrete Coal Storage Pad
- Not analyzed for PCBs
- PCBs not detected or detected below RDCSRS
- PCBs exceeded RDCSRS
- PCBs exceeded both RDCSRS and NRDCSRS
- Deep (approx. 3-3.5 ft. bgs)
- Intermediate (approx. 2-2.5 ft. bgs)
- Shallow (approx. 0.5-1.5 ft. bgs)

NOTES:

RDCSRS = Residential Direct Contact Soil Remediation Standard

NRDCSRS = Non-Residential Direct Contact Soil Remediation Standard

bgs = Below Ground Surface
NE = No Exceedance
-- = Not Sampled
All results are in milligrams per kilogram.

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description: HS – Hazardous Substance Storage; HR – Hazardous Substance Release; PS – Petroleum Storage; PR – Petroleum Release; (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 120 feet

0 60 120 240 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

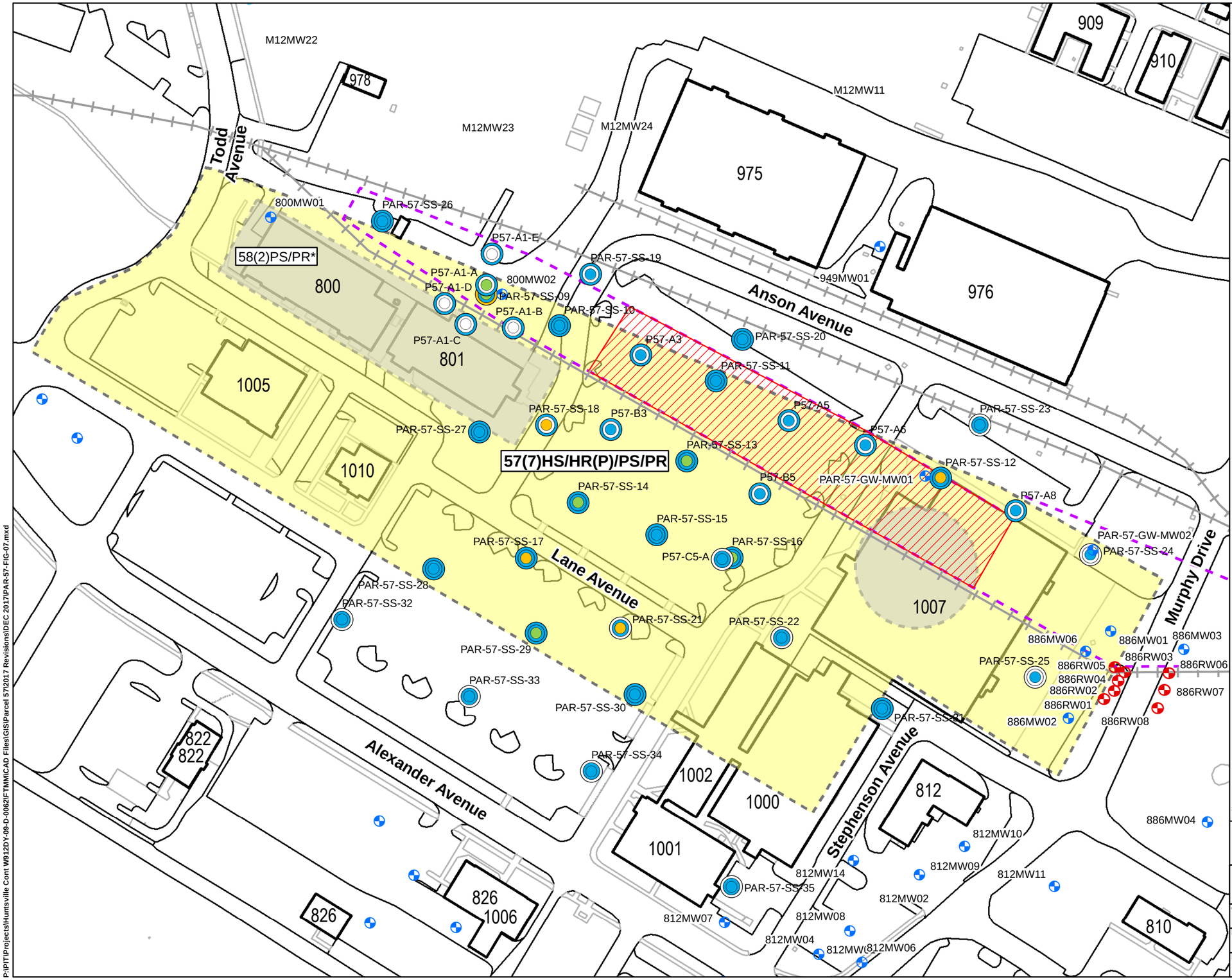
PARSONS
401 Diamond Drive NW, Huntsville AL

Fort Monmouth New Jersey

COMPARISON OF 2010, 2015 AND 2016 SOIL RESULTS FOR PCBs TO NJDEP DIRECT CONTACT STANDARDS

CREATED BY:	REVIEWED BY:
RR	JB
DATE:	FIGURE NUMBER:
JAN. 2018	FIGURE 6
PROJECT NUMBER:	FILE:
748810-06018	PAR-57-FIG-06.mxd

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LEGEND:

- Shallow Monitoring Well
- Recovery Well
- Parcel 57 Boundary
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Approximate Extent of Former Coal Storage
- Former Concrete Coal Storage Pad
- Not analyzed for PAHs
- PAHs not detected or detected below RDCSRS
- PAHs exceeded RDCSRS
- PAHs exceeded both RDCSRS and NRDCSRS
- Water Table (approx. 5-7.5 ft. bgs)
- Intermediate (approx. 2-3.5 ft. bgs)
- Shallow (approx. 0-1 ft. bgs)

NOTES:

1. RDCSRS = Residential Direct Contact Soil Remediation Standard
2. NRDCSRS = Non-Residential Direct Contact Soil Remediation Standard
3. 2007 Sample Results are not shown if a 2010, 2015, or 2016 sample was collected in the same location.

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description
  - HS – Hazardous Substance Storage
  - HR – Hazardous Substance Release
  - PS – Petroleum Storage
  - PR – Petroleum Release
  - (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 120 feet

0 60 120 240 Feet

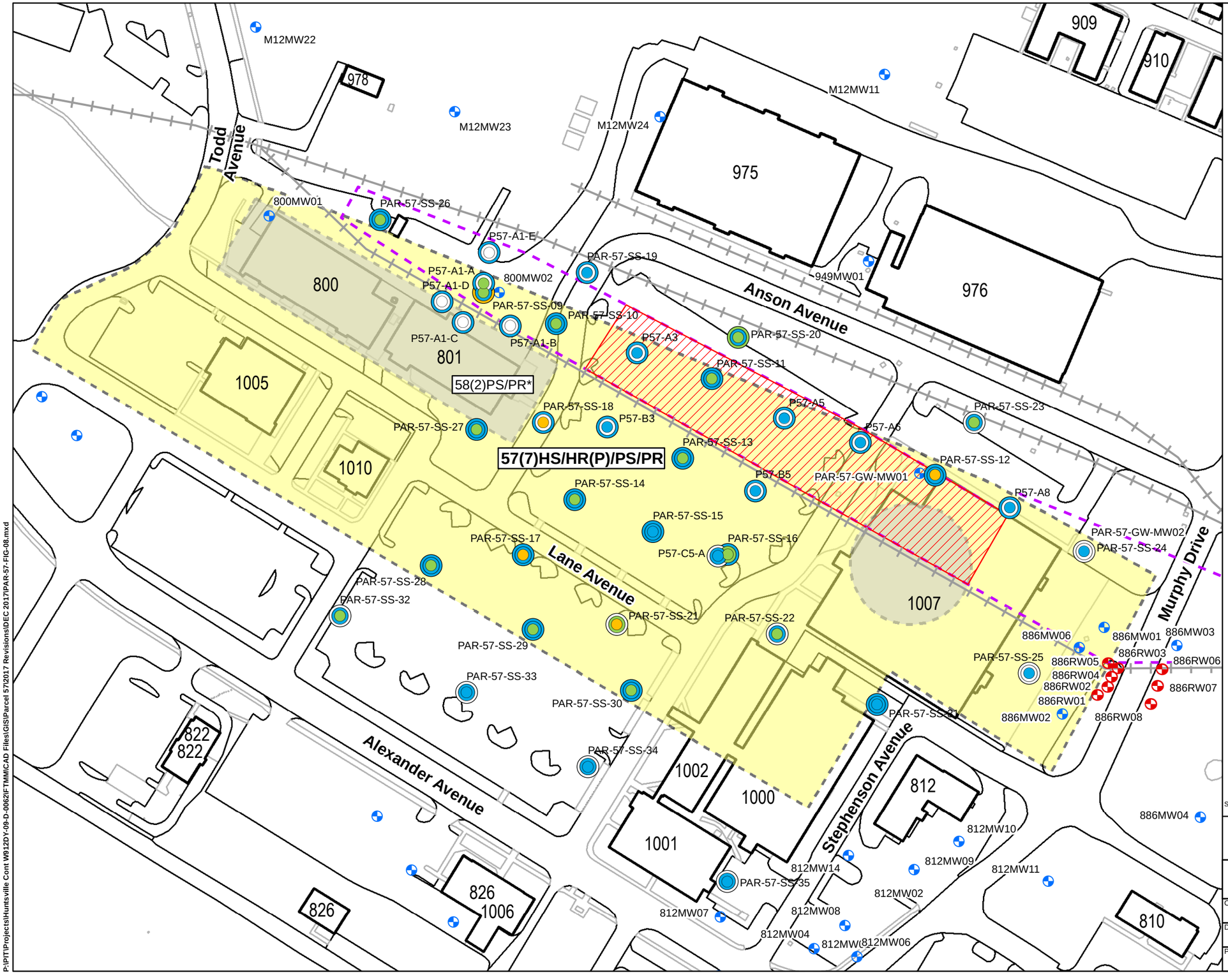
Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey

COMPARISON OF SOIL RESULTS FOR PAHS TO NJDEP DIRECT CONTACT STANDARDS

CREATED BY: RR	REVIEWED BY: JB
DATE: MAR. 2018	FIGURE NUMBER: FIGURE 7
PROJECT NUMBER: 748810-02110	FILE: PAR-57-FIG-07.mxd

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LEGEND:

- Shallow Monitoring Well
- Recovery Well
- Parcel 57 Boundary
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Approximate Extent of Former Coal Storage
- Former Concrete Coal Storage Pad
- Not analyzed for PAHs
- PAHs not detected or detected below Residential
- PAHs exceeded Residential RSLs
- PAHs exceeded both Residential RSLs & NRDCSRS
- Water Table (approx. 5-7.5 ft. bgs)
- Intermediate (approx. 2-3.5 ft. bgs)
- Shallow (approx. 0-1 ft. bgs)

NOTES:

1. USEPA RSLs = United States Environmental Protection Agency Regional Screening Levels
2. 2007 Sample Results are not shown if a 2010, 2015, or 2016 sample was collected in the same location.

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description
  - HS – Hazardous Substance Storage
  - HR – Hazardous Substance Release
  - PS – Petroleum Storage
  - PR – Petroleum Release
  - (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 120 feet

0 60 120 240 Feet

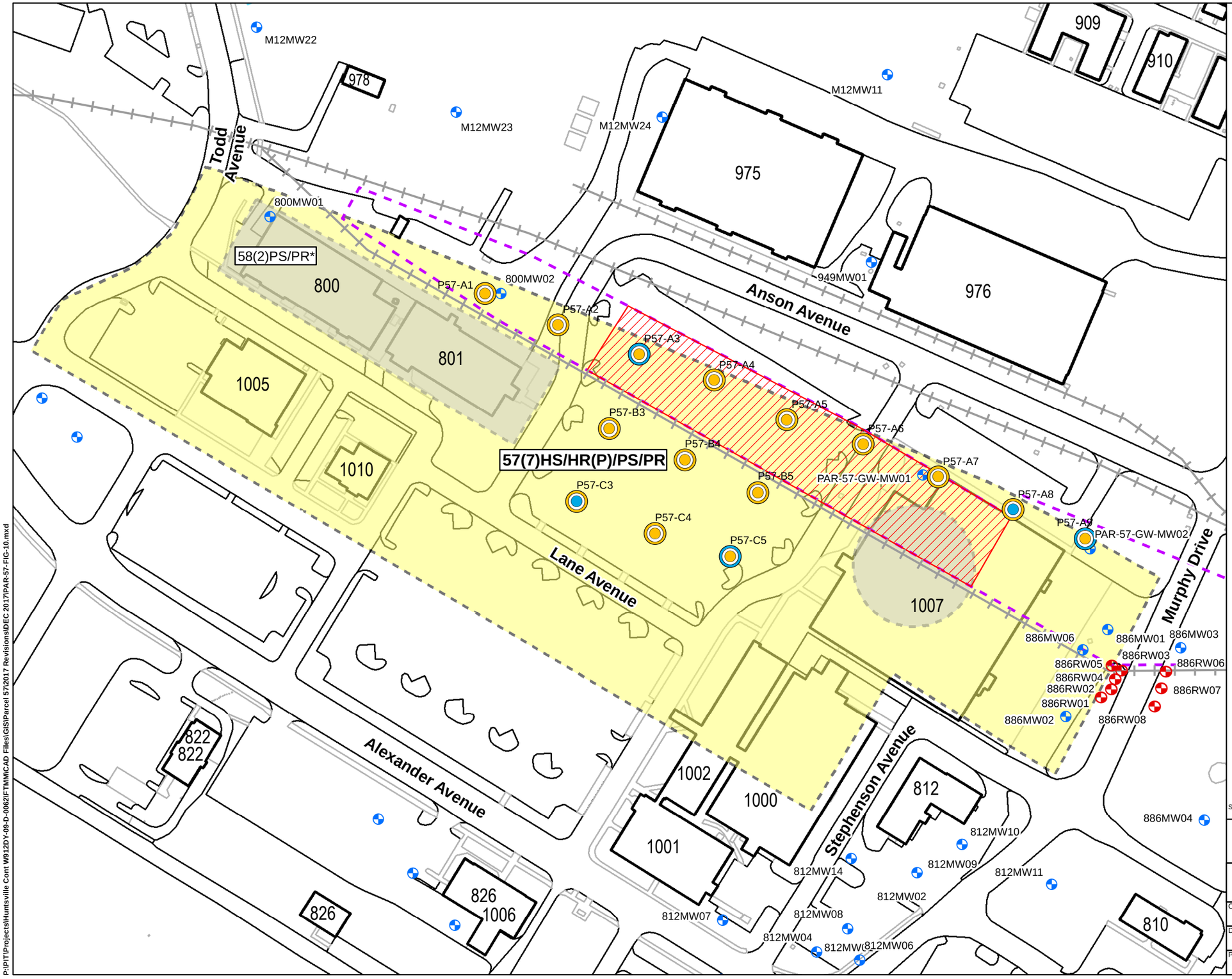
Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

PARSONS 401 Diamond Drive NW, Huntsville AL	**Fort Monmouth** **New Jersey**

COMPARISON OF SOIL RESULTS FOR PAHS TO USEPA RSLS

CREATED BY: RR	REVIEWED BY: JB
DATE: JAN. 2018	FIGURE NUMBER: FIGURE 8
PROJECT NUMBER: 748810-02110	FILE: PAR-57-FIG-08.mxd

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LEGEND:

- Shallow Monitoring Well
- Recovery Well
- Parcel 57 Boundary
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Approximate Extent of Former Coal Storage
- Former Concrete Coal Storage Pad
- Not analyzed for Metals
- Metals not detected or detected below Residential RSLs
- Metals exceeded Residential RSLs
- Metals exceeded both Residential & Industrial RSLs
- Water Table (approx. 5-7.5 ft. bgs)
- Intermediate (approx. 2-3.5 ft. bgs)
- Shallow (approx. 0-1 ft. bgs)

NOTES:

1. USEPA RSLs = United States Environmental Protection Agency Regional Screening Levels.

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description: HS – Hazardous Substance Storage; HR – Hazardous Substance Release; PS – Petroleum Storage; PR – Petroleum Release; (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 120 feet

0 60 120 240 Feet

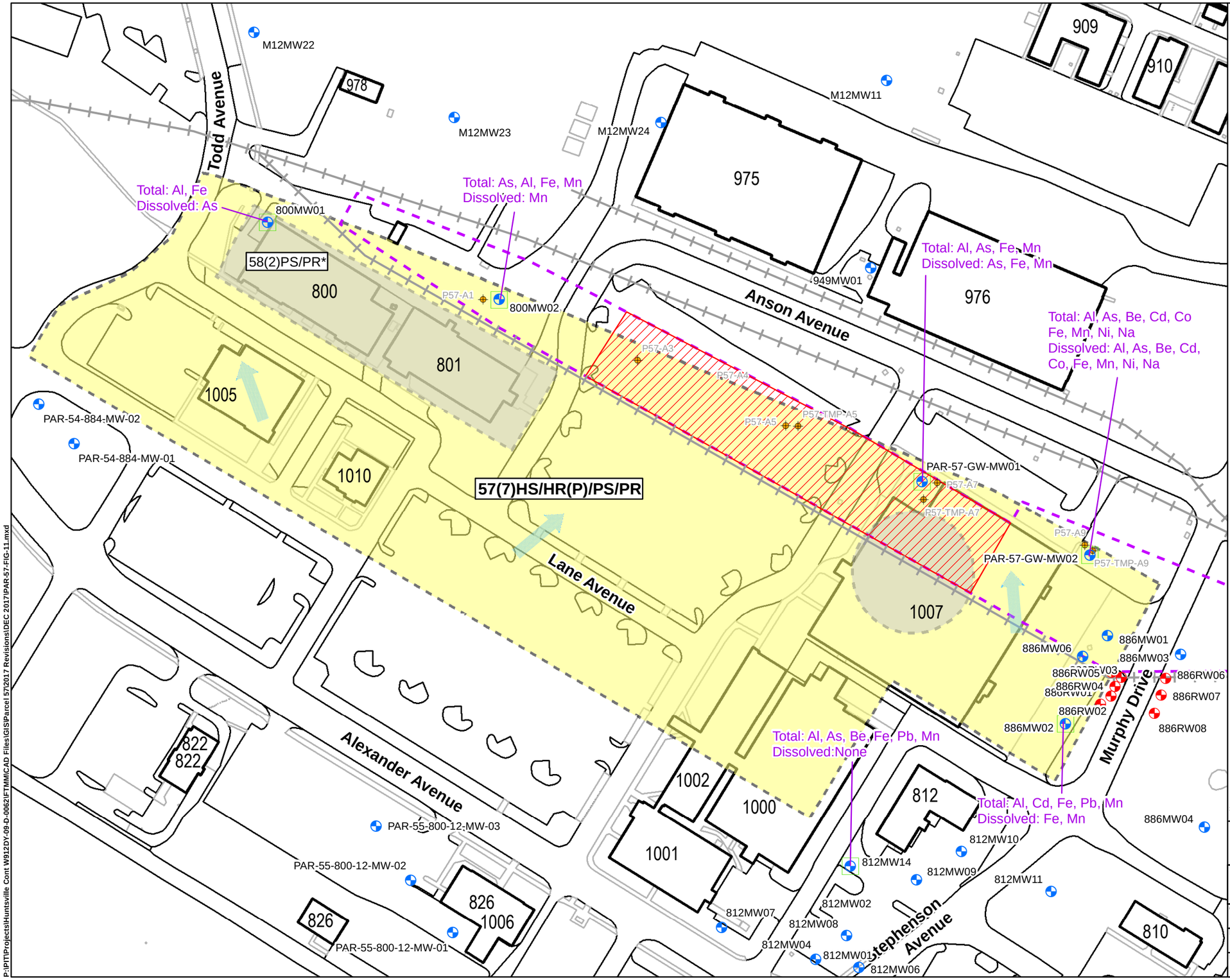
Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey

COMPARISON OF SOIL RESULTS FOR METALS TO USEPA RSLS

CREATED BY: RR	REVIEWED BY: JB
DATE: JAN. 2018	FIGURE NUMBER: FIGURE 9
PROJECT NUMBER: 748810-02110	FILE: PAR-57-FIG-10.mxd

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LEGEND:

- Groundwater Sample for Metal Analysis
- Historical Soil Sample and Temporary 2" Monitoring Well Location (2007 or 2010)
- FTMM-66 Free Product and Recovery Well
- Shallow Monitoring Well (various dates)
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Parcel 57 Boundary
- Approximate Extent of Former Coal Storage Area
- Former Concrete Coal Storage Pad
- Generalized Groundwater Flow Direction
- Al — Element that Exceeds Groundwater Quality Criteria in one or more sampling events (2011-2016).

N

1 inch = 120 feet

0 60 120 240 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

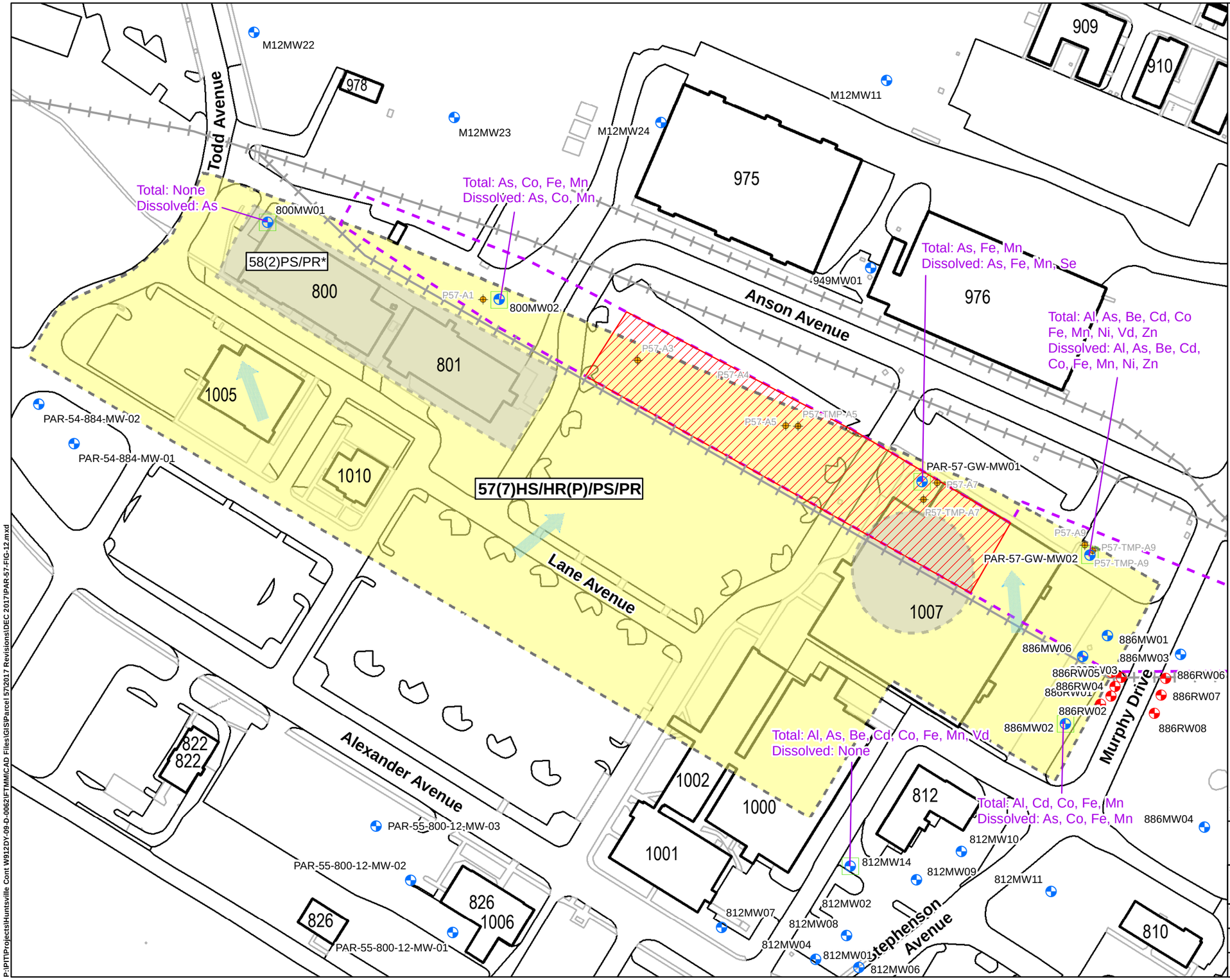
P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 57\2017 Revisions\DEC 2017\PAR-57-FIG-11.mxd

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

GROUNDWATER EXCEEDANCES OF NJDEP CRITERIA

CREATED BY:	REVIEWED BY:
RR	JB
DATE:	FIGURE NUMBER:
JAN. 2018	FIGURE 10
PROJECT NUMBER:	FILE:
748810-06018	PAR-57-FIG-11.mxd



LEGEND:

- Groundwater Sample for Metal Analysis
- Historical Soil Sample and Temporary 2" Monitoring Well Location (2007 or 2010)
- FTMM-66 Free Product and Recovery Well
- Shallow Monitoring Well (various dates)
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Parcel 57 Boundary
- Approximate Extent of Former Coal Storage Area
- Former Concrete Coal Storage Pad
- Generalized Groundwater Flow Direction
- Al — Element that Exceeds USEPA Tap Water RSLs

N

1 inch = 120 feet

0 60 120 240 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 57\2017 Revisions\DEC 2017\PAR-57-FIG-12.mxd

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

GROUNDWATER EXCEEDANCE OF USEPA TAP WATER RSLs

CREATED BY:	REVIEWED BY:
RR	JB
DATE:	FIGURE NUMBER:
JAN. 2018	FIGURE 11
PROJECT NUMBER:	FILE:
748810-06018	PAR-57-FIG-12.mxd

TABLES

Table 1 - UST Status Summary

Table 2 - Post-Phase I Army Sampling and ECP Phase II Site Investigation Sample and Analytical Summary

Table 3 - Detected Soil Sampling Results – Comparison to NJDEP Direct Contact Criteria

Table 4 - Detected Soil Sampling Results – Comparison to USEPA Risk-Based Screening Levels

Table 5 - Soil Sampling Summary of Exceedances

Table 6 - Detected Groundwater Sampling Results – Comparison to NJDEP Ground Water Quality Criteria and USEPA Tap Water RSLs

Table 7 - Groundwater Sampling Summary of Exceedances

TABLE 1
UNDERGROUND STORAGE TANK STATUS SUMMARY
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Site Name	Residential?	RegistrationID	Discharge Investigation and Corrective Action Report #	Tank Size and Type	Product	Date Tank Removed	No Further Action (NFA) Approved or Requested Status
800 A	NO	81533-127	--	2,000 gallon fiberglass	#2 FUEL OIL	7/10/1998	NFA approved 1/10/2003
801A	NO	81533-128	--	2,000 gallon fiberglass	#2 FUEL OIL	7/16/1998	NFA approved 2/24/2000
801B	NO	81533-129	95-11-13-1007-23	1,000 gallon fiberglass	#2 FUEL OIL	11/9/1995	NFA approved 1/10/2003
804A	NO	81533-130	95-11-09-1328-28	1,000 gallon fiberglass	#2 FUEL OIL	11/9/1995	NFA approved 1/10/2003
804B	NO	81533-228	--	1,000 gallon fiberglass	#2 FUEL OIL	6/17/1996	NFA approved 7/10/1998
810	NO	81533-131	--	1,000 gallon steel	#2 FUEL OIL	4/21/1998	NFA approved 8/29/2000
812	NO	81533-133	--	2,000 gallon fiberglass	#2 FUEL OIL	4/27/1998	NFA approved 2/24/2000
884	YES	None	03-10-07-1347-49	1,000 gallon steel	#2 FUEL OIL	11/2/2003	NFA approved 9/10/2018
886	NO	81533-140	--	1,000 gallon steel	#2 FUEL OIL	4/21/1998	NFA approved 1/10/2003
1004	NO	81533-158	--	3,000 gallon steel	#2 FUEL OIL	6/26/1990	NFA approved 1/31/2018

TABLE 2
POST-PHASE I ARMY SAMPLING AND ECP PHASE II SITE INVESTIGATION SAMPLE AND ANALYTICAL SUMMARY
REMEDIAL INVESTIGATION LETTER REPORT FOR PARCEL 57
FORT MONMOUTH, NEW JERSEY

Media	Type	Sample Identification	Sample Type	Sample Date	Sample Depth Top	Sample Depth Bottom	VO+ TICs	SVO+ TICs	Total Metals	Dissolved Metals	PAHs	PCBs
2010-2011 Post-Phase I Sampling (U.S. Army)												
Soil	Geoprobe	P57-SS-A1-1.0-1.5	Primary Sample	01-Feb-10	1	1.5	--	--	--	--	X	--
Soil	Geoprobe	P57-SS-A1-1.5-2.0	Primary Sample	01-Feb-10	1.5	2	--	--	--	--	X	--
Soil	Geoprobe	P57-SS-C5-1.0-1.5	Primary Sample	01-Feb-10	1	1.5	--	--	--	--	X	--
Soil	Geoprobe	P57-SS-C5-1.5-2.0	Primary Sample	01-Feb-10	1.5	2	--	--	--	--	X	--
Soil	Geoprobe	P57-SS-A1-A-6.5-7.0	Primary Sample	22-Nov-10	6.5	7	--	X	--	--	--	--
Soil	Geoprobe	P57-SS-A1-B-6.5-7.0	Primary Sample	22-Nov-10	6.5	7	--	X	--	--	--	--
Soil	Geoprobe	P57-SS-A1-C-8.0-8.5	Primary Sample	22-Nov-10	8	8.5	--	X	--	--	--	--
Soil	Geoprobe	P57-SS-A1-D-6.0-6.5	Primary Sample	22-Nov-10	6	6.5	--	X	--	--	--	--
Soil	Geoprobe	P57-SS-A1-E-5.5-6.0	Primary Sample	22-Nov-10	5.5	6	--	X	--	--	--	--
Groundwater	Temporary Well	PAR57-GW-57-TMP-A-5	Primary Sample	02-Apr-10	NA	NA	--	--	X[(1)]	X[(1)]	--	--
Groundwater	Temporary Well	PAR57-GW-57-TMP-A-7	Primary Sample	11-Mar-10	NA	NA	--	--	X[(1)]	X[(1)]	--	--
Groundwater	Temporary Well	PAR57-GW-57-TMP-A-9	Primary Sample	10-Mar-10	NA	NA	--	--	X[(2)]	X[(2)]	--	--
Groundwater	Monitoring Well	PAR57-GW-800MW02	Primary Sample	04-Feb-11	5	20	X	X	X	--	--	--
Groundwater	Monitoring Well	PAR57-GW-800MW02-Dup	Duplicate of PAR-57-GW-800MW02	04-Feb-11	5	20	X	X	X	--	--	--
2015 ECP Phase II Sampling (Parsons)												
Soil	Geoprobe	FTMM-57-SS01-0.5-1.0	Primary Sample	18-Sep-15	0.5	1	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS02-1.3-1.8	Primary Sample	18-Sep-15	1.3	1.8	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS03-0.5-1.0	Primary Sample	18-Sep-15	0.5	1	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS04-1.0-1.5	Primary Sample	18-Sep-15	1	1.5	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS04-2.0-2.5	Primary Sample	18-Sep-15	2	2.5	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS04-3.0-3.5	Primary Sample	18-Sep-15	3	3.5	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS05-0.5-1.0	Primary Sample	18-Sep-15	0.5	1	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS06-0.5-1.0	Primary Sample	18-Sep-15	0.5	1	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS07-0.5-1.0	Primary Sample	18-Sep-15	0.5	1	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS08-0.9-1.4	Primary Sample	21-Sep-15	0.9	1.4	--	--	--	--	--	X
Soil	Geoprobe	FTMM-57-SS09-0.5-1.0	Primary Sample	01-Oct-15	0.5	1	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS09-2.0-2.5	Primary Sample	01-Oct-15	2	2.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS09-5.5-6.0	Primary Sample	01-Oct-15	5.5	6	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS10-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS10-3.0-3.5	Primary Sample	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS10-7.0-7.5	Primary Sample	01-Oct-15	7	7.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS11-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS111-3.0-3.5	Duplicate of FTMM-57-SS11-3.0-3.5	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS112-0.0-0.5	Duplicate of FTMM-57-SS12-0.0-0.5	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS11-3.0-3.5	Primary Sample	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS11-7.0-7.5	Primary Sample	01-Oct-15	7	7.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS12-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS12-3.0-3.5	Primary Sample	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS12-7.0-7.5	Primary Sample	01-Oct-15	7	7.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS13-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS13-3.0-3.5	Primary Sample	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS13-6.5-7.0	Primary Sample	01-Oct-15	6.5	7	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS14-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS14-3.0-3.5	Primary Sample	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS14-5.0-5.5	Primary Sample	01-Oct-15	5	5.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS15-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS15-3.0-3.5	Primary Sample	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS15-5.5-6.0	Primary Sample	01-Oct-15	5.5	6	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS16-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS16-1.5-2.0	Primary Sample	01-Oct-15	1.5	2	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS16-6.0-6.5	Primary Sample	01-Oct-15	6	6.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS17-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS17-3.0-3.5	Primary Sample	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS17-5.5-6.0	Primary Sample	01-Oct-15	5.5	6	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS18-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS18-5.0-5.5	Primary Sample	01-Oct-15	5	5.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS19-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS19-5.5-6.0	Primary Sample	01-Oct-15	5.5	6	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS20-0.0-0.5	Primary Sample	01-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS20-3.0-3.5	Primary Sample	01-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS20-5.0-5.5	Primary Sample	01-Oct-15	5	5.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS21-0.0-0.5	Primary Sample	02-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS21-3.0-3.5	Primary Sample	02-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS22-0.0-0.5	Primary Sample	02-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS22-3.0-3.5	Primary Sample	02-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS23-0.0-0.5	Primary Sample	02-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS23-3.0-3.5	Primary Sample	02-Oct-15	3	3.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS24-0.0-0.5	Primary Sample	02-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Soil	Geoprobe	FTMM-57-SS25-0.0-0.5	Primary Sample	02-Oct-15	0	0.5	--	--	--	--	X[(3)]	--
Groundwater	Monitoring Well / LFPS	PAR57-GW-MW01-15.1	Primary Sample	23-Nov-15	pump tubing set at 15.1		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	PAR57-GW-MW01-15.1 DISSOLVED	Primary Sample	23-Nov-15	pump tubing set at 15.1		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	PAR57-GW-MW101-15.1	Duplicate of PAR57-GW-MW01-15.1	23-Nov-15	pump tubing set at 15.1		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	PAR57-GW-MW101-15.1 DISSOLVED	Duplicate of PAR57-GW-MW01-15.1 DISSOLVED	23-Nov-15	pump tubing set at 15.1		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	PAR57-GW-MW02-15.25	Primary Sample	24-Nov-15	pump tubing set at 15.25		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	PAR57-GW-MW02-15.25 DISSOLVED	Primary Sample	24-Nov-15	pump tubing set at 15.25		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	PAR57-GW-MW02-20.25	Primary Sample	24-Nov-15	pump tubing set at 20.25		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	PAR57-GW-MW02-20.25 DISSOLVED	Primary Sample	24-Nov-15	pump tubing set at 20.25		--	--	--	X	--	--
2016 ECP Phase II Sampling (Parsons)												
Soil	Geoprobe	PAR-57-SB-26-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X[(4)]	--
Soil	Geoprobe	PAR-57-SB-26-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X[(4)]	--
Soil	Geoprobe	PAR-57-SB-126-3.5-4	Duplicate of PAR-57-SB-26-3.5-4	22-Apr-16	3.5	4	--	--	--	--	X[(4)]	--
Soil	Geoprobe	PAR-57-SB-26-7.5-8	Primary Sample	22-Apr-16	7.5	8	--	--	--	--	X[(4)]	--
Soil	Geoprobe	PAR-57-SB-27-0-0.5	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X[(4)]	--
Soil	Geoprobe	PAR-57-SB-27-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X[(4)]	--
Soil	Geoprobe	PAR-57-SB-27-7.5-8	Primary Sample	22-Apr-16	7.5	8	--	--	--	--	X[(4)]	--
Soil	Geoprobe	PAR-57-SB-28-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X[(4)]	--
Soil	Geoprobe	PAR-57-SB-28-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X[(4)]	--

TABLE 2
POST-PHASE I ARMY SAMPLING AND ECP PHASE II SITE INVESTIGATION SAMPLE AND ANALYTICAL SUMMARY
REMEDIAL INVESTIGATION LETTER REPORT FOR PARCEL 57
FORT MONMOUTH, NEW JERSEY

Media	Type	Sample Identification	Sample Type	Sample Date	Sample Depth Top	Sample Depth Bottom	VO+ TICs	SVO+ TICs	Total Metals	Dissolved Metals	PAHs	PCBs
Soil	Geoprobe	PAR-57-SB-28-7.5-8	Primary Sample	22-Apr-16	7.5	8	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-29-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-29-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-29-7.5-8	Primary Sample	22-Apr-16	7.5	8	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-30-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-30-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-30-7.5-8	Primary Sample	22-Apr-16	7.5	8	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-31-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-31-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-31-7.5-8	Primary Sample	22-Apr-16	7.5	8	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-32-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-32-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-33-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-33-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-34-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-34-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-35-0.5-1	Primary Sample	22-Apr-16	0.5	1	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-35-3.5-4	Primary Sample	22-Apr-16	3.5	4	--	--	--	--	X(4)	--
Soil	Geoprobe	PAR-57-SB-36-4.5-5	Primary Sample	21-Apr-16	4.5	5	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-37-0.5-1	Primary Sample	21-Apr-16	0.5	1	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-37-2.5-3	Primary Sample	21-Apr-16	2.5	3	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-137-2.5-3	Duplicate of PAR-57-SB-37-2.5-3	21-Apr-16	2.5	3	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-37-4.5-5	Primary Sample	21-Apr-16	4.5	5	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-38-0.5-1	Primary Sample	21-Apr-16	0.5	1	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-38-2.5-3	Primary Sample	21-Apr-16	2.5	3	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-38-4.5-5	Primary Sample	21-Apr-16	4.5	5	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-39-0.5-1	Primary Sample	21-Apr-16	0.5	1	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-39-2.5-3	Primary Sample	21-Apr-16	2.5	3	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-39-4.5-5	Primary Sample	21-Apr-16	4.5	5	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-40-0.5-1	Primary Sample	21-Apr-16	0.5	1	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-40-2.5-3	Primary Sample	21-Apr-16	2.5	3	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-140-2.5-3	Duplicate of PAR-57-SB-40-2.5-3	21-Apr-16	2.5	3	--	--	--	--	--	X(5)
Soil	Geoprobe	PAR-57-SB-40-4.5-5	Primary Sample	21-Apr-16	4.5	5	--	--	--	--	--	X(5)
Groundwater	Monitoring Well / LFPS	800MW01-10.06	Primary Sample	23-May-16	pump tubing set at 10.06		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	800MW01-10.06 DISSOLVED	Primary Sample	23-May-16	pump tubing set at 10.06		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	800MW101-10.06	Duplicate of 800MW01-10.06	23-May-16	pump tubing set at 10.06		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	800MW101-10.06 DISSOLVED	Duplicate of 800MW01-10.06 DISSOLVED	23-May-16	pump tubing set at 10.06		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	800MW02-6.9	Primary Sample	23-May-16	pump tubing set at 6.9		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	800MW02-6.9 DISSOLVED	Primary Sample	23-May-16	pump tubing set at 6.9		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	800MW02-11.9	Primary Sample	23-May-16	pump tubing set at 11.9		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	800MW02-11.9 DISSOLVED	Primary Sample	23-May-16	pump tubing set at 11.9		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	800MW02-16.9	Primary Sample	23-May-16	pump tubing set at 16.9		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	800MW02-16.9 DISSOLVED	Primary Sample	23-May-16	pump tubing set at 16.9		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	812MW14-10.27	Primary Sample	24-May-16	pump tubing set at 10.27		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	812-MW114-10.27	Duplicate of 812MW14-10.27	24-May-16	pump tubing set at 10.27		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	812MW14-10.27 DISSOLVED	Primary Sample	24-May-16	pump tubing set at 10.27		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	866MW02-14.35	Primary Sample	24-May-16	pump tubing set at 14.35		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	866MW02-14.35 DISSOLVED	Primary Sample	24-May-16	pump tubing set at 14.35		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	86MW02-9.35	Primary Sample	24-May-16	pump tubing set at 9.35		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	86MW02-9.35 DISSOLVED	Primary Sample	24-May-16	pump tubing set at 9.35		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	PAR-57-GW-MW01-12.5	Primary Sample	23-May-16	pump tubing set at 12.5		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	PAR-57-GW-MW01-12.5 DISSOLVED	Primary Sample	23-May-16	pump tubing set at 12.5		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	PAR-57-GW-MW01-17.5	Primary Sample	24-May-16	pump tubing set at 17.5		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	PAR-57-GW-MW01-17.5 DISSOLVED	Primary Sample	24-May-16	pump tubing set at 17.5		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	PAR-57-GW-MW02-15.8	Primary Sample	24-May-16	pump tubing set at 15.8		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	PAR-57-GW-MW02-15.8 DISSOLVED	Primary Sample	24-May-16	pump tubing set at 15.8		--	--	--	X	--	--
Groundwater	Monitoring Well / LFPS	PAR-57-GW-MW02-20.8	Primary Sample	24-May-16	pump tubing set at 20.8		--	--	X	--	--	--
Groundwater	Monitoring Well / LFPS	PAR-57-GW-MW02-20.8 DISSSOLVED	Primary Sample	24-May-16	pump tubing set at 20.8		--	--	--	X	--	--

Notes:
1) X(1) Analyzed for Beryllium and Lead only
2) X(2) Analyzed for Beryllium, Cadmium, Chromium, Cobalt and Lead only
3) X(3) Analyzed for Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene only
4) X(4) Analyzed for Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene only
5) X(5) Analyzed for Aroclor-1254 and Aroclor-1260 only
6) VO+TICs = volatile organics + tentatively identified compounds, SVO = semivolatile organics, PAHs = polycyclic aromatic hydrocarbons, PCBs = polychlorinated biphenyls
7) 2015 and 2016 soil sample depths are in feet below bottom of asphalt and asphalt base material
8) 2010 soil sample depths are in feet below ground surface
9) Groundwater sample depths, where known, are in feet below top of casing
10) LFPS = low flow purge and sample method

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	P57-A1		P57- C5		PAR-57-SS-01	PAR-57-SS-02	PAR-57-SS-03	PAR-57-SS-04		
Sample ID					P57-SS-A1-1.0-1.5	P57-SS-A1-1.5-2.0	P57-SS-C5-1.0-1.5	P57-SS-C5-1.5-2.0	FTMM-57-SS01-0.5-1.0	FTMM-57-SS02-1.3-1.8	FTMM-57-SS03-0.5-1.0	FTMM-57-SS04-1.0-1.5	FTMM-57-SS04-2.0-2.5	FTMM-57-SS04-3.0-3.5
					1-1.5	1.5-2	1-1.5	1.5-2	0.5-1	1.3-1.8	0.5-1	1-1.5	2-2.5	3-3.5
Sample Date					2/1/2010	2/1/2010	2/1/2010	2/1/2010	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015
Volatile Organic Compounds (mg/kg)														
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)														
2-Methylnaphthalene	230	2,400	8	-	**1.45**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	**0.72**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.5	2	0.2	-	**0.77**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	5	17	2	-	**1.54**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	380,000	30,000	NLE	-	**0.43 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	**0.55 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	**0.95**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	**1.16**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	**0.39 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Naphthalene	6	17	25	-	**0.99**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	**0.9**	< 0.54	< 0.57	**0.49 J**	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	**1.37**	< 0.54	< 0.57	**0.83**	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	**83.6 J**	**59.77 J**	**41.69 J**	**116.7 J**	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	< 0.022 UJ	< 0.025 UJ	< 0.022 UJ	**0.35 J**	**0.25**	**0.8**
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	< 0.02 UJ	< 0.022 UJ	< 0.02 UJ	**0.28 J**	< 0.039	< 2.2
Inorganics (mg/kg)														
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	**89.7**	**77.3**	**87.8**	**78.1**	**87.3**	**77.5**
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-05	PAR-57-SS-06	PAR-57-SS-07	PAR-57-SS-08	PAR-57-SS-09			PAR-57-SS-10		
Sample ID					FTMM-57-SS05-0.5-1.0	FTMM-57-SS06-0.5-1.0	FTMM-57-SS07-0.5-1.0	FTMM-57-SS08-0.9-1.4	FTMM-57-SS09-0.5-1.0	FTMM-57-SS09-2.0-2.5	FTMM-57-SS09-5.5-6.0	FTMM-57-SS10-0.0-0.5	FTMM-57-SS10-3.0-3.5	FTMM-57-SS10-7.0-7.5
					0.5-1	0.5-1	0.5-1	0.9-1.4	0.5-1	2-2.5	5.5-6	0-0.5	3-3.5	7-7.5
Sample Date					9/18/2015	9/18/2015	9/18/2015	9/21/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)														
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)														
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	NA	NA	NA	NA	**0.77 J**	**0.0023 J**	**10**	**0.27**	**0.0053 J**	< 0.0044
Benzo(a)pyrene	0.5	2	0.2	-	NA	NA	NA	NA	**0.88**	**0.0031 J**	**8**	**0.27**	**0.0049 J**	< 0.0044
Benzo(b)fluoranthene	5	17	2	-	NA	NA	NA	NA	**1.2 J**	**0.0039 J**	**11**	**0.39**	**0.0058 J**	< 0.0044
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	NA	NA	NA	NA	**0.35 J**	< 0.0038	**3.3**	**0.12**	**0.0031 J**	< 0.0044
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	NA	NA	NA	NA	**0.29 J**	< 0.0038	**1.8**	**0.075**	< 0.0044	< 0.0044
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	NA	NA	NA	NA	**0.57 J**	< 0.0038	**4.5**	**0.2**	**0.0031 J**	< 0.0044
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1254	0.2	1	0.2	-	< 0.13 UJ	< 0.13 UJ	< 0.13 UJ	< 0.023 UJ	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	< 0.11 UJ	< 0.12 UJ	< 0.11 UJ	< 0.021 UJ	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)														
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	**78.9**	**77.5**	**77.7**	**82.3**	**91.4**	**86**	**91.4**	**89.3**	**75.1**	**75.1**
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-11				PAR-57-SS-12				PAR-57-SS-13		
Sample ID					FTMM-57-SS11-0.0-0.5	FTMM-57-SS111-3.0-3.5	FTMM-57-SS11-3.0-3.5	FTMM-57-SS11-7.0-7.5	FTMM-57-SS112-0.0-0.5	FTMM-57-SS12-0.0-0.5	FTMM-57-SS12-3.0-3.5	FTMM-57-SS12-7.0-7.5	FTMM-57-SS13-0.0-0.5	FTMM-57-SS13-3.0-3.5	FTMM-57-SS13-6.5-7.0
					0-0.5	3-3.5	3-3.5	7-7.5	0-0.5	0-0.5	3-3.5	7-7.5	0-0.5	3-3.5	6.5-7
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)															
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)															
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	**0.25 J**	**0.015**	**0.01**	**0.0035 J**	**0.24 J**	**4.7 J**	**0.043**	**0.026**	**0.98**	< 0.0039	< 0.0041
Benzo(a)pyrene	0.5	2	0.2	-	**0.21 J**	**0.015**	**0.012**	**0.0039 J**	**0.26 J**	**3.7 J**	**0.039**	**0.02**	**0.89**	< 0.0039	< 0.0041
Benzo(b)fluoranthene	5	17	2	-	**0.27 J**	**0.019**	**0.016**	**0.0048 J**	**0.37 J**	**4.5 J**	**0.054**	**0.026**	**1.2**	< 0.0039	< 0.0041
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	**0.11 J**	**0.0042 J**	**0.005 J**	< 0.0043	**0.11 J**	**2 J**	**0.024**	**0.011**	**0.31**	< 0.0039	< 0.0041
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	**0.056 J**	< 0.0038	< 0.0038	< 0.0043	**0.046 J**	**0.85 J**	**0.01**	< 0.0039	**0.17**	< 0.0039	< 0.0041
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	**0.14 J**	**0.011**	**0.005 J**	**0.0026 J**	**0.16 J**	**2.3 J**	**0.023**	**0.0093**	**0.52**	< 0.0039	< 0.0041
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)															
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)															
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)															
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids															
Percent Solids (percent)	NLE	NLE	NLE	-	**92.1**	**87.8**	**86.2**	**76.2**	**94.5**	**88.9**	**93.5**	**85.6**	**88.3**	**85.6**	**80.7**
Wet Chemistry - Solids															
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-14			PAR-57-SS-15			PAR-57-SS-16		
Sample ID					FTMM-57-SS14-0.0-0.5	FTMM-57-SS14-3.0-3.5	FTMM-57-SS14-5.0-5.5	FTMM-57-SS15-0.0-0.5	FTMM-57-SS15-3.0-3.5	FTMM-57-SS15-5.5-6.0	FTMM-57-SS16-0.0-0.5	FTMM-57-SS16-1.5-2.0	FTMM-57-SS16-6.0-6.5
					0-0.5	3-3.5	5-5.5	0-0.5	3-3.5	5.5-6	0-0.5	1.5-2	6-6.5
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)													
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)													
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	**1.2**	**0.035**	< 0.0037	**0.066**	< 0.0039	**0.034**	**0.81**	**0.2**	< 0.0039
Benzo(a)pyrene	0.5	2	0.2	-	**0.97**	**0.035**	< 0.0037	**0.077**	< 0.0039	**0.031**	**0.66**	**0.22**	< 0.0039
Benzo(b)fluoranthene	5	17	2	-	**1.4**	**0.041**	< 0.0037	**0.092**	< 0.0039	**0.038**	**1.1**	**0.39**	< 0.0039
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	**0.48**	**0.014**	< 0.0037	**0.019**	< 0.0039	**0.016**	**0.28**	< 0.035	< 0.0039
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	**0.19**	**0.012**	< 0.0037	**0.021**	< 0.0039	< 0.0036	< 0.038	< 0.035	< 0.0039
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	**0.51**	**0.023**	< 0.0037	**0.047**	< 0.0039	**0.023**	**0.44**	< 0.035	< 0.0039
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)													
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)													
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)													
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids													
Percent Solids (percent)	NLE	NLE	NLE	-	**88**	**91.3**	**90.6**	**90.2**	**84.9**	**92.4**	**87.4**	**93.3**	**84.5**
Wet Chemistry - Solids													
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-17			PAR-57-SS-18		PAR-57-SS-19		PAR-57-SS-20		
Sample ID					FTMM-57-SS17-0.0-0.5	FTMM-57-SS17-3.0-3.5	FTMM-57-SS17-5.5-6.0	FTMM-57-SS18-0.0-0.5	FTMM-57-SS18-5.0-5.5	FTMM-57-SS19-0.0-0.5	FTMM-57-SS19-5.5-6.0	FTMM-57-SS20-0.0-0.5	FTMM-57-SS20-3.0-3.5	FTMM-57-SS20-5.0-5.5
					0-0.5	3-3.5	5.5-6	0-0.5	5-5.5	0-0.5	5.5-6	0-0.5	3-3.5	5-5.5
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)														
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)														
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	**4.3**	< 0.004	**0.0027 J**	**3.7**	**0.037**	< 0.18	< 0.0045	**0.27**	**0.023**	**0.51**
Benzo(a)pyrene	0.5	2	0.2	-	**4.8**	< 0.004	**0.0023 J**	**2.3**	**0.035**	< 0.18	< 0.0045	**0.3**	**0.013**	**0.27**
Benzo(b)fluoranthene	5	17	2	-	**6.1**	< 0.004	< 0.0038	**3.8**	**0.049**	< 0.18	< 0.0045	**0.44**	**0.02**	**0.4**
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	**2.2**	< 0.004	**0.0046 J**	**1.1**	**0.013**	< 0.18	< 0.0045	**0.12**	**0.013**	**0.17**
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	**1.2**	< 0.004	< 0.0038	**0.4**	**0.0068 J**	< 0.18	< 0.0045	**0.079**	< 0.0039	< 0.039
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	**2.5**	< 0.004	< 0.0038	**1.1**	**0.025**	< 0.18	< 0.0045	**0.2**	**0.011**	**0.21**
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)														
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	**96.6**	**82.8**	**87.5**	**88.3**	**87.7**	**93.8**	**73.7**	**84**	**85.5**	**83.7**
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-21		PAR-57-SS-22		PAR-57-SS-23		PAR-57-SS-24	PAR-57-SS-25	P57-A1		
Sample ID					FTMM-57-SS21-0.0-0.5	FTMM-57-SS21-3.0-3.5	FTMM-57-SS22-0.0-0.5	FTMM-57-SS22-3.0-3.5	FTMM-57-SS23-0.0-0.5	FTMM-57-SS23-3.0-3.5	FTMM-57-SS24-0.0-0.5	FTMM-57-SS25-0.0-0.5	P57-A1-A	P57-A1-B	P57-A1-C
					0-0.5	3-3.5	0-0.5	3-3.5	0-0.5	3-3.5	0-0.5	0-0.5	0.5-1	1.5-2	7.5-8
Sample Date					10/2/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015	12/11/2007	12/11/2007	12/11/2007
Volatile Organic Compounds (mg/kg)															
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.26	**0.4**
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.26	< 0.33
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.26	< 0.33
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.26	< 0.33
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.78	< 0.99
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.26	< 0.33
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.26	< 0.33
Semivolatile Organic Compounds (mg/kg)															
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA	NA	**1.4**	NA	< 1.3
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA	NA	**1.2**	NA	< 1.3
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	**0.76 J**	NA	< 1.3
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA	NA	**5.6**	NA	< 1.3
Benzo(a)anthracene	5	17	0.8	-	**7.8**	**0.15**	**0.32**	**0.033**	**0.21**	**0.06**	**0.1**	**0.0076**	**9.5 JD**	NA	< 1.3
Benzo(a)pyrene	0.5	2	0.2	-	**8.2**	**0.15**	**0.39**	**0.035**	**0.28**	**0.059**	**0.1**	**0.0076**	**9.9**	NA	< 1.3
Benzo(b)fluoranthene	5	17	2	-	**11**	**0.2**	**0.53**	**0.048**	**0.4**	**0.085**	**0.16**	**0.0087**	**9.9 JD**	NA	< 1.3
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	**3.4**	NA	< 1.3
Benzo(k)fluoranthene	45	170	25	-	**3.2**	**0.061**	**0.17**	**0.015**	**0.12**	**0.037**	**0.061**	**0.0018 J**	**7**	NA	< 1.3
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	< 1.1	NA	**0.08 J**
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	< 1.1	NA	< 1.3
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA	NA	**10 JD**	NA	< 1.3
Dibenz(a,h)anthracene	0.5	2	0.8	-	**2.3**	**0.039**	**0.1**	**0.0086**	**0.07**	**0.014**	**0.022**	< 0.0036	NA	NA	NA
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	**1.8**	NA	< 1.3
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	**0.21 J**	NA	**0.99 J**
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA	NA	**25 D**	NA	**0.058 J**
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA	NA	**2.2**	NA	< 1.3
Indeno(1,2,3-cd)pyrene	5	17	7	-	**6**	**0.098**	**0.38**	**0.025**	**0.24**	**0.037**	**0.072**	**0.0047 J**	**3.2**	NA	< 1.3
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA	NA	**0.88 J**	NA	< 1.3
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	**19 D**	NA	< 1.3
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA	NA	**22 D**	NA	**0.05 J**
TIC SVOCs (mg/kg)															
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)															
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)															
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	**17.8**	NA	**9.11**
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	**0.769**	NA	**0.926**
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	**0.325**	NA	**0.221**
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	**1.98**	NA	**0.526**
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	**15.9**	NA	**0.525**
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	NA	< 0.119
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	**7.56**	NA	**4.39**
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	**42.5**	NA	< 41.667
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	**45.7**	NA	**60.5**
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	**39.1**	NA	**46.9**
Wet Chemistry - Solids															
Percent Solids (percent)	NLE	NLE	NLE	-	**96.3**	**87.6**	**90.1**	**92.8**	**88.5**	**87.5**	**79.8**	**92.6**	NA	NA	NA
Wet Chemistry - Solids															
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	P57-A1-A	P57-A1-B	P57-A1-C	P57-A1-D	P57-A1-E	P57-A2			P57-A3			P57-A4			P57-A5		
Sample ID					P57-SS-A1-A-6.5-7.0	P57-SS-A1-B-6.5-7.0	P57-SS-A1-C-8.0-8.5	P57-SS-A1-D-6.0-6.5	P57-SS-A1-E-5.5-6.0	P57-A2-A	P57-A2-B	P57-A2-C	P57-A3-A	P57-A3-B	P57-A3-C	P57-A4-A	P57-A4-B	P57-A4-C	P57-A5-A	P57-A5-B	P57-A5-C
					6.5-7	6.5-7	8-8.5	6-6.5	5.5-6	0-0.5	1.5-2	5.5-6	0.5-1	1.5-2	4-4.5	0.5-1	1.5-2	6.5-7	0.5-1	1.5-2	7.5-8
Sample Date					11/22/2010	11/22/2010	11/22/2010	11/22/2010	11/22/2010	12/8/2007	12/8/2007	12/8/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007
Volatile Organic Compounds (mg/kg)																					
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	< 0.24	< 0.32	NA	**0.42**	**0.3**	NA	**0.043 J**	**0.45**	NA	**0.34**	**0.42**
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	**0.017 J**	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	**0.023 J**	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	**0.077 J**	< 0.32	NA	< 0.26	< 0.25	NA	**0.069 J**	< 0.29	NA	< 0.25	< 0.28
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	**0.35 J**	< 0.95	NA	< 0.78	< 0.75	NA	< 1	< 0.87	NA	< 0.76	< 0.84
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	< 0.24	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	**0.069 J**	< 0.28
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	< 0.24	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28
Semivolatile Organic Compounds (mg/kg)																					
2-Methylnaphthalene	230	2,400	8	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.075 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Acenaphthene	3,400	37,000	110	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	**0.085 J**	NA	< 1.2
Acenaphthylene	NLE	300,000	NLE	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	**0.077 J**	NA	< 1.1	**0.061 J**	NA	< 1.2
Anthracene	17,000	30,000	2,400	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.055 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.16 J**	NA	< 1.1	**0.18 J**	NA	< 1.2
Benzo(a)anthracene	5	17	0.8	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.22 J**	NA	< 1.3	**0.1 J**	NA	< 1.1	**0.31 J**	NA	< 1.1	**0.34 J**	NA	< 1.2
Benzo(a)pyrene	0.5	2	0.2	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.21 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.35 J**	NA	< 1.1	< 1.1	NA	< 1.2
Benzo(b)fluoranthene	5	17	2	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.33 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.47 J**	NA	< 1.1	**0.52 J**	NA	< 1.2
Benzo(ghi)perylene	380,000	30,000	NLE	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Benzo(k)fluoranthene	45	170	25	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.11 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.16 J**	NA	< 1.1	**0.21 J**	NA	< 1.2
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.099 J**	NA	**0.052 J**	< 1.2	NA	**0.086 J**	**0.15 J**	NA	< 1.1	**3.2**	NA	**0.067 J**
Butyl benzyl phthalate	1,200	14,000	230	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Chrysene	450	1,700	80	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.27 J**	NA	< 1.3	**0.13 J**	NA	< 1.1	**0.39 J**	NA	< 1.1	**0.43 J**	NA	< 1.2
Dibenz(a,h)anthracene	0.5	2	0.8	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NLE	NLE	NLE	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	**0.032 J**	NA	< 1.1	**0.061 J**	NA	< 1.2
Di-n-butylphthalate	6,100	68,000	760	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 2.7	NA	< 1.8	**0.82 J**	NA	**1.5**	< 0.49	NA	< 1.4	**1.3**	NA	**0.3 J**
Fluoranthene	2,300	24,000	1,300	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.42 J**	NA	< 1.3	**0.28 J**	NA	< 1.1	**0.68 J**	NA	< 1.1	**0.9 J**	NA	**0.077 J**
Fluorene	2,300	24,000	170	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Indeno(1,2,3-cd)pyrene	5	17	7	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.082 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Naphthalene	6	17	25	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.051 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Phenanthrene	NLE	300,000	NLE	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.2 J**	NA	< 1.3	**0.14 J**	NA	< 1.1	**0.51 J**	NA	**0.041 J**	**0.66 J**	NA	**0.057 J**
Pyrene	1,700	18,000	840	-	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.41 J**	NA	< 1.3	**0.3 J**	NA	< 1.1	**0.82 J**	NA	**0.034 J**	**1.1 J**	NA	**0.074 J**
TIC SVOCs (mg/kg)																					
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	**97.4 J**	**114 J**	**91 J**	**110 J**	**99 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																					
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																					
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	**7.39**	NA	**11.4**	**12.4**	NA	**2.73**	**6.16**	NA	**8.12**	**6.05**	NA	**6.04**
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	**0.882**	NA	**1.54**	**1.35**	NA	**0.271**	**0.527**	NA	**1.61**	**0.52**	NA	**1.02**
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	**0.384**	NA	**0.311**	**0.426**	NA	**0.112**	**0.468**	NA	**0.497**	**0.425**	NA	**0.203**
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	**3.48**	NA	**0.832**	**1.79**	NA	< 0.338	**8.52**	NA	**1.3**	**4.8**	NA	< 0.347
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	**22.8**	NA	**3.88**	**11.2**	NA	**3.01**	**21**	NA	< 0.351	**29.3**	NA	**3.05**
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	< 0.11	NA	< 0.122	< 0.116	NA	< 0.099	< 0.105	NA	< 0.109	< 0.113	NA	< 0.101
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	**10.4**	NA	**50.3**	**14.6**	NA	**2.76**	**17.6**	NA	**44.1**	**11.5**	NA	**5.57**
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	< 38.48	NA	< 43.926	< 42.214	NA	< 38.483	**904**	NA	< 37.586	**434**	NA	< 39.424
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	**49.9**	NA	**86.1**	**77.6**	NA	**18.1**	**60.4**	NA	**70.2**	**43.3**	NA	**40.9**
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	**61.7**	NA	**72.6**	**70.2**	NA	**36.5**	**65**	NA	**165**	**74.4**	NA	**80.4**
Wet Chemistry - Solids																					
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																					
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	P57-A6			P57-A7			P57-A8			P57-A9				P57-B3		
Sample ID					P57-A6-A	P57-A6-B	P57-A6-C	P57-A7-A	P57-A7-B	P57-A7-C	P57-A8-A	P57-A8-B	P57-A8-C	P57-A9-A	P57-A9-B	P57-A9-C	P57-A9-C DUP	P57-B3-A	P57-B3-B	P57-B3-C
					0.5-1	1.5-2	7-7.5	0-0.5	1.5-2	5.5-6	0.5-1	1.5-2	6-6.5	0-0.5	1.5-2	7.5-8	7.5-8	0.5-1	1.5-2	7-7.5
Sample Date					12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/8/2007	12/8/2007	12/8/2007
Volatile Organic Compounds (mg/kg)																				
Acetone	70,000	NLE	19	-	NA	**0.4**	**0.38**	NA	**0.61**	**0.34**	NA	**0.39**	**0.56**	NA	**0.51**	**0.49**	**0.73**	NA	< 0.26	< 0.33
Benzene	2	5	0.005	-	NA	< 0.27	< 0.26	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33
Ethyl benzene	7,800	110,000	13	-	NA	< 0.27	< 0.26	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33
Toluene	6,300	91,000	7	-	NA	< 0.27	< 0.26	NA	< 0.27	**0.024 J**	NA	< 0.26	< 0.27	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33
Total Xylenes	12,000	170,000	19	-	NA	< 0.81	< 0.78	NA	< 0.82	**0.021 J**	NA	< 0.77	< 0.81	NA	< 0.79	< 0.75	< 0.87	NA	< 0.79	< 0.98
Trichlorofluoromethane	23,000	340,000	34	-	NA	< 0.27	< 0.26	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33
Vinyl acetate	NLE	NLE	NLE	-	NA	< 0.27	< 0.26	NA	< 0.27	< 0.28	NA	**0.21 J**	< 0.27	NA	< 0.26	< 0.25	**0.24 J**	NA	< 0.26	< 0.33
Semivolatile Organic Compounds (mg/kg)																				
2-Methylnaphthalene	230	2,400	8	-	**0.091 J**	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2
Acenaphthene	3,400	37,000	110	-	**0.07 J**	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2
Acenaphthylene	NLE	300,000	NLE	-	**0.059 J**	NA	< 1.1	< 1.1	NA	**0.069 J**	**0.17 J**	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2
Anthracene	17,000	30,000	2,400	-	**0.15 J**	NA	**0.03 J**	**0.058 J**	NA	**0.039 J**	**0.52 J**	NA	< 1.1	< 1.2	NA	< 1.1	**0.11 J**	**0.049 J**	NA	< 1.2
Benzo(a)anthracene	5	17	0.8	-	**0.35 J**	NA	**0.054 J**	**0.24 J**	NA	**0.1 J**	**1.1 J**	NA	< 1.1	**0.089 J**	NA	< 1.1	**0.23 J**	**0.21 J**	NA	< 1.2
Benzo(a)pyrene	0.5	2	0.2	-	< 1.1	NA	< 1.1	**0.24 J**	NA	**0.088 J**	< 4.4	NA	< 1.1	**0.08 J**	NA	< 1.1	**0.15 J**	< 1.1	NA	< 1.2
Benzo(b)fluoranthene	5	17	2	-	< 1.1	NA	**0.069 J**	**0.43 J**	NA	**0.072 J**	< 4.4	NA	< 1.1	**0.13 J**	NA	< 1.1	**0.22 J**	< 1.1	NA	< 1.2
Benzo(ghi)perylene	380,000	30,000	NLE	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	**0.1 J**	< 1.1	NA	< 1.2
Benzo(k)fluoranthene	45	170	25	-	< 1.1	NA	**0.039 J**	**0.1 J**	NA	**0.077 J**	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	**0.093 J**	< 1.1	NA	< 1.2
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	< 1.1	NA	**0.044 J**	**1.9**	NA	**0.73 J**	**1.2 J**	NA	**0.11 J**	**0.18 J**	NA	**0.1 J**	**0.062 J**	**0.15 J**	NA	< 1.2
Butyl benzyl phthalate	1,200	14,000	230	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2
Chrysene	450	1,700	80	-	**0.47 J**	NA	**0.077 J**	**0.32 J**	NA	**0.14 J**	**1.5 J**	NA	< 1.1	**0.12 J**	NA	< 1.1	**0.25 J**	**0.25 J**	NA	< 1.2
Dibenz(a,h)anthracene	0.5	2	0.8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NLE	NLE	NLE	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.1	**0.17 J**	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2
Di-n-butylphthalate	6,100	68,000	760	-	< 1.1	NA	< 0.38	**1.5**	NA	**0.81 J**	< 2.3	NA	< 3.8	**0.34 J**	NA	**1.1 J**	**1 J**	< 1.6	NA	< 0.63
Fluoranthene	2,300	24,000	1,300	-	**0.85 J**	NA	**0.13 J**	**0.58 J**	NA	**0.14 J**	**2.4 J**	NA	**0.055 J**	**0.17 J**	NA	< 1.1	**0.68 J**	**0.32 J**	NA	< 1.2
Fluorene	2,300	24,000	170	-	**0.073 J**	NA	< 1.1	< 1.1	NA	< 1.1	**0.28 J**	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2
Indeno(1,2,3-cd)pyrene	5	17	7	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2
Naphthalene	6	17	25	-	**0.043 J**	NA	< 1.1	< 1.1	NA	< 1.1	**0.16 J**	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2
Phenanthrene	NLE	300,000	NLE	-	**0.67 J**	NA	**0.1 J**	**0.27 J**	NA	**0.05 J**	**2.1 J**	NA	**0.031 J**	**0.1 J**	NA	< 1.1	**0.51 J**	**0.18 J**	NA	< 1.2
Pyrene	1,700	18,000	840	-	**1.3**	NA	**0.15 J**	**0.55 J**	NA	**0.21 J**	**4 J**	NA	**0.051 J**	**0.2 J**	NA	< 1.1	**0.58 J**	**0.5 J**	NA	< 1.2
TIC SVOCs (mg/kg)																				
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																				
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																				
Arsenic	19	19	19	22.9	**4.58**	NA	**13.2**	**8.01**	NA	**4.58**	**2.84**	NA	**8.05**	**10.3**	NA	**2.42**	**1.7**	**7.58**	NA	**11**
Beryllium	16	140	0.7	2	**0.346**	NA	**1.23**	**0.529**	NA	**0.524**	**0.259**	NA	**0.556**	**0.933**	NA	**0.462**	**0.475**	**1.25**	NA	**0.917**
Cadmium	78	78	2	ND	**0.435**	NA	**0.359**	**0.329**	NA	**0.185**	**0.247**	NA	**0.0843**	**0.306**	NA	**0.135**	**0.126**	**0.193**	NA	**0.261**
Cobalt	1,600	590	90	2.5	**5.53**	NA	**1.7**	**1.32**	NA	**0.876**	**6.6**	NA	< 0.337	**1.42**	NA	< 0.332	< 0.333	**1.94**	NA	**2.47**
Lead	400	800	90	19.5	**15.7**	NA	**7.57**	**29.5**	NA	**7**	**9.78**	NA	**1.65**	**28.9**	NA	**40.7**	**38**	**7.69**	NA	**7.04**
Mercury	23	65	0.1	ND	< 0.099	NA	< 0.108	< 0.106	NA	< 0.101	< 0.104	NA	< 0.109	< 0.109	NA	< 0.106	< 0.114	< 0.11	NA	< 0.116
Nickel	1,600	23,000	48	8.4	**20**	NA	**10.3**	**6.45**	NA	**4.43**	**14.5**	NA	**2.27**	**6.97**	NA	**2.35**	**2.49**	**6.29**	NA	**11**
Sodium	NLE	NLE	NLE	51.6	**539**	NA	< 41.362	< 36.479	NA	< 38.989	**429**	NA	< 38.358	< 38.584	NA	< 37.822	< 37.867	< 37.752	NA	< 43.828
Vanadium	390 [5]	1,100	NLE	94.1	**46.8**	NA	**63.9**	**37.5**	NA	**29.7**	**70.6**	NA	**40.6**	**47**	NA	**19.4**	**18.2**	**51.2**	NA	**62.7**
Zinc	23,000	110,000	930	81.4	**70.4**	NA	**58.2**	**76.4**	NA	**35.8**	**50.4**	NA	**14.4**	**57.8**	NA	**29.4**	**28.8**	**72.5**	NA	**57.9**
Wet Chemistry - Solids																				
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																				
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	P57-B4			P57-B5				P57-C3				P57-C4			P57-C5		
Sample ID					P57-B4-A	P57-B4-B	P57-B4-C	P57-B5-A	P57-B5-B	P57-B5-C	P57-B5-C DUP	P57-C3-A	P57-C3-B	P57-C3-C	P57-C3-C DUP	P57-C4-A	P57-C4-B	P57-C4-C	P57-C5-A	P57-C5-B	P57-C5-C
					0.5-1	1.5-2	6.5-7	0.5-1	1.5-2	6.5-7	6.5-7	0.5-1	1.5-2	6.5-7	6.5-7	0.5-1	1.5-2	6.5-7	0.5-1	1.5-2	7-7.5
Sample Date					12/8/2007	12/8/2007	12/8/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007
Volatile Organic Compounds (mg/kg)																					
Acetone	70,000	NLE	19	-	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	**0.28 J**	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	**0.28 J**	< 0.32
Benzene	2	5	0.005	-	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Ethyl benzene	7,800	110,000	13	-	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	**0.011 J**	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Toluene	6,300	91,000	7	-	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Total Xylenes	12,000	170,000	19	-	NA	< 0.79	< 0.84	NA	< 0.81	< 1.06	< 0.9	NA	< 0.81	< 0.78	< 0.78	NA	< 0.92	< 0.81	NA	< 0.99	< 0.96
Trichlorofluoromethane	23,000	340,000	34	-	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Vinyl acetate	NLE	NLE	NLE	-	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Semivolatile Organic Compounds (mg/kg)																					
2-Methylnaphthalene	230	2,400	8	-	**0.08 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.075 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	< 1.1	NA	< 1.1
Acenaphthene	3,400	37,000	110	-	**0.041 J**	NA	< 1.1	**0.066 J**	NA	< 1.2	< 1.2	**0.54 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	**0.078 J**	NA	< 1.1
Acenaphthylene	NLE	300,000	NLE	-	**0.071 J**	NA	< 1.1	**0.039 J**	NA	< 1.2	< 1.2	**0.097 J**	NA	< 1.1	< 1.1	**0.19 J**	NA	< 1.1	**0.1 J**	NA	< 1.1
Anthracene	17,000	30,000	2,400	-	**0.2 J**	NA	< 1.1	**0.2 J**	NA	< 1.2	< 1.2	**1.2**	NA	< 1.1	< 1.1	**0.13 J**	NA	< 1.1	**0.43 J**	NA	< 1.1
Benzo(a)anthracene	5	17	0.8	-	**0.6 J**	NA	< 1.1	**0.46 J**	NA	< 1.2	< 1.2	**2.9**	NA	**0.1 J**	< 1.1	**0.42 J**	NA	< 1.1	**1.2**	NA	< 1.1
Benzo(a)pyrene	0.5	2	0.2	-	**0.48 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**2**	NA	**0.081 J**	< 1.1	**0.47 J**	NA	< 1.1	**0.95 J**	NA	< 1.1
Benzo(b)fluoranthene	5	17	2	-	**0.79 J**	NA	< 1.1	**0.52 J**	NA	< 1.2	< 1.2	**3.1**	NA	**0.11 J**	< 1.1	**0.65 J**	NA	< 1.1	**1.5**	NA	< 1.1
Benzo(ghi)perylene	380,000	30,000	NLE	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.73 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	< 1.1	NA	< 1.1
Benzo(k)fluoranthene	45	170	25	-	**0.36 J**	NA	< 1.1	**0.35 J**	NA	< 1.2	< 1.2	**1.9**	NA	**0.059 J**	< 1.1	**0.29 J**	NA	< 1.1	**0.48 J**	NA	< 1.1
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	**0.13 J**	NA	< 1.1	**0.3 J**	NA	< 1.2	**0.087 J**	**0.22 J**	NA	**0.092 J**	**0.09 J**	**0.2 J**	NA	< 1.1	**1.1**	NA	< 1.1
Butyl benzyl phthalate	1,200	14,000	230	-	< 1.1	NA	< 1.1	**0.13 J**	NA	< 1.2	< 1.2	< 1.1	NA	< 1.1	< 1.1	< 1	NA	< 1.1	< 1.1	NA	< 1.1
Chrysene	450	1,700	80	-	**0.69 J**	NA	< 1.1	**0.51 J**	NA	< 1.2	< 1.2	**3**	NA	**0.12 J**	< 1.1	**0.52 J**	NA	< 1.1	**1.3**	NA	< 1.1
Dibenz(a,h)anthracene	0.5	2	0.8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NLE	NLE	NLE	-	**0.064 J**	NA	< 1.1	**0.057 J**	NA	< 1.2	< 1.2	**0.26 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	**0.058 J**	NA	< 1.1
Di-n-butylphthalate	6,100	68,000	760	-	< 1.7	NA	< 0.61	< 0.76	NA	< 0.91	< 2.7	< 2	NA	< 2.4	< 0.41	< 0.77	NA	< 0.57	< 0.64	NA	< 0.58
Fluoranthene	2,300	24,000	1,300	-	**1.4**	NA	< 1.1	**0.99 J**	NA	< 1.2	< 1.2	**7.5**	NA	**0.12 J**	**0.041 J**	**0.64 J**	NA	< 1.1	**2.6**	NA	< 1.1
Fluorene	2,300	24,000	170	-	**0.038 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.38 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	**0.11 J**	NA	< 1.1
Indeno(1,2,3-cd)pyrene	5	17	7	-	**0.15 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.69 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	**0.33 J**	NA	< 1.1
Naphthalene	6	17	25	-	**0.065 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.12 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	< 1.1	NA	< 1.1
Phenanthrene	NLE	300,000	NLE	-	**0.75 J**	NA	< 1.1	**1 J**	NA	< 1.2	< 1.2	**4.7**	NA	**0.033 J**	< 1.1	**0.26 J**	NA	< 1.1	**1.4**	NA	< 1.1
Pyrene	1,700	18,000	840	-	**1.6**	NA	< 1.1	**1.6**	NA	< 1.2	< 1.2	**9.4**	NA	**0.16 J**	**0.041 J**	**1.2**	NA	< 1.1	**3.6**	NA	< 1.1
TIC SVOCs (mg/kg)																					
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																					
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																					
Arsenic	19	19	19	22.9	**5.89**	NA	**6.21**	**5.03**	NA	**7.71**	**9.35**	**2.36**	NA	**4.98**	**3.65**	**5.4**	NA	**11.4**	**4.64**	NA	**2.04**
Beryllium	16	140	0.7	2	**0.517**	NA	**0.516**	**0.54**	NA	**1.06**	**1.18**	**0.494**	NA	**0.637**	**0.508**	**0.59**	NA	**1.33**	**0.615**	NA	**0.326**
Cadmium	78	78	2	ND	**0.318**	NA	**0.414**	**0.289**	NA	**0.317**	**0.534**	**0.163**	NA	**0.194**	**0.0962**	**0.362**	NA	**0.196**	**0.319**	NA	**0.0535**
Cobalt	1,600	590	90	2.5	**2.82**	NA	**2.93**	**5.07**	NA	**1.64**	**1.58**	**0.756**	NA	**1.11**	**1.43**	**8.68**	NA	**1.42**	**3.13**	NA	< 0.326
Lead	400	800	90	19.5	**20.3**	NA	**51.4**	**15**	NA	**3.03**	**2.82**	**4.81**	NA	**5.1**	**4.66**	**30.1**	NA	**1.2**	**51.6**	NA	**1.4**
Mercury	23	65	0.1	ND	< 0.102	NA	< 0.102	< 0.107	NA	< 0.114	< 0.11	**0.16**	NA	< 0.1	< 0.101	< 0.098	NA	< 0.096	< 0.099	NA	< 0.099
Nickel	1,600	23,000	48	8.4	**8.92**	NA	**8.99**	**9.44**	NA	**8.71**	**8.98**	**5.59**	NA	**5.79**	**7.16**	**14.1**	NA	**5.97**	**9.05**	NA	**3.63**
Sodium	NLE	NLE	NLE	51.6	< 36.969	NA	< 39.984	**48.6**	NA	< 42.72	< 39.581	< 40.694	NA	< 35.244	< 37.691	**688**	NA	< 36.431	< 40.061	NA	< 37.124
Vanadium	390 [5]	1,100	NLE	94.1	**40.8**	NA	**40**	**59.1**	NA	**85.3**	**91.4**	**30.9**	NA	**46.7**	**36.6**	**65.3**	NA	**60**	**65.3**	NA	**24.5**
Zinc	23,000	110,000	930	81.4	**50.5**	NA	**84.8**	**46.2**	NA	**62.6**	**67**	**25.2**	NA	**39.8**	**43.6**	**53.6**	NA	**61.5**	**58.2**	NA	**28**
Wet Chemistry - Solids																					
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																					
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-26				PAR-57-SS-27			PAR-57-SS-28			PAR-57-SS-29		
Sample ID					PAR-57-SB-126-3.5-4	PAR-57-SB-26-0.5-1	PAR-57-SB-26-3.5-4	PAR-57-SB-26-7.5-8	PAR-57-SB-27-0-0.5	PAR-57-SB-27-3.5-4	PAR-57-SB-27-7.5-8	PAR-57-SB-28-0.5-1	PAR-57-SB-28-3.5-4	PAR-57-SB-28-7.5-8	PAR-57-SB-29-0.5-1	PAR-57-SB-29-3.5-4	PAR-57-SB-29-7.5-8
					3.5-4	0.5-1	3.5-4	7.5-8	0-0.5	3.5-4	7.5-8	0.5-1	3.5-4	7.5-8	0.5-1	3.5-4	7.5-8
Sample Date					4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Volatile Organic Compounds (mg/kg)																	
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)																	
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	**0.0035 J**	**0.12**	< 0.004	**0.0041 J**	**0.12**	< 0.0039	< 0.0039	**0.4**	**0.0032 J**	< 0.0042	**1.6**	**0.0073 J**	**0.0025 J**
Benzo(a)pyrene	0.5	2	0.2	-	< 0.0042	**0.12**	< 0.004	**0.0021 J**	**0.17**	< 0.0039	< 0.0039	**0.32**	< 0.0042	< 0.0042	**1.2**	**0.005 J**	< 0.0041
Benzo(b)fluoranthene	5	17	2	-	< 0.0042	**0.15**	< 0.004	**0.0031 J**	**0.2**	< 0.0039	< 0.0039	**0.28**	< 0.0042	< 0.0042	**1.1**	**0.0038 J**	< 0.0041
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	< 0.0042	**0.024**	< 0.004	< 0.0039	**0.027**	< 0.0039	< 0.0039	**0.057**	< 0.0042	< 0.0042	**0.21**	< 0.0039	< 0.0041
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	< 0.0042	**0.099**	< 0.004	< 0.0039	**0.12**	< 0.0039	< 0.0039	**0.16**	< 0.0042	< 0.0042	**0.67**	**0.0023 J**	< 0.0041
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)																	
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																	
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																	
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																	
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																	
Percent Solids (percent)	NLE	NLE	NLE	-	**78.5**	**82.6**	**83.2**	**83.5**	**92.6**	**83.8**	**85.3**	**87.4**	**77.9**	**78.1**	**94.2**	**84**	**80**

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-30			PAR-57-SS-31			PAR-57-SS-32		PAR-57-SS-33		PAR-57-SS-34	
Sample ID					PAR-57-SB-30-0.5-1	PAR-57-SB-30-3.5-4	PAR-57-SB-30-7.5-8	PAR-57-SB-31-0.5-1	PAR-57-SB-31-3.5-4	PAR-57-SB-31-7.5-8	PAR-57-SB-32-0.5-1	PAR-57-SB-32-3.5-4	PAR-57-SB-33-0.5-1	PAR-57-SB-33-3.5-4	PAR-57-SB-34-0.5-1	PAR-57-SB-34-3.5-4
					0.5-1	3.5-4	7.5-8	0.5-1	3.5-4	7.5-8	0.5-1	3.5-4	0.5-1	3.5-4	0.5-1	3.5-4
Sample Date					4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Volatile Organic Compounds (mg/kg)																
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)																
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	**0.3**	< 0.004	**0.0027 J**	**0.035**	**0.052**	**0.0026 J**	**0.25**	**0.0035 J**	**0.009**	< 0.0042	**0.0033 J**	< 0.0038
Benzo(a)pyrene	0.5	2	0.2	-	**0.32**	< 0.004	**0.003 J**	**0.061**	**0.07**	< 0.0039	**0.27**	< 0.0038	**0.013**	< 0.0042	< 0.0041	< 0.0038
Benzo(b)fluoranthene	5	17	2	-	**0.43**	< 0.004	< 0.0036	**0.053**	**0.062**	< 0.0039	**0.34**	< 0.0038	**0.014**	< 0.0042	< 0.0041	< 0.0038
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	**0.057**	< 0.004	< 0.0036	**0.014**	**0.018**	< 0.0039	**0.035**	< 0.0038	**0.0026 J**	< 0.0042	< 0.0041	< 0.0038
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	**0.19**	< 0.004	**0.0033 J**	**0.047**	**0.056**	< 0.0039	**0.21**	< 0.0038	**0.0098**	< 0.0042	< 0.0041	< 0.0038
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)																
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																
Aroclor-1254	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.2	1	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																
Percent Solids (percent)	NLE	NLE	NLE	-	**96**	**83.1**	**90.8**	**86.4**	**93.3**	**84.6**	**82.2**	**86.1**	**88.3**	**79.2**	**80.6**	**85.8**

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-35		PAR-57-SS-36	PAR-57-SS-37				PAR-57-SS-38		
Sample ID					PAR-57-SB-35-0.5-1	PAR-57-SB-35-3.5-4	PAR-57-SB-36-4.5-5	PAR-57-SB-137-2.5-3	PAR-57-SB-37-0.5-1	PAR-57-SB-37-2.5-3	PAR-57-SB-37-4.5-5	PAR-57-SB-38-0.5-1	PAR-57-SB-38-2.5-3	PAR-57-SB-38-4.5-5
					0.5-1	3.5-4	4.5-5	2.5-3	0.5-1	2.5-3	4.5-5	0.5-1	2.5-3	4.5-5
Sample Date					4/22/2016	4/22/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016
Volatile Organic Compounds (mg/kg)														
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)														
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	< 0.0038	< 0.004	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.5	2	0.2	-	< 0.0038	< 0.004	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	5	17	2	-	< 0.0038	< 0.004	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	< 0.0038	< 0.004	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	< 0.0038	< 0.004	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1254	0.2	1	0.2	-	NA	NA	< 0.024	< 0.022	< 0.021	< 0.022	< 0.023	< 0.022	< 0.023	< 0.024
Aroclor-1260	0.2	1	0.2	-	NA	NA	< 0.022	< 0.02	**0.057**	< 0.019	< 0.021	**0.048**	< 0.02	< 0.022
Inorganics (mg/kg)														
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	**86.2**	**83.2**	**80.8**	**89**	**91**	**89.9**	**84.5**	**88.8**	**85.1**	**80.2**

TABLE 3
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO NJDEP DIRECT CONTACT CRITERIA
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	Weston 1995 Background (Main Post)	PAR-57-SS-39			PAR-57-SS-40			
Sample ID					PAR-57-SB-39-0.5-1	PAR-57-SB-39-2.5-3	PAR-57-SB-39-4.5-5	PAR-57-SB-140-2.5-3	PAR-57-SB-40-0.5-1	PAR-57-SB-40-2.5-3	PAR-57-SB-40-4.5-5
					0.5-1	2.5-3	4.5-5	2.5-3	0.5-1	2.5-3	4.5-5
Sample Date					4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016
Volatile Organic Compounds (mg/kg)											
Acetone	70,000	NLE	19	-	NA	NA	NA	NA	NA	NA	NA
Benzene	2	5	0.005	-	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	7,800	110,000	13	-	NA	NA	NA	NA	NA	NA	NA
Toluene	6,300	91,000	7	-	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	12,000	170,000	19	-	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	23,000	340,000	34	-	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	230	2,400	8	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3,400	37,000	110	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA
Anthracene	17,000	30,000	2,400	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5	17	0.8	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.5	2	0.2	-	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	5	17	2	-	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	380,000	30,000	NLE	-	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	45	170	25	-	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	35	140	1,200	-	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	1,200	14,000	230	-	NA	NA	NA	NA	NA	NA	NA
Chrysene	450	1,700	80	-	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.5	2	0.8	-	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	6,100	68,000	760	-	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2,300	24,000	1,300	-	NA	NA	NA	NA	NA	NA	NA
Fluorene	2,300	24,000	170	-	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5	17	7	-	NA	NA	NA	NA	NA	NA	NA
Naphthalene	6	17	25	-	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	300,000	NLE	-	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,700	18,000	840	-	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)											
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254	0.2	1	0.2	-	< 0.022	< 0.022	< 0.023	< 0.022	< 0.024	< 0.032	< 0.024
Aroclor-1260	0.2	1	0.2	-	< 0.02	< 0.02	< 0.021	< 0.02	**0.068**	< 0.029	< 0.022
Inorganics (mg/kg)											
Arsenic	19	19	19	22.9	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	140	0.7	2	NA	NA	NA	NA	NA	NA	NA
Cadmium	78	78	2	ND	NA	NA	NA	NA	NA	NA	NA
Cobalt	1,600	590	90	2.5	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	90	19.5	NA	NA	NA	NA	NA	NA	NA
Mercury	23	65	0.1	ND	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	23,000	48	8.4	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA
Vanadium	390 [5]	1,100	NLE	94.1	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	110,000	930	81.4	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	**89.2**	**87.1**	**82.9**	**86.5**	**80.9**	**89.4**	**80**

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

E (or ER) = Estimated result.

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected at or above this value.

J-DL = Elevated sample detection limit due to difficult sample matrix.

U-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

3) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Shade values represent a result that is above the NJ Residential Direct Contact Soil Remediation Standard. ####

There are no NJDEP soil standards for individual PCB Aroclors, therefore the total PCB NJDEP standards were used for individual Aroclors.

- Cell Shade values represent a result that is above the NJ Non-Residential Direct Contact Soil Remediation Standard. ###

- Cell Shade values represent a result that is above the NJ Impact to GW Soil Screening Level ###

- Cell Style values represent a result that is above the Weston 1995 Background (Main Post). ###

n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified.

Dash (-) = only background concentrations for metals are being used as comparison criteria.

- Cell Shade values represent a result that is above both the NJ Residential, Non-Residential, AND NJ Impact to GW Soil Screening Level Direct Contact Soil Remediation Standard. ###

- Cell Shade values represent a result that is above both the NJ Residential and Non-Residential Direct Contact Soil Remediation Standard. ###

4) Criteria action level source document and web address.

- The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's Sept 18, 2017 Remediation Standards

http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

- The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's Sept 18, 2017 Remediation Standards

http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

- The NJ Impact to GW Soil Screening Level criteria refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised

http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf

- The Weston 1995 Background (Main Post) refers to the FTMM reports.

5) Alternative Soil Remediation Standard, Section 4.3.1 and Attachment F

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	P57-A1		P57-C5		PAR-57-SS-01	PAR-57-SS-02	PAR-57-SS-03
Sample ID					P57-SS-A1-1.0-1.5	P57-SS-A1-1.5-2.0	P57-SS-C5-1.0-1.5	P57-SS-C5-1.5-2.0	FTMM-57-SS01-0.5-1.0	FTMM-57-SS02-1.3-1.8	FTMM-57-SS03-0.5-1.0
Sample Date					2/1/2010	2/1/2010	2/1/2010	2/1/2010	9/18/2015	9/18/2015	9/18/2015
Volatile Organic Compounds (mg/kg)											
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	24	300	0.019	-	**1.45**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.72**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.77**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Benzo(b)fluoranthene	1.1	21	0.3	-	**1.54**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Benzo(ghi)perylene	NLE	NLE	NLE	-	**0.43 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	**0.55 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	**0.95**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	**1.16**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Fluorene	240	3,000	0.54	-	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.39 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Naphthalene	3.8	17	0.00054	-	**0.99**	< 0.54	< 0.57	< 0.54	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	**0.9**	< 0.54	< 0.57	**0.49 J**	NA	NA	NA
Pyrene	180	2,300	1.3	-	**1.37**	< 0.54	< 0.57	**0.83**	NA	NA	NA
TIC SVOCs (mg/kg)											
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	**83.6 J**	**59.77 J**	**41.69 J**	**116.7 J**	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	< 0.022 UJ	< 0.025 UJ	< 0.022 UJ
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	< 0.02 UJ	< 0.022 UJ	< 0.02 UJ
Inorganics (mg/kg)											
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	**89.7**	**77.3**	**87.8**
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-04			PAR-57-SS-05	PAR-57-SS-06	PAR-57-SS-07	PAR-57-SS-08
Sample ID					FTMM-57-SS04-1.0-1.5	FTMM-57-SS04-2.0-2.5	FTMM-57-SS04-3.0-3.5	FTMM-57-SS05-0.5-1.0	FTMM-57-SS06-0.5-1.0	FTMM-57-SS07-0.5-1.0	FTMM-57-SS08-0.9-1.4
Sample Date					9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/21/2015
Volatile Organic Compounds (mg/kg)											
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.11	2.1	0.029	-	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.1	21	0.3	-	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	NA	NA	NA	NA	NA	NA	NA
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)											
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254	0.12	0.97	0.002	-	**0.35 J**	**0.25**	**8.8**	< 0.13 UJ	< 0.13 UJ	< 0.13 UJ	< 0.023 UJ
Aroclor-1260	0.24	0.99	0.0055	-	**0.28 J**	< 0.039	< 2.2	< 0.11 UJ	< 0.12 UJ	< 0.11 UJ	< 0.021 UJ
Inorganics (mg/kg)											
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	**78.1**	**87.3**	**77.5**	**78.9**	**77.5**	**77.7**	**82.3**
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-09			PAR-57-SS-10		
Sample ID					FTMM-57-SS09-0.5-1.0	FTMM-57-SS09-2.0-2.5	FTMM-57-SS09-5.5-6.0	FTMM-57-SS10-0.0-0.5	FTMM-57-SS10-3.0-3.5	FTMM-57-SS10-7.0-7.5
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)										
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.77 J**	**0.0023 J**	**10**	**0.27**	**0.0053 J**	< 0.0044
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.88**	**0.0031 J**	**8**	**0.27**	**0.0049 J**	< 0.0044
Benzo(b)fluoranthene	1.1	21	0.3	-	**1.2 J**	**0.0039 J**	**11**	**0.39**	**0.0058 J**	< 0.0044
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	**0.35 J**	< 0.0038	**3.3**	**0.12**	**0.0031 J**	< 0.0044
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**0.29 J**	< 0.0038	**1.8**	**0.075**	< 0.0044	< 0.0044
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.57 J**	< 0.0038	**4.5**	**0.2**	**0.0031 J**	< 0.0044
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)										
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)										
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)										
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids										
Percent Solids (percent)	NLE	NLE	NLE	-	**91.4**	**86**	**91.4**	**89.3**	**75.1**	**75.1**
Wet Chemistry - Solids										
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-11				PAR-57-SS-12			
Sample ID					FTMM-57-SS11-0.0-0.5	FTMM-57-SS111-3.0-3.5	FTMM-57-SS11-3.0-3.5	FTMM-57-SS11-7.0-7.5	FTMM-57-SS112-0.0-0.5	FTMM-57-SS12-0.0-0.5	FTMM-57-SS12-3.0-3.5	FTMM-57-SS12-7.0-7.5
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)												
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)												
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.25 J**	**0.015**	**0.01**	**0.0035 J**	**0.24 J**	**4.7 J**	**0.043**	**0.026**
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.21 J**	**0.015**	**0.012**	**0.0039 J**	**0.26 J**	**3.7 J**	**0.039**	**0.02**
Benzo(b)fluoranthene	1.1	21	0.3	-	**0.27 J**	**0.019**	**0.016**	**0.0048 J**	**0.37 J**	**4.5 J**	**0.054**	**0.026**
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	**0.11 J**	**0.0042 J**	**0.005 J**	< 0.0043	**0.11 J**	**2 J**	**0.024**	**0.011**
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**0.056 J**	< 0.0038	< 0.0038	< 0.0043	**0.046 J**	**0.85 J**	**0.01**	< 0.0039
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.14 J**	**0.011**	**0.005 J**	**0.0026 J**	**0.16 J**	**2.3 J**	**0.023**	**0.0093**
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)												
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)												
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)												
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids												
Percent Solids (percent)	NLE	NLE	NLE	-	**92.1**	**87.8**	**86.2**	**76.2**	**94.5**	**88.9**	**93.5**	**85.6**
Wet Chemistry - Solids												
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-13			PAR-57-SS-14		
Sample ID					FTMM-57-SS13-0.0-0.5	FTMM-57-SS13-3.0-3.5	FTMM-57-SS13-6.5-7.0	FTMM-57-SS14-0.0-0.5	FTMM-57-SS14-3.0-3.5	FTMM-57-SS14-5.0-5.5
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)										
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.98**	< 0.0039	< 0.0041	**1.2**	**0.035**	< 0.0037
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.89**	< 0.0039	< 0.0041	**0.97**	**0.035**	< 0.0037
Benzo(b)fluoranthene	1.1	21	0.3	-	**1.2**	< 0.0039	< 0.0041	**1.4**	**0.041**	< 0.0037
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	**0.31**	< 0.0039	< 0.0041	**0.48**	**0.014**	< 0.0037
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**0.17**	< 0.0039	< 0.0041	**0.19**	**0.012**	< 0.0037
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.52**	< 0.0039	< 0.0041	**0.51**	**0.023**	< 0.0037
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)										
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)										
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)										
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids										
Percent Solids (percent)	NLE	NLE	NLE	-	**88.3**	**85.6**	**80.7**	**88**	**91.3**	**90.6**
Wet Chemistry - Solids										
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-15			PAR-57-SS-16		
Sample ID					FTMM-57-SS15-0.0-0.5	FTMM-57-SS15-3.0-3.5	FTMM-57-SS15-5.5-6.0	FTMM-57-SS16-0.0-0.5	FTMM-57-SS16-1.5-2.0	FTMM-57-SS16-6.0-6.5
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)										
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.066**	< 0.0039	**0.034**	**0.81**	**0.2**	< 0.0039
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.077**	< 0.0039	**0.031**	**0.66**	**0.22**	< 0.0039
Benzo(b)fluoranthene	1.1	21	0.3	-	**0.092**	< 0.0039	**0.038**	**1.1**	**0.39**	< 0.0039
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	**0.019**	< 0.0039	**0.016**	**0.28**	< 0.035	< 0.0039
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**0.021**	< 0.0039	< 0.0036	< 0.038	< 0.035	< 0.0039
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.047**	< 0.0039	**0.023**	**0.44**	< 0.035	< 0.0039
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)										
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)										
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)										
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids										
Percent Solids (percent)	NLE	NLE	NLE	-	**90.2**	**84.9**	**92.4**	**87.4**	**93.3**	**84.5**
Wet Chemistry - Solids										
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-17			PAR-57-SS-18		PAR-57-SS-19	
Sample ID					FTMM-57-SS17-0.0-0.5	FTMM-57-SS17-3.0-3.5	FTMM-57-SS17-5.5-6.0	FTMM-57-SS18-0.0-0.5	FTMM-57-SS18-5.0-5.5	FTMM-57-SS19-0.0-0.5	FTMM-57-SS19-5.5-6.0
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)											
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**4.3**	< 0.004	**0.0027 J**	**3.7**	**0.037**	< 0.18	< 0.0045
Benzo(a)pyrene	0.11	2.1	0.029	-	**4.8**	< 0.004	**0.0023 J**	**2.3**	**0.035**	< 0.18	< 0.0045
Benzo(b)fluoranthene	1.1	21	0.3	-	**6.1**	< 0.004	< 0.0038	**3.8**	**0.049**	< 0.18	< 0.0045
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	**2.2**	< 0.004	**0.0046 J**	**1.1**	**0.013**	< 0.18	< 0.0045
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**1.2**	< 0.004	< 0.0038	**0.4**	**0.0068 J**	< 0.18	< 0.0045
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**2.5**	< 0.004	< 0.0038	**1.1**	**0.025**	< 0.18	< 0.0045
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)											
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)											
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	**96.6**	**82.8**	**87.5**	**88.3**	**87.7**	**93.8**	**73.7**
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-20			PAR-57-SS-21		PAR-57-SS-22	
Sample ID					FTMM-57-SS20-0.0-0.5	FTMM-57-SS20-3.0-3.5	FTMM-57-SS20-5.0-5.5	FTMM-57-SS21-0.0-0.5	FTMM-57-SS21-3.0-3.5	FTMM-57-SS22-0.0-0.5	FTMM-57-SS22-3.0-3.5
Sample Date					10/1/2015	10/1/2015	10/1/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015
Volatile Organic Compounds (mg/kg)											
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.27**	**0.023**	**0.51**	**7.8**	**0.15**	**0.32**	**0.033**
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.3**	**0.013**	**0.27**	**8.2**	**0.15**	**0.39**	**0.035**
Benzo(b)fluoranthene	1.1	21	0.3	-	**0.44**	**0.02**	**0.4**	**11**	**0.2**	**0.53**	**0.048**
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	**0.12**	**0.013**	**0.17**	**3.2**	**0.061**	**0.17**	**0.015**
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**0.079**	< 0.0039	< 0.039	**2.3**	**0.039**	**0.1**	**0.0086**
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.2**	**0.011**	**0.21**	**6**	**0.098**	**0.38**	**0.025**
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)											
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)											
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	**84**	**85.5**	**83.7**	**96.3**	**87.6**	**90.1**	**92.8**
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-23		PAR-57-SS-24	PAR-57-SS-25	P57-A1			P57-A1-A	P57-A1-B	P57-A1-C
Sample ID					FTMM-57-SS23-0.0-0.5	FTMM-57-SS23-3.0-3.5	FTMM-57-SS24-0.0-0.5	FTMM-57-SS25-0.0-0.5	P57-A1-A	P57-A1-B	P57-A1-C	P57-SS-A1-A-6.5-7.0	P57-SS-A1-B-6.5-7.0	P57-SS-A1-C-8.0-8.5
Sample Date					10/2/2015	10/2/2015	10/2/2015	10/2/2015	12/11/2007	12/11/2007	12/11/2007	11/22/2010	11/22/2010	11/22/2010
Volatile Organic Compounds (mg/kg)														
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	< 0.26	**0.4**	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	< 0.26	< 0.33	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	< 0.26	< 0.33	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	< 0.26	< 0.33	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	< 0.78	< 0.99	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	< 0.26	< 0.33	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	< 0.26	< 0.33	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)														
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	**1.4**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	**1.2**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	**0.76 J**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	**5.6**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Benzo(a)anthracene	1.1	21	0.011	-	**0.21**	**0.06**	**0.1**	**0.0076**	**9.5 JD**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.28**	**0.059**	**0.1**	**0.0076**	**9.9**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Benzo(b)fluoranthene	1.1	21	0.3	-	**0.4**	**0.085**	**0.16**	**0.0087**	**9.9 JD**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	**3.4**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Benzo(k)fluoranthene	11	210	2.9	-	**0.12**	**0.037**	**0.061**	**0.0018 J**	**7**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	< 1.1	NA	**0.08 J**	< 0.62	< 0.62	< 0.65
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	< 1.1	NA	< 1.3	< 0.62	< 0.62	< 0.65
Chrysene	110	2,100	9	-	NA	NA	NA	NA	**10 JD**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**0.07**	**0.014**	**0.022**	< 0.0036	NA	NA	NA	< 0.62	< 0.62	< 0.65
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	**1.8**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	**0.21 J**	NA	**0.99 J**	< 0.62	< 0.62	< 0.65
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	**25 D**	NA	**0.058 J**	< 0.62	< 0.62	< 0.65
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	**2.2**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.24**	**0.037**	**0.072**	**0.0047 J**	**3.2**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	**0.88 J**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	**19 D**	NA	< 1.3	< 0.62	< 0.62	< 0.65
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	**22 D**	NA	**0.05 J**	< 0.62	< 0.62	< 0.65
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	**97.4 J**	**114 J**	**91 J**
PCBs (mg/kg)														
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)														
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	**17.8**	NA	**9.11**	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	**0.769**	NA	**0.926**	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	**0.325**	NA	**0.221**	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	**1.98**	NA	**0.526**	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	**15.9**	NA	**0.525**	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	< 0.1	NA	< 0.119	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	**7.56**	NA	**4.39**	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	**42.5**	NA	< 41.667	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	**45.7**	NA	**60.5**	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	**39.1**	NA	**46.9**	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	**88.5**	**87.5**	**79.8**	**92.6**	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	P57-A1-D	P57-A1-E	P57-A2			P57-A3			P57-A4			P57-A5		
Sample ID					P57-SS-A1-D-6.0-6.5	P57-SS-A1-E-5.5-6.0	P57-A2-A	P57-A2-B	P57-A2-C	P57-A3-A	P57-A3-B	P57-A3-C	P57-A4-A	P57-A4-B	P57-A4-C	P57-A5-A	P57-A5-B	P57-A5-C
Sample Date					11/22/2010	11/22/2010	12/8/2007	12/8/2007	12/8/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007
Volatile Organic Compounds (mg/kg)																		
Acetone	6,100	67,000	0.29	-	NA	NA	NA	< 0.24	< 0.32	NA	**0.42**	**0.3**	NA	**0.043 J**	**0.45**	NA	**0.34**	**0.42**
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	**0.017 J**	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	**0.023 J**	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28
Toluene	490	4,700	0.076	-	NA	NA	NA	**0.077 J**	< 0.32	NA	< 0.26	< 0.25	NA	**0.069 J**	< 0.29	NA	< 0.25	< 0.28
Total Xylenes	58	250	0.019	-	NA	NA	NA	**0.35 J**	< 0.95	NA	< 0.78	< 0.75	NA	< 1	< 0.87	NA	< 0.76	< 0.84
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	< 0.24	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	**0.069 J**	< 0.28
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	< 0.24	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28
Semivolatile Organic Compounds (mg/kg)																		
2-Methylnaphthalene	24	300	0.019	-	< 0.63	NA U	**0.075 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Acenaphthene	360	4,500	0.55	-	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	**0.085 J**	NA	< 1.2
Acenaphthylene	NLE	NLE	NLE	-	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	**0.077 J**	NA	< 1.1	**0.061 J**	NA	< 1.2
Anthracene	1,800	23,000	5.8	-	< 0.63	NA U	**0.055 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.16 J**	NA	< 1.1	**0.18 J**	NA	< 1.2
Benzo(a)anthracene	1.1	21	0.011	-	< 0.63	NA U	**0.22 J**	NA	< 1.3	**0.1 J**	NA	< 1.1	**0.31 J**	NA	< 1.1	**0.34 J**	NA	< 1.2
Benzo(a)pyrene	0.11	2.1	0.029	-	< 0.63	NA U	**0.21 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.35 J**	NA	< 1.1	< 1.1	NA	< 1.2
Benzo(b)fluoranthene	1.1	21	0.3	-	< 0.63	NA U	**0.33 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.47 J**	NA	< 1.1	**0.52 J**	NA	< 1.2
Benzo(ghi)perylene	NLE	NLE	NLE	-	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Benzo(k)fluoranthene	11	210	2.9	-	< 0.63	NA U	**0.11 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.16 J**	NA	< 1.1	**0.21 J**	NA	< 1.2
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	< 0.63	NA U	**0.099 J**	NA	**0.052 J**	< 1.2	NA	**0.086 J**	**0.15 J**	NA	< 1.1	**3.2**	NA	**0.067 J**
Butyl benzyl phthalate	290	1,200	0.24	-	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Chrysene	110	2,100	9	-	< 0.63	NA U	**0.27 J**	NA	< 1.3	**0.13 J**	NA	< 1.1	**0.39 J**	NA	< 1.1	**0.43 J**	NA	< 1.2
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7.3	100	0.015	-	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	**0.032 J**	NA	< 1.1	**0.061 J**	NA	< 1.2
Di-n-butylphthalate	630	8,200	0.23	-	< 0.63	NA U	< 2.7	NA	< 1.8	**0.82 J**	NA	**1.5**	< 0.49	NA	< 1.4	**1.3**	NA	**0.3 J**
Fluoranthene	240	3,000	8.9	-	< 0.63	NA U	**0.42 J**	NA	< 1.3	**0.28 J**	NA	< 1.1	**0.68 J**	NA	< 1.1	**0.9 J**	NA	**0.077 J**
Fluorene	240	3,000	0.54	-	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	< 0.63	NA U	**0.082 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Naphthalene	3.8	17	0.00054	-	< 0.63	NA U	**0.051 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2
Phenanthrene	NLE	NLE	NLE	-	< 0.63	NA U	**0.2 J**	NA	< 1.3	**0.14 J**	NA	< 1.1	**0.51 J**	NA	**0.041 J**	**0.66 J**	NA	**0.057 J**
Pyrene	180	2,300	1.3	-	< 0.63	NA U	**0.41 J**	NA	< 1.3	**0.3 J**	NA	< 1.1	**0.82 J**	NA	**0.034 J**	**1.1 J**	NA	**0.074 J**
TIC SVOCs (mg/kg)																		
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	**110 J**	**99 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																		
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																		
Arsenic	0.68	3	0.0015	22.9	NA	NA	**7.39**	NA	**11.4**	**12.4**	NA	**2.73**	**6.16**	NA	**8.12**	**6.05**	NA	**6.04**
Beryllium	16	230	1.9	2	NA	NA	**0.882**	NA	**1.54**	**1.35**	NA	**0.271**	**0.527**	NA	**1.61**	**0.52**	NA	**1.02**
Cadmium	7.1	98	0.069	ND	NA	NA	**0.384**	NA	**0.311**	**0.426**	NA	**0.112**	**0.468**	NA	**0.497**	**0.425**	NA	**0.203**
Cobalt	2.3	35	0.027	2.5	NA	NA	**3.48**	NA	**0.832**	**1.79**	NA	< 0.338	**8.52**	NA	**1.3**	**4.8**	NA	< 0.347
Lead	400	800	NLE	19.5	NA	NA	**22.8**	NA	**3.88**	**11.2**	NA	**3.01**	**21**	NA	< 0.351	**29.3**	NA	**3.05**
Mercury	2.3	35	0.0033	ND	NA	NA	< 0.11	NA	< 0.122	< 0.116	NA	< 0.099	< 0.105	NA	< 0.109	< 0.113	NA	< 0.101
Nickel	150	2,200	2.6	8.4	NA	NA	**10.4**	NA	**50.3**	**14.6**	NA	**2.76**	**17.6**	NA	**44.1**	**11.5**	NA	**5.57**
Sodium	NLE	NLE	NLE	51.6	NA	NA	< 38.48	NA	< 43.926	< 42.214	NA	< 38.483	**904**	NA	< 37.586	**434**	NA	< 39.424
Vanadium	39	580	8.6	94.1	NA	NA	**49.9**	NA	**86.1**	**77.6**	NA	**18.1**	**60.4**	NA	**70.2**	**43.3**	NA	**40.9**
Zinc	2,300	35,000	37	81.4	NA	NA	**61.7**	NA	**72.6**	**70.2**	NA	**36.5**	**65**	NA	**165**	**74.4**	NA	**80.4**
Wet Chemistry - Solids																		
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																		
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	P57-A6			P57-A7			P57-A8		
Sample ID					P57-A6-A	P57-A6-B	P57-A6-C	P57-A7-A	P57-A7-B	P57-A7-C	P57-A8-A	P57-A8-B	P57-A8-C
Sample Date					12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007
Volatile Organic Compounds (mg/kg)													
Acetone	6,100	67,000	0.29	-	NA	**0.4**	**0.38**	NA	**0.61**	**0.34**	NA	**0.39**	**0.56**
Benzene	1.2	5.1	0.00023	-	NA	< 0.27	< 0.26	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27
Ethyl benzene	5.8	25	0.0017	-	NA	< 0.27	< 0.26	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27
Toluene	490	4,700	0.076	-	NA	< 0.27	< 0.26	NA	< 0.27	**0.024 J**	NA	< 0.26	< 0.27
Total Xylenes	58	250	0.019	-	NA	< 0.81	< 0.78	NA	< 0.82	**0.021 J**	NA	< 0.77	< 0.81
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	< 0.27	< 0.26	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27
Vinyl acetate	91	380	0.0087	-	NA	< 0.27	< 0.26	NA	< 0.27	< 0.28	NA	**0.21 J**	< 0.27
Semivolatile Organic Compounds (mg/kg)													
2-Methylnaphthalene	24	300	0.019	-	**0.091 J**	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1
Acenaphthene	360	4,500	0.55	-	**0.07 J**	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1
Acenaphthylene	NLE	NLE	NLE	-	**0.059 J**	NA	< 1.1	< 1.1	NA	**0.069 J**	**0.17 J**	NA	< 1.1
Anthracene	1,800	23,000	5.8	-	**0.15 J**	NA	**0.03 J**	**0.058 J**	NA	**0.039 J**	**0.52 J**	NA	< 1.1
Benzo(a)anthracene	1.1	21	0.011	-	**0.35 J**	NA	**0.054 J**	**0.24 J**	NA	**0.1 J**	**1.1 J**	NA	< 1.1
Benzo(a)pyrene	0.11	2.1	0.029	-	< 1.1	NA	< 1.1	**0.24 J**	NA	**0.088 J**	< 4.4	NA	< 1.1
Benzo(b)fluoranthene	1.1	21	0.3	-	< 1.1	NA	**0.069 J**	**0.43 J**	NA	**0.072 J**	< 4.4	NA	< 1.1
Benzo(ghi)perylene	NLE	NLE	NLE	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1
Benzo(k)fluoranthene	11	210	2.9	-	< 1.1	NA	**0.039 J**	**0.1 J**	NA	**0.077 J**	< 4.4	NA	< 1.1
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	< 1.1	NA	**0.044 J**	**1.9**	NA	**0.73 J**	**1.2 J**	NA	**0.11 J**
Butyl benzyl phthalate	290	1,200	0.24	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1
Chrysene	110	2,100	9	-	**0.47 J**	NA	**0.077 J**	**0.32 J**	NA	**0.14 J**	**1.5 J**	NA	< 1.1
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7.3	100	0.015	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.1	**0.17 J**	NA	< 1.1
Di-n-butylphthalate	630	8,200	0.23	-	< 1.1	NA	< 0.38	**1.5**	NA	**0.81 J**	< 2.3	NA	< 3.8
Fluoranthene	240	3,000	8.9	-	**0.85 J**	NA	**0.13 J**	**0.58 J**	NA	**0.14 J**	**2.4 J**	NA	**0.055 J**
Fluorene	240	3,000	0.54	-	**0.073 J**	NA	< 1.1	< 1.1	NA	< 1.1	**0.28 J**	NA	< 1.1
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	< 1.1	NA	< 1.1	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1
Naphthalene	3.8	17	0.00054	-	**0.043 J**	NA	< 1.1	< 1.1	NA	< 1.1	**0.16 J**	NA	< 1.1
Phenanthrene	NLE	NLE	NLE	-	**0.67 J**	NA	**0.1 J**	**0.27 J**	NA	**0.05 J**	**2.1 J**	NA	**0.031 J**
Pyrene	180	2,300	1.3	-	**1.3**	NA	**0.15 J**	**0.55 J**	NA	**0.21 J**	**4 J**	NA	**0.051 J**
TIC SVOCs (mg/kg)													
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)													
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)													
Arsenic	0.68	3	0.0015	22.9	**4.58**	NA	**13.2**	**8.01**	NA	**4.58**	**2.84**	NA	**8.05**
Beryllium	16	230	1.9	2	**0.346**	NA	**1.23**	**0.529**	NA	**0.524**	**0.259**	NA	**0.556**
Cadmium	7.1	98	0.069	ND	**0.435**	NA	**0.359**	**0.329**	NA	**0.185**	**0.247**	NA	**0.0843**
Cobalt	2.3	35	0.027	2.5	**5.53**	NA	**1.7**	**1.32**	NA	**0.876**	**6.6**	NA	< 0.337
Lead	400	800	NLE	19.5	**15.7**	NA	**7.57**	**29.5**	NA	**7**	**9.78**	NA	**1.65**
Mercury	2.3	35	0.0033	ND	< 0.099	NA	< 0.108	< 0.106	NA	< 0.101	< 0.104	NA	< 0.109
Nickel	150	2,200	2.6	8.4	**20**	NA	**10.3**	**6.45**	NA	**4.43**	**14.5**	NA	**2.27**
Sodium	NLE	NLE	NLE	51.6	**539**	NA	< 41.362	< 36.479	NA	< 38.989	**429**	NA	< 38.358
Vanadium	39	580	8.6	94.1	**46.8**	NA	**63.9**	**37.5**	NA	**29.7**	**70.6**	NA	**40.6**
Zinc	2,300	35,000	37	81.4	**70.4**	NA	**58.2**	**76.4**	NA	**35.8**	**50.4**	NA	**14.4**
Wet Chemistry - Solids													
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids													
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	P57-A9				P57-B3			P57-B4		
Sample ID					P57-A9-A	P57-A9-B	P57-A9-C	P57-A9-C DUP	P57-B3-A	P57-B3-B	P57-B3-C	P57-B4-A	P57-B4-B	P57-B4-C
Sample Date					12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007
Volatile Organic Compounds (mg/kg)														
Acetone	6,100	67,000	0.29	-	NA	**0.51**	**0.49**	**0.73**	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28
Benzene	1.2	5.1	0.00023	-	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28
Ethyl benzene	5.8	25	0.0017	-	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28
Toluene	490	4,700	0.076	-	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28
Total Xylenes	58	250	0.019	-	NA	< 0.79	< 0.75	< 0.87	NA	< 0.79	< 0.98	NA	< 0.79	< 0.84
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28
Vinyl acetate	91	380	0.0087	-	NA	< 0.26	< 0.25	**0.24 J**	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28
Semivolatile Organic Compounds (mg/kg)														
2-Methylnaphthalene	24	300	0.019	-	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.08 J**	NA	< 1.1
Acenaphthene	360	4,500	0.55	-	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.041 J**	NA	< 1.1
Acenaphthylene	NLE	NLE	NLE	-	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.071 J**	NA	< 1.1
Anthracene	1,800	23,000	5.8	-	< 1.2	NA	< 1.1	**0.11 J**	**0.049 J**	NA	< 1.2	**0.2 J**	NA	< 1.1
Benzo(a)anthracene	1.1	21	0.011	-	**0.089 J**	NA	< 1.1	**0.23 J**	**0.21 J**	NA	< 1.2	**0.6 J**	NA	< 1.1
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.08 J**	NA	< 1.1	**0.15 J**	< 1.1	NA	< 1.2	**0.48 J**	NA	< 1.1
Benzo(b)fluoranthene	1.1	21	0.3	-	**0.13 J**	NA	< 1.1	**0.22 J**	< 1.1	NA	< 1.2	**0.79 J**	NA	< 1.1
Benzo(ghi)perylene	NLE	NLE	NLE	-	< 1.2	NA	< 1.1	**0.1 J**	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1
Benzo(k)fluoranthene	11	210	2.9	-	< 1.2	NA	< 1.1	**0.093 J**	< 1.1	NA	< 1.2	**0.36 J**	NA	< 1.1
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	**0.18 J**	NA	**0.1 J**	**0.062 J**	**0.15 J**	NA	< 1.2	**0.13 J**	NA	< 1.1
Butyl benzyl phthalate	290	1,200	0.24	-	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1
Chrysene	110	2,100	9	-	**0.12 J**	NA	< 1.1	**0.25 J**	**0.25 J**	NA	< 1.2	**0.69 J**	NA	< 1.1
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7.3	100	0.015	-	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.064 J**	NA	< 1.1
Di-n-butylphthalate	630	8,200	0.23	-	**0.34 J**	NA	**1.1 J**	**1 J**	< 1.6	NA	< 0.63	< 1.7	NA	< 0.61
Fluoranthene	240	3,000	8.9	-	**0.17 J**	NA	< 1.1	**0.68 J**	**0.32 J**	NA	< 1.2	**1.4**	NA	< 1.1
Fluorene	240	3,000	0.54	-	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.038 J**	NA	< 1.1
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.15 J**	NA	< 1.1
Naphthalene	3.8	17	0.00054	-	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.065 J**	NA	< 1.1
Phenanthrene	NLE	NLE	NLE	-	**0.1 J**	NA	< 1.1	**0.51 J**	**0.18 J**	NA	< 1.2	**0.75 J**	NA	< 1.1
Pyrene	180	2,300	1.3	-	**0.2 J**	NA	< 1.1	**0.58 J**	**0.5 J**	NA	< 1.2	**1.6**	NA	< 1.1
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)														
Arsenic	0.68	3	0.0015	22.9	**10.3**	NA	**2.42**	**1.7**	**7.58**	NA	**11**	**5.89**	NA	**6.21**
Beryllium	16	230	1.9	2	**0.933**	NA	**0.462**	**0.475**	**1.25**	NA	**0.917**	**0.517**	NA	**0.516**
Cadmium	7.1	98	0.069	ND	**0.306**	NA	**0.135**	**0.126**	**0.193**	NA	**0.261**	**0.318**	NA	**0.414**
Cobalt	2.3	35	0.027	2.5	**1.42**	NA	< 0.332	< 0.333	**1.94**	NA	**2.47**	**2.82**	NA	**2.93**
Lead	400	800	NLE	19.5	**28.9**	NA	**40.7**	**38**	**7.69**	NA	**7.04**	**20.3**	NA	**51.4**
Mercury	2.3	35	0.0033	ND	< 0.109	NA	< 0.106	< 0.114	< 0.11	NA	< 0.116	< 0.102	NA	< 0.102
Nickel	150	2,200	2.6	8.4	**6.97**	NA	**2.35**	**2.49**	**6.29**	NA	**11**	**8.92**	NA	**8.99**
Sodium	NLE	NLE	NLE	51.6	< 38.584	NA	< 37.822	< 37.867	< 37.752	NA	< 43.828	< 36.969	NA	< 39.984
Vanadium	39	580	8.6	94.1	**47**	NA	**19.4**	**18.2**	**51.2**	NA	**62.7**	**40.8**	NA	**40**
Zinc	2,300	35,000	37	81.4	**57.8**	NA	**29.4**	**28.8**	**72.5**	NA	**57.9**	**50.5**	NA	**84.8**
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	P57-B5				P57-C3				P57-C4			P57-C5		
Sample ID					P57-B5-A	P57-B5-B	P57-B5-C	P57-B5-C DUP	P57-C3-A	P57-C3-B	P57-C3-C	P57-C3-C DUP	P57-C4-A	P57-C4-B	P57-C4-C	P57-C5-A	P57-C5-B	P57-C5-C
Sample Date					12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007
Volatile Organic Compounds (mg/kg)																		
Acetone	6,100	67,000	0.29	-	NA	< 0.27	< 0.35	**0.28 J**	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	**0.28 J**	< 0.32
Benzene	1.2	5.1	0.00023	-	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Ethyl benzene	5.8	25	0.0017	-	NA	< 0.27	< 0.35	< 0.3	NA	**0.011 J**	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Toluene	490	4,700	0.076	-	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Total Xylenes	58	250	0.019	-	NA	< 0.81	< 1.06	< 0.9	NA	< 0.81	< 0.78	< 0.78	NA	< 0.92	< 0.81	NA	< 0.99	< 0.96
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Vinyl acetate	91	380	0.0087	-	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32
Semivolatile Organic Compounds (mg/kg)																		
2-Methylnaphthalene	24	300	0.019	-	< 1.1	NA	< 1.2	< 1.2	**0.075 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	< 1.1	NA	< 1.1
Acenaphthene	360	4,500	0.55	-	**0.066 J**	NA	< 1.2	< 1.2	**0.54 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	**0.078 J**	NA	< 1.1
Acenaphthylene	NLE	NLE	NLE	-	**0.039 J**	NA	< 1.2	< 1.2	**0.097 J**	NA	< 1.1	< 1.1	**0.19 J**	NA	< 1.1	**0.1 J**	NA	< 1.1
Anthracene	1,800	23,000	5.8	-	**0.2 J**	NA	< 1.2	< 1.2	**1.2**	NA	< 1.1	< 1.1	**0.13 J**	NA	< 1.1	**0.43 J**	NA	< 1.1
Benzo(a)anthracene	1.1	21	0.011	-	**0.46 J**	NA	< 1.2	< 1.2	**2.9**	NA	**0.1 J**	< 1.1	**0.42 J**	NA	< 1.1	**1.2**	NA	< 1.1
Benzo(a)pyrene	0.11	2.1	0.029	-	< 1.1	NA	< 1.2	< 1.2	**2**	NA	**0.081 J**	< 1.1	**0.47 J**	NA	< 1.1	**0.95 J**	NA	< 1.1
Benzo(b)fluoranthene	1.1	21	0.3	-	**0.52 J**	NA	< 1.2	< 1.2	**3.1**	NA	**0.11 J**	< 1.1	**0.65 J**	NA	< 1.1	**1.5**	NA	< 1.1
Benzo(ghi)perylene	NLE	NLE	NLE	-	< 1.1	NA	< 1.2	< 1.2	**0.73 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	< 1.1	NA	< 1.1
Benzo(k)fluoranthene	11	210	2.9	-	**0.35 J**	NA	< 1.2	< 1.2	**1.9**	NA	**0.059 J**	< 1.1	**0.29 J**	NA	< 1.1	**0.48 J**	NA	< 1.1
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	**0.3 J**	NA	< 1.2	**0.087 J**	**0.22 J**	NA	**0.092 J**	**0.09 J**	**0.2 J**	NA	< 1.1	**1.1**	NA	< 1.1
Butyl benzyl phthalate	290	1,200	0.24	-	**0.13 J**	NA	< 1.2	< 1.2	< 1.1	NA	< 1.1	< 1.1	< 1	NA	< 1.1	< 1.1	NA	< 1.1
Chrysene	110	2,100	9	-	**0.51 J**	NA	< 1.2	< 1.2	**3**	NA	**0.12 J**	< 1.1	**0.52 J**	NA	< 1.1	**1.3**	NA	< 1.1
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7.3	100	0.015	-	**0.057 J**	NA	< 1.2	< 1.2	**0.26 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	**0.058 J**	NA	< 1.1
Di-n-butylphthalate	630	8,200	0.23	-	< 0.76	NA	< 0.91	< 2.7	< 2	NA	< 2.4	< 0.41	< 0.77	NA	< 0.57	< 0.64	NA	< 0.58
Fluoranthene	240	3,000	8.9	-	**0.99 J**	NA	< 1.2	< 1.2	**7.5**	NA	**0.12 J**	**0.041 J**	**0.64 J**	NA	< 1.1	**2.6**	NA	< 1.1
Fluorene	240	3,000	0.54	-	< 1.1	NA	< 1.2	< 1.2	**0.38 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	**0.11 J**	NA	< 1.1
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	< 1.1	NA	< 1.2	< 1.2	**0.69 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	**0.33 J**	NA	< 1.1
Naphthalene	3.8	17	0.00054	-	< 1.1	NA	< 1.2	< 1.2	**0.12 J**	NA	< 1.1	< 1.1	< 1	NA	< 1.1	< 1.1	NA	< 1.1
Phenanthrene	NLE	NLE	NLE	-	**1 J**	NA	< 1.2	< 1.2	**4.7**	NA	**0.033 J**	< 1.1	**0.26 J**	NA	< 1.1	**1.4**	NA	< 1.1
Pyrene	180	2,300	1.3	-	**1.6**	NA	< 1.2	< 1.2	**9.4**	NA	**0.16 J**	**0.041 J**	**1.2**	NA	< 1.1	**3.6**	NA	< 1.1
TIC SVOCs (mg/kg)																		
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																		
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																		
Arsenic	0.68	3	0.0015	22.9	**5.03**	NA	**7.71**	**9.35**	**2.36**	NA	**4.98**	**3.65**	**5.4**	NA	**11.4**	**4.64**	NA	**2.04**
Beryllium	16	230	1.9	2	**0.54**	NA	**1.06**	**1.18**	**0.494**	NA	**0.637**	**0.508**	**0.59**	NA	**1.33**	**0.615**	NA	**0.326**
Cadmium	7.1	98	0.069	ND	**0.289**	NA	**0.317**	**0.534**	**0.163**	NA	**0.194**	**0.0962**	**0.362**	NA	**0.196**	**0.319**	NA	**0.0535**
Cobalt	2.3	35	0.027	2.5	**5.07**	NA	**1.64**	**1.58**	**0.756**	NA	**1.11**	**1.43**	**8.68**	NA	**1.42**	**3.13**	NA	< 0.326
Lead	400	800	NLE	19.5	**15**	NA	**3.03**	**2.82**	**4.81**	NA	**5.1**	**4.66**	**30.1**	NA	**1.2**	**51.6**	NA	**1.4**
Mercury	2.3	35	0.0033	ND	< 0.107	NA	< 0.114	< 0.11	**0.16**	NA	< 0.1	< 0.101	< 0.098	NA	< 0.096	< 0.099	NA	< 0.099
Nickel	150	2,200	2.6	8.4	**9.44**	NA	**8.71**	**8.98**	**5.59**	NA	**5.79**	**7.16**	**14.1**	NA	**5.97**	**9.05**	NA	**3.63**
Sodium	NLE	NLE	NLE	51.6	**48.6**	NA	< 42.72	< 39.581	< 40.694	NA	< 35.244	< 37.691	**688**	NA	< 36.431	< 40.061	NA	< 37.124
Vanadium	39	580	8.6	94.1	**59.1**	NA	**85.3**	**91.4**	**30.9**	NA	**46.7**	**36.6**	**65.3**	NA	**60**	**65.3**	NA	**24.5**
Zinc	2,300	35,000	37	81.4	**46.2**	NA	**62.6**	**67**	**25.2**	NA	**39.8**	**43.6**	**53.6**	NA	**61.5**	**58.2**	NA	**28**
Wet Chemistry - Solids																		
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																		
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-26				PAR-57-SS-27			PAR-57-SS-28	
Sample ID					PAR-57-SB-126-3.5-4	PAR-57-SB-26-0.5-1	PAR-57-SB-26-3.5-4	PAR-57-SB-26-7.5-8	PAR-57-SB-27-0-0.5	PAR-57-SB-27-3.5-4	PAR-57-SB-27-7.5-8	PAR-57-SB-28-0.5-1	PAR-57-SB-28-3.5-4
Sample Date					4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Volatile Organic Compounds (mg/kg)													
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)													
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.0035 J**	**0.12**	< 0.004	**0.0041 J**	**0.12**	< 0.0039	< 0.0039	**0.4**	**0.003 J**
Benzo(a)pyrene	0.11	2.1	0.029	-	< 0.0042	**0.12**	< 0.004	**0.0021 J**	**0.17**	< 0.0039	< 0.0039	**0.32**	< 0.0042
Benzo(b)fluoranthene	1.1	21	0.3	-	< 0.0042	**0.15**	< 0.004	**0.0031 J**	**0.2**	< 0.0039	< 0.0039	**0.28**	< 0.0042
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	< 0.0042	**0.024**	< 0.004	< 0.0039	**0.027**	< 0.0039	< 0.0039	**0.057**	< 0.0042
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	< 0.0042	**0.099**	< 0.004	< 0.0039	**0.12**	< 0.0039	< 0.0039	**0.16**	< 0.0042
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)													
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)													
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)													
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids													
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids													
Percent Solids (percent)	NLE	NLE	NLE	-	**78.5**	**82.6**	**83.2**	**83.5**	**92.6**	**83.8**	**85.3**	**87.4**	**77.9**

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-30			PAR-57-SS-31			PAR-57-SS-32	
Sample ID					PAR-57-SB-30-0.5-1	PAR-57-SB-30-3.5-4	PAR-57-SB-30-7.5-8	PAR-57-SB-31-0.5-1	PAR-57-SB-31-3.5-4	PAR-57-SB-31-7.5-8	PAR-57-SB-32-0.5-1	PAR-57-SB-32-3.5-4
Sample Date					4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Volatile Organic Compounds (mg/kg)												
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)												
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.3**	< 0.004	**0.0027**	**0.035**	**0.052**	**0.0026 J**	**0.25**	**0.0035 J**
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.32**	< 0.004	**0.003**	**0.061**	**0.07**	< 0.0039	**0.27**	< 0.0038
Benzo(b)fluoranthene	1.1	21	0.3	-	**0.43**	< 0.004	< 0.0036	**0.053**	**0.062**	< 0.0039	**0.34**	< 0.0038
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**0.057**	< 0.004	< 0.0036	**0.014**	**0.018**	< 0.0039	**0.035**	< 0.0038
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.19**	< 0.004	**0.0033**	**0.047**	**0.056**	< 0.0039	**0.21**	< 0.0038
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)												
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)												
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)												
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids												
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids												
Percent Solids (percent)	NLE	NLE	NLE	-	**96**	**83.1**	**90.8**	**86.4**	**93.3**	**84.6**	**82.2**	**86.1**

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-33		PAR-57-SS-34		PAR-57-SS-35		PAR-57-SS-36
Sample ID					PAR-57-SB-33-0.5-1	PAR-57-SB-33-3.5-4	PAR-57-SB-34-0.5-1	PAR-57-SB-34-3.5-4	PAR-57-SB-35-0.5-1	PAR-57-SB-35-3.5-4	PAR-57-SB-36-4.5-5
Sample Date					4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/21/2016
Volatile Organic Compounds (mg/kg)											
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	**0.009**	< 0.0042	**0.0033 J**	< 0.0038	< 0.0038	< 0.004	NA
Benzo(a)pyrene	0.11	2.1	0.029	-	**0.013**	< 0.0042	< 0.0041	< 0.0038	< 0.0038	< 0.004	NA
Benzo(b)fluoranthene	1.1	21	0.3	-	**0.014**	< 0.0042	< 0.0041	< 0.0038	< 0.0038	< 0.004	NA
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	**0.0026 J**	< 0.0042	< 0.0041	< 0.0038	< 0.0038	< 0.004	NA
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	**0.0098**	< 0.0042	< 0.0041	< 0.0038	< 0.0038	< 0.004	NA
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)											
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254	0.12	0.97	0.002	-	NA	NA	NA	NA	NA	NA	< 0.024
Aroclor-1260	0.24	0.99	0.0055	-	NA	NA	NA	NA	NA	NA	< 0.022
Inorganics (mg/kg)											
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	**88.3**	**79.2**	**80.6**	**85.8**	**86.2**	**83.2**	**80.8**

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-37				PAR-57-SS-38		
Sample ID					PAR-57-SB-137-2.5-3	PAR-57-SB-37-0.5-1	PAR-57-SB-37-2.5-3	PAR-57-SB-37-4.5-5	PAR-57-SB-38-0.5-1	PAR-57-SB-38-2.5-3	PAR-57-SB-38-4.5-5
Sample Date					4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016
Volatile Organic Compounds (mg/kg)											
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.11	2.1	0.029	-	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.1	21	0.3	-	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	NA	NA	NA	NA	NA	NA	NA
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)											
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254	0.12	0.97	0.002	-	< 0.022	< 0.021	< 0.022	< 0.023	< 0.022	< 0.023	< 0.024
Aroclor-1260	0.24	0.99	0.0055	-	< 0.02	**0.057**	< 0.019	< 0.021	**0.048**	< 0.02	< 0.022
Inorganics (mg/kg)											
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	**89**	**91**	**89.9**	**84.5**	**88.8**	**85.1**	**80.2**

TABLE 4
DETECTED SOIL SAMPLING RESULTS - COMPARISON TO USEPA RISK BASED SCREENING LEVELS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	2017-06 RSL Residential Soil (HQ=0.1)	2017-06 RSL Industrial Soil (HQ=0.1)	2017-06 RSL Protect GW Risk-Based (HQ=0.1)	Weston 1995 Background (Main Post)	PAR-57-SS-39			PAR-57-SS-40			
Sample ID					PAR-57-SB-39-0.5-1	PAR-57-SB-39-2.5-3	PAR-57-SB-39-4.5-5	PAR-57-SB-140-2.5-3	PAR-57-SB-40-0.5-1	PAR-57-SB-40-2.5-3	PAR-57-SB-40-4.5-5
Sample Date					4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016
Volatile Organic Compounds (mg/kg)											
Acetone	6,100	67,000	0.29	-	NA	NA	NA	NA	NA	NA	NA
Benzene	1.2	5.1	0.00023	-	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	5.8	25	0.0017	-	NA	NA	NA	NA	NA	NA	NA
Toluene	490	4,700	0.076	-	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	58	250	0.019	-	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	2,300	35,000	0.33	-	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	91	380	0.0087	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	24	300	0.019	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	360	4,500	0.55	-	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,800	23,000	5.8	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1	21	0.011	-	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.11	2.1	0.029	-	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.1	21	0.3	-	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	11	210	2.9	-	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	39	160	1.3	-	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	290	1,200	0.24	-	NA	NA	NA	NA	NA	NA	NA
Chrysene	110	2,100	9	-	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.11	2.1	0.096	-	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7.3	100	0.015	-	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	630	8,200	0.23	-	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	240	3,000	8.9	-	NA	NA	NA	NA	NA	NA	NA
Fluorene	240	3,000	0.54	-	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.1	21	0.98	-	NA	NA	NA	NA	NA	NA	NA
Naphthalene	3.8	17	0.00054	-	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Pyrene	180	2,300	1.3	-	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)											
Total TIC, Semi-Volatile	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)											
Aroclor-1254	0.12	0.97	0.002	-	< 0.022	< 0.022	< 0.023	< 0.022	< 0.024	< 0.032	< 0.024
Aroclor-1260	0.24	0.99	0.0055	-	< 0.02	< 0.02	< 0.021	< 0.02	**0.068**	< 0.029	< 0.022
Inorganics (mg/kg)											
Arsenic	0.68	3	0.0015	22.9	NA	NA	NA	NA	NA	NA	NA
Beryllium	16	230	1.9	2	NA	NA	NA	NA	NA	NA	NA
Cadmium	7.1	98	0.069	ND	NA	NA	NA	NA	NA	NA	NA
Cobalt	2.3	35	0.027	2.5	NA	NA	NA	NA	NA	NA	NA
Lead	400	800	NLE	19.5	NA	NA	NA	NA	NA	NA	NA
Mercury	2.3	35	0.0033	ND	NA	NA	NA	NA	NA	NA	NA
Nickel	150	2,200	2.6	8.4	NA	NA	NA	NA	NA	NA	NA
Sodium	NLE	NLE	NLE	51.6	NA	NA	NA	NA	NA	NA	NA
Vanadium	39	580	8.6	94.1	NA	NA	NA	NA	NA	NA	NA
Zinc	2,300	35,000	37	81.4	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids											
Percent Solids (percent)	NLE	NLE	NLE	-	**89.2**	**87.1**	**82.9**	**86.5**	**80.9**	**89.4**	**80**

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) **BOLD** = chemical dectected

3) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

E (or ER) = Estimated result.

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected at or above this value.

J-DL = Elevated sample detection limit due to difficult sample matrix.

U-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

4) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Shade values represent a result that is above the USEPA 2017-06 RSL Residential Soil (HQ=0.1). ####
- Cell Shade values represent a result that is above the USEPA 2017-06 RSL Industrial Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above the USEPA 2017-06 RSL Protect GW Risk-Based (HQ=0.1). ###
- Cell Style values represent a result that is above the Weston 1995 Background (Main Post). ###

  n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified.

  Dash (-) = only background concentrations for metals are being used as comparison criteria.

- Cell Shade values represent a result that is above both the USEPA RSL Residential and Industrial Soil (HQ=0.1), 2017-06. ###
- Cell Shade values represent a result that is above the USEPA RSL Residential, Industrial, Protect GW Risk-Based Soil (HQ=0.1), 2017-06. ###

5) Criteria action level source document and web address.

- The 2017-06 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Region 9 Regional Screening Levels (HQ=0.1)
  http://www.epa.gov/region9/superfund/prg/
- The 2017-06 USEPA RSL Industrial Soil (HQ=0.1) refers to the EPA's Region 9 Regional Screening Levels (HQ=0.1)
  http://www.epa.gov/region9/superfund/prg/
- The 2017-06 USEPA RSL Protect GW Risk-Based (HQ=0.1) refers to the EPA's Region 9 Regional Screening Levels (HQ=0.1)
  http://www.epa.gov/region9/superfund/prg/
- The Weston 1995 Background (Main Post) refers to the FTMM reports.

TABLE 5
SOIL SAMPLING SUMMARY OF EXCEEDANCES
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Analyte	Maximum Detected Concentration		Location of Maximum Concentration	Sample Date	Number of Samples	Number of Detections	NJ Residential Direct Contact SRS (1)		NJ Non-Residential Direct Contact SRS (1)		NJ Impact to GW Soil Screening Level (2)		2017-06 RSL Residential Soil (HQ=0.1) (3)		2017-06 RSL Industrial Soil (HQ=0.1) (3)		2017-06 RSL Protect GW Risk-Based (HQ=0.1) (3)		Weston 1995 Background (Main Post) (4)		Identification of COPCs	
							Action Level	#of Exceedances	Action Level	#of Exceedances	Action Level	#of Exceedances	Action Level	#of Exceedances	Action Level	#of Exceedances	Action Level	#of Exceedances	Action Level	#of Exceedances	Evaluated as COPC in Risk Assessment?	Rationale
Volatile Organic Compounds (mg/kg)																						
Acetone	0.73		P57-A9	12/11/2007	33	18	70,000	0	NLE	NLE	19	0	6,100	0	67,000	0	0.29	15	-	n/a	No	Less than USEPA Residential RSL
Benzene	0.017	J	P57-A2	12/8/2007	33	1	2	0	5	0	0.005	1	1.2	0	5.1	0	0.00023	1	-	n/a	No	Less than USEPA Residential RSL
Ethyl benzene	0.023	J	P57-A2	12/8/2007	33	2	7,800	0	110,000	0	13	0	5.8	0	25	0	0.0017	2	-	n/a	No	Less than USEPA Residential RSL
Toluene	0.077	J	P57-A2	12/8/2007	33	3	6,300	0	91,000	0	7	0	490	0	4,700	0	0.076	1	-	n/a	No	Less than USEPA Residential RSL
Total Xylenes	0.35	J	P57-A2	12/8/2007	33	2	12,000	0	170,000	0	19	0	58	0	250	0	0.019	2	-	n/a	No	Less than USEPA Residential RSL
Trichlorofluoromethane	0.069	J	P57-A5	12/11/2007	33	1	23,000	0	340,000	0	34	0	2,300	0	35,000	0	0.33	0	-	n/a	No	Less than USEPA Residential RSL
Vinyl acetate	0.24	J	P57-A9	12/11/2007	33	2	NLE	NLE	NLE	NLE	NLE	NLE	91	0	380	0	0.0087	2	-	n/a	No	Less than USEPA Residential RSL
Semivolatile Organic Compounds (mg/kg)																						
2-Methylnaphthalene	1.45		A1	2/1/2010	41	6	230	0	2,400	0	8	0	24	0	300	0	0.019	6	-	n/a	No	Less than USEPA Residential RSL
Acenaphthene	1.2		P57-A1	12/11/2007	41	7	3,400	0	37,000	0	110	0	360	0	4,500	0	0.55	1	-	n/a	No	Less than USEPA Residential RSL
Acenaphthylene	0.76	J	P57-A1	12/11/2007	41	11	NLE	NLE	300,000	0	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	-	n/a	No	No USEPA Residential RSL
Anthracene	5.6		P57-A1	12/11/2007	41	16	17,000	0	30,000	0	2,400	0	1,800	0	23,000	0	5.8	0	-	n/a	No	Less than USEPA Residential RSL
Benzo(a)anthracene	10		FTMM-57-SS09	10/1/2015	112	73	5	3	17	0	0.8	13	1.1	10	21	0	0.011	57	-	n/a	**Yes**	Exceeded USEPA Residential RSL
Benzo(a)pyrene	9.9		P57-A1	12/11/2007	112	60	0.5	14	2	6	0.2	30	0.11	34	2.1	6	0.029	47	-	n/a	**Yes**	Exceeded USEPA Residential RSL
Benzo(b)fluoranthene	11		FTMM-57-SS09 FTMM-57-SS21	10/1/2015 10/2/2015	112	61	5	4	17	0	2	7	1.1	12	21	0	0.3	30	-	n/a	**Yes**	Exceeded USEPA Residential RSL
Benzo(ghi)perylene	3.4		P57-A1	12/11/2007	41	4	380,000	0	30,000	0	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	-	n/a	No	No USEPA Residential RSL
Benzo(k)fluoranthene	7		P57-A1	12/11/2007	85	47	45	0	170	0	25	0	11	0	210	0	2.9	3	-	n/a	No	Less than USEPA Residential RSL
Bis(2-Ethylhexyl)phthalate	3.2		P57-A5	12/11/2007	37	24	35	0	140	0	1,200	0	39	0	160	0	1.3	2	-	n/a	No	Less than USEPA Residential RSL
Butyl benzyl phthalate	0.13	J	P57-B5	12/10/2007	37	1	1,200	0	14,000	0	230	0	290	0	1,200	0	0.24	0	-	n/a	No	Less than USEPA Residential RSL
Chrysene	10	JD	P57-A1	12/11/2007	41	20	450	0	1,700	0	80	0	110	0	2,100	0	9	1	-	n/a	No	Less than USEPA Residential RSL
Dibenz(a,h)anthracene	2.3		FTMM-57-SS21	10/2/2015	79	31	0.5	4	2	1	0.8	4	0.11	9	2.1	1	0.096	10	-	n/a	**Yes**	Exceeded USEPA Residential RSL
Dibenzofuran	1.8		P57-A1	12/11/2007	37	8	NLE	NLE	NLE	NLE	NLE	NLE	7.3	0	100	0	0.015	8	-	n/a	No	Less than USEPA Residential RSL
Di-n-butylphthalate	1.5		P57-A3 P57-A7	12/11/2007 12/11/2007	37	11	6,100	0	68,000	0	760	0	630	0	8,200	0	0.23	10	-	n/a	No	Less than USEPA Residential RSL
Fluoranthene	25	D	P57-A1	12/11/2007	41	24	2,300	0	24,000	0	1,300	0	240	0	3,000	0	8.9	1	-	n/a	No	Less than USEPA Residential RSL
Fluorene	2.2		P57-A1	12/11/2007	41	6	2,300	0	24,000	0	170	0	240	0	3,000	0	0.54	1	-	n/a	No	Less than USEPA Residential RSL
Indeno(1,2,3-cd)pyrene	6		FTMM-57-SS21	10/2/2015	112	49	5	1	17	0	7	0	1.1	5	21	0	0.98	6	-	n/a	**Yes**	Exceeded USEPA Residential RSL
Naphthalene	0.99		A1	2/1/2010	41	7	6	0	17	0	25	0	3.8	0	17	0	0.00054	7	-	n/a	No	Less than USEPA Residential RSL
Phenanthrene	19	D	P57-A1	12/11/2007	41	24	NLE	NLE	300,000	0	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	-	n/a	No	No USEPA Residential RSL
Pyrene	22	D	P57-A1	12/11/2007	41	26	1,700	0	18,000	0	840	0	180	0	2,300	0	1.3	7	-	n/a	No	Less than USEPA Residential RSL
TIC SVOCs (mg/kg)																						
Total TIC, Semi-Volatile	116.7	J	C5	2/1/2010	9	9	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	-	n/a	No	No USEPA Residential RSL
PCBs (mg/kg)																						
Aroclor-1254	8.8		FTMM-57-SS04	9/18/2015	25	3	NLE	NLE	NLE	NLE	NLE	NLE	0.12	3	0.97	1	0.002	3	-	n/a	No	Soil excavated at sample location FTMM-57-SS-04 during 2016 IRA. PCB contamination no longer present on site
Aroclor-1260	0.28	J	FTMM-57-SS04	9/18/2015	25	4	NLE	NLE	NLE	NLE	NLE	NLE	0.24	1	0.99	0	0.0055	4	-	n/a	No	Soil excavated at sample location FTMM-57-SS-04 during 2016 IRA. PCB contamination no longer present on site
Inorganics (mg/kg)																						
Arsenic	17.8		P57-A1	12/11/2007	33	33	19	0	19	0	19	0	0.68	33	3	27	0.0015	33	22.9	0	**Yes**	Exceeded USEPA Residential RSL
Beryllium	1.61		P57-A4	12/10/2007	33	33	16	0	140	0	0.7	14	16	0	230	0	1.9	0	2	0	No	Less than USEPA Residential RSL
Cadmium	0.534		P57-B5	12/10/2007	33	33	78	0	78	0	2	0	7.1	0	98	0	0.069	32	ND	33	No	Less than USEPA Residential RSL
Cobalt	8.68		P57-C4	12/10/2007	33	27	1,600	0	590	0	90	0	2.3	11	35	0	0.027	27	2.5	10	**Yes**	Exceeded USEPA Residential RSL
Lead	51.6		P57-C5	12/10/2007	33	32	400	0	800	0	90	0	400	0	800	0	NLE	NLE	19.5	11	No	Less than USEPA Residential RSL
Mercury	0.16		P57-C3	12/8/2007	33	1	23	0	65	0	0.1	1	2.3	0	35	0	0.0033	1	ND	1	No	Less than USEPA Residential RSL
Nickel	50.3		P57-A2	12/8/2007	33	33	1,600	0	23,000	0	48	1	150	0	2,200	0	2.6	30	8.4	17	No	Less than USEPA Residential RSL
Sodium	904		P57-A4	12/10/2007	33	7	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	51.6	5	No	Essential human nutrient
Vanadium	91.4		P57-B5	12/10/2007	33	33	78	3	1,100	0	NLE	NLE	39	25	580	0	8.6	33	94.1	0	**Yes**	Exceeded USEPA Residential RSL
Zinc	165		P57-A4	12/10/2007	33	33	23,000	0	110,000	0	930	0	2,300	0	35,000	0	37	26	81.4	2	No	Less than USEPA Residential RSL
Wet Chemistry - Solids																						
Percent Solids (percent)	96.6		FTMM-57-SS17	10/1/2015	54	54	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	-	n/a	No	No USEPA Residential RSL
Wet Chemistry - Solids																						
Percent Solids (percent)	96		SB30	4/22/2016	42	42	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	NLE	-	n/a	No	No USEPA Residential RSL

Notes:

(1) The NJ Residential (RDCSRS) and Non-Residential (NRDCSRS) Direct Contact Soil Remediation Standards refers to the NJDEP's September 18, 2017 Remediation Standards (http://www.nj.gov/dep/rules/rules/njac7_26d.pdf)

(2) NJDEP Impact to Ground Water (IGW) (NJDEP guidance document; Nov 2013) (http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf)

(3) The 2017-06 USEPA RSLs for Residential and Industrial Soil and Protection of Groundwater Risk-Based (HQ=0.1) refers to the USEPA's Regional Screening Levels (HQ=0.1) https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017

(4) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

NLE = no limit established.
RSL values were current at the time that the screening was conducted.

mg/kg = milligrams per kilogram
Dash (--) = Category does not apply to this compound, because there were no detections.
Compound included in data set for the risk assessment.
COPC = contaminant of potential concern

TABLE 6
DETECTED GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUNDWATER QUALITY
CRITERIA AND USEPA TAPWATER RSLS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	**NJ Ground Water Quality Criteria**	**2017-06 RSL Tap Water (HQ=0.1)**	**Weston 1995 Background (Main Post)**	P57-TMP-A5		P57-TMP-A7		P57-TMP-A9	
Sample ID				PAR57-GW-57-TMP-A-5	PAR57-GW-57-TMP-A-5	PAR57-GW-57-TMP-A-7	PAR57-GW-57-TMP-A-7	PAR57-GW-57-TMP-A-9	PAR57-GW-57-TMP-A-9
Sample Date				4/2/2010	4/2/2010	3/11/2010	3/11/2010	3/10/2010	3/10/2010
Sample Round									
Filtered				Dissolved	Total	Dissolved	Total	Dissolved	Total
Volatile Organic Compounds (µg/l)									
Carbon disulfide	700	81	-	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	300	560	-	NA	NA	NA	NA	NA	NA
Tert Butyl Alcohol	100	NLE	-	NA	NA	NA	NA	NA	NA
Toluene	600	110	-	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/l)									
Bis(2-Ethylhexyl)phthalate	3	5.6	-	NA	NA	NA	NA	NA	NA
Naphthalene	300	0.17	-	NA	NA	NA	NA	NA	NA
Phenanthrene	100	NLE	-	NA	NA	NA	NA	NA	NA
Inorganics (µg/l)									
Aluminum	200	2,000	121,000	NA	NA	NA	NA	NA	NA
Antimony	6	0.78	20.7	NA	NA	NA	NA	NA	NA
Arsenic	3	0.052	89.3	NA	NA	NA	NA	NA	NA
Barium	6,000	380	699	NA	NA	NA	NA	NA	NA
Beryllium	1	2.5	2.1	< 0.5	**2.85**	< 0.5	**2.81**	< 0.5	**0.459**
Cadmium	4	0.92	9.5	NA	NA	NA	NA	**3.97**	**5.43**
Calcium	NLE	NLE	45,400	NA	NA	NA	NA	NA	NA
Chromium	70	NLE	191	NA	NA	NA	NA	NA	**54.7**
Cobalt	100	0.6	18.3	NA	NA	NA	NA	**51.2**	**53.8**
Copper	1,300	80	65.6	NA	NA	NA	NA	NA	NA
Iron	300	1,400	431,000	NA	NA	NA	NA	NA	NA
Lead	5	15	22.7	< 5	**138**	< 5	**43.2**	**2.81**	**6.74**
Magnesium	NLE	NLE	62,700	NA	NA	NA	NA	NA	NA
Manganese	50	43	331	NA	NA	NA	NA	NA	NA
Mercury	2	0.063	0.26	NA	NA	NA	NA	NA	NA
Nickel	100	39	187	NA	NA	NA	NA	NA	NA
Potassium	NLE	NLE	137,000	NA	NA	NA	NA	NA	NA
Selenium	40	10	29.6	NA	NA	NA	NA	NA	NA
Silver	40	9.4	ND	NA	NA	NA	NA	NA	NA
Sodium	50,000	NLE	21,500	NA	NA	NA	NA	NA	NA
Vanadium	NLE	8.6	108	NA	NA	NA	NA	NA	NA
Zinc	2,000	600	233	NA	NA	NA	NA	NA	NA

TABLE 6
DETECTED GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUNDWATER QUALITY
CRITERIA AND USEPA TAPWATER RSLS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	**NJ Ground Water Quality Criteria**	**2017-06 RSL Tap Water (HQ=0.1)**	**Weston 1995 Background (Main Post)**	800MW01				800MW02			
Sample ID				800MW01-10.06	800MW01-10.06 DISSOLVED	800MW101-10.06	800MW101-10.06 DISSOLVED	PAR57-GW-800MW02	PAR57-GW-800MW02-Dup	800MW02-11.9	800MW02-11.9 DISSOLVED
Sample Date				5/23/2016	5/23/2016	5/23/2016	5/23/2016	2/4/2011	2/4/2011	5/23/2016	5/23/2016
Sample Round											
Filtered				Total	Dissolved	Total	Dissolved	Total	Total	Total	Dissolved
Volatile Organic Compounds (µg/l)											
Carbon disulfide	700	81	-	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA
Methyl ethyl ketone	300	560	-	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA
Tert Butyl Alcohol	100	NLE	-	NA	NA	NA	NA	< 5	< 5	NA	NA
Toluene	600	110	-	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA
Semivolatile Organic Compounds (µg/l)											
Bis(2-Ethylhexyl)phthalate	3	5.6	-	NA	NA	NA	NA	< 2	< 2	NA	NA
Naphthalene	300	0.17	-	NA	NA	NA	NA	**0.15**	**0.151**	NA	NA
Phenanthrene	100	NLE	-	NA	NA	NA	NA	**0.136**	**0.14**	NA	NA
Inorganics (µg/l)											
Aluminum	200	2,000	121,000	**390**	< 33	**410**	< 33	**290**	**300**	**210**	**120**
Antimony	6	0.78	20.7	< 10	< 6.6	< 10	< 6.6	< 6	< 6	< 10	< 6.6
Arsenic	3	0.052	89.3	< 1	**2.9 J**	< 1	**3.6 J**	**4.1**	**4.1**	**1.2 J**	< 2.6
Barium	6,000	380	699	**5.2 J**	**3.4 J**	**5.6 J**	**6.8 J**	< 200	< 200	**33**	**34**
Beryllium	1	2.5	2.1	< 0.3	< 1.3	< 0.3	< 1.3	< 1	< 1	< 0.3	< 1.3
Cadmium	4	0.92	9.5	< 0.7	< 0.7	< 0.7	< 0.7	< 3	< 3	< 0.7	< 0.7
Calcium	NLE	NLE	45,400	**20,700**	**23,100**	**20,800**	**23,100**	**13,300**	**13,800**	**3,600**	**3,700**
Chromium	70	NLE	191	< 2	< 1.6	< 2	< 1.6	< 10	< 10	< 2	< 1.6
Cobalt	100	0.6	18.3	< 2	< 1.6	< 2	< 1.6	< 50	< 50	**2.7 J**	**2.4 J**
Copper	1,300	80	65.6	**8.3 J**	**5 J**	**8.8 J**	**5.7 J**	< 10	< 10	< 3.6	< 3.3
Iron	300	1,400	431,000	**860**	**22 J**	**880**	**25 J**	**8,220**	**8,710**	**1,900**	**40 J**
Lead	5	15	22.7	< 2.2	< 2	< 2.2	< 2	**3.5**	**3.7**	**2.6 J**	< 2
Magnesium	NLE	NLE	62,700	**4,400**	**4,900**	**4,400**	**4,900**	**5,190**	**5,570**	**2,500**	**2,700**
Manganese	50	43	331	**28**	**15**	**27**	**15**	**172**	**180**	**56**	**59**
Mercury	2	0.063	0.26	< 0.2	< 0.1	< 0.2	< 0.1	< 0.2	< 0.2	< 0.2	< 0.1
Nickel	100	39	187	< 7.3	< 6.6	< 7.3	< 6.6	**16**	**16.9**	**10 J**	**10 J**
Potassium	NLE	NLE	137,000	**1,700**	**2,000**	**1,700**	**2,000**	< 10000	< 10000	**2,500**	**2,900**
Selenium	40	10	29.6	< 7.3	< 6.6	< 7.3	< 6.6	< 10	< 10	< 7.3	< 6.6
Silver	40	9.4	ND	< 1.4	< 1.3	< 1.4	< 1.3	< 10	< 10	< 1.4	< 1.3
Sodium	50,000	NLE	21,500	**2,700**	**3,000**	**2,700**	**3,000**	**35,600**	**35,500**	**17,500**	**18,700**
Vanadium	NLE	8.6	108	**3.2 J**	**1.8 J**	**3.2 J**	**1.6 J**	< 50	< 50	< 2	< 1.6
Zinc	2,000	600	233	**10 J**	< 6.6	**11 J**	**6.7 J**	**125**	**130**	**21 J**	**26**

TABLE 6
DETECTED GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUNDWATER QUALITY
CRITERIA AND USEPA TAPWATER RSLS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	**NJ Ground Water Quality Criteria**	**2017-06 RSL Tap Water (HQ=0.1)**	**Weston 1995 Background (Main Post)**	800MW02 *(continued)*				812MW14		
Sample ID				800MW02-16.9	800MW02-16.9 DISSOLVED	800MW02-6.9	800MW02-6.9 DISSOLVED	812-MW114-10.27	812MW14-10.27	812MW14-10.27 DISSOLVED
Sample Date				5/23/2016	5/23/2016	5/23/2016	5/23/2016	5/24/2016	5/24/2016	5/24/2016
Sample Round										
Filtered				Total	Dissolved	Total	Dissolved	Total	Total	Dissolved
Volatile Organic Compounds (µg/l)										
Carbon disulfide	700	81	-	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	300	560	-	NA	NA	NA	NA	NA	NA	NA
Tert Butyl Alcohol	100	NLE	-	NA	NA	NA	NA	NA	NA	NA
Toluene	600	110	-	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/l)										
Bis(2-Ethylhexyl)phthalate	3	5.6	-	NA	NA	NA	NA	NA	NA	NA
Naphthalene	300	0.17	-	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	100	NLE	-	NA	NA	NA	NA	NA	NA	NA
Inorganics (µg/l)										
Aluminum	200	2,000	121,000	**230**	**110**	**200**	**120**	**9,500**	**9,600**	< 33
Antimony	6	0.78	20.7	< 10	< 6.6	< 10	< 6.6	< 10	< 10	< 6.6
Arsenic	3	0.052	89.3	**2.7 J**	**2.9 J**	< 1	< 2.6	**5.5**	**6.7**	< 2.6
Barium	6,000	380	699	**31**	**32**	**28**	**31**	**55**	**56**	**3.3 J**
Beryllium	1	2.5	2.1	< 0.3	< 1.3	< 0.3	< 1.3	**0.8 J**	**1.3**	< 1.3
Cadmium	4	0.92	9.5	< 0.7	< 0.7	< 0.7	< 0.7	**0.9 J**	**1 J**	< 0.7
Calcium	NLE	NLE	45,400	**3,500**	**3,600**	**3,300**	**3,400**	**13,000**	**12,400**	**11,700**
Chromium	70	NLE	191	< 2	< 1.6	< 2	< 1.6	**41**	**43**	< 1.6
Cobalt	100	0.6	18.3	**2.8 J**	**2.3 J**	**2.7 J**	**2.3 J**	**4.4 J**	**5.2 J**	< 1.6
Copper	1,300	80	65.6	< 3.6	< 3.3	< 3.6	< 3.3	**9.7 J**	**9.7 J**	< 3.3
Iron	300	1,400	431,000	**3,800**	**89**	**870**	**25 J**	**18,700**	**19,000**	**59 J**
Lead	5	15	22.7	< 2.2	**2.4 J**	< 2.2	**2.8 J**	**14**	**13**	< 2
Magnesium	NLE	NLE	62,700	**2,400**	**2,600**	**2,400**	**2,500**	**2,600**	**2,600**	**1,400**
Manganese	50	43	331	**54**	**58**	**53**	**56**	**400**	**420**	< 1.6
Mercury	2	0.063	0.26	< 0.2	< 0.1	< 0.2	< 0.1	< 0.2	< 0.2	< 0.1
Nickel	100	39	187	**9.9 J**	**9.6 J**	**9.3 J**	**9.4 J**	< 7.3	< 7.3	< 6.6
Potassium	NLE	NLE	137,000	**2,500**	**2,800**	**2,200**	**2,500**	**2,400**	**2,500**	**1,000**
Selenium	40	10	29.6	< 7.3	< 6.6	< 7.3	< 6.6	< 7.3	< 7.3	< 6.6
Silver	40	9.4	ND	< 1.4	< 1.3	< 1.4	< 1.3	< 1.4	< 1.4	< 1.3
Sodium	50,000	NLE	21,500	**17,300**	**18,400**	**17,200**	**18,100**	**26,800**	**25,600**	**28,200**
Vanadium	NLE	8.6	108	< 2	< 1.6	< 2	< 1.6	**42**	**44**	< 1.6
Zinc	2,000	600	233	**22**	**23**	**21 J**	**23**	**34**	**37**	< 6.6

TABLE 6
DETECTED GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUNDWATER QUALITY
CRITERIA AND USEPA TAPWATER RSLS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	**NJ Ground Water Quality Criteria**	**2017-06 RSL Tap Water (HQ=0.1)**	**Weston 1995 Background (Main Post)**	866MW02		86MW02		P57-A1	P57-A3		P57-A5	P57-A7
Sample ID				866MW02-14.35	866MW02-14.35 DISSOLVED	86MW02-9.35	86MW02-9.35 DISSOLVED	P57-A-1	P57-A-3	P57-A-3 DUP	P57-A-5	P57-A-7
Sample Date				5/24/2016	5/24/2016	5/24/2016	5/24/2016	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007
Sample Round												
Filtered				Total	Dissolved	Total	Dissolved	Total	Total	Total	Total	Total
Volatile Organic Compounds (µg/l)												
Carbon disulfide	700	81	-	NA	NA	NA	NA	< 0.44	< 0.44	< 0.44	< 0.44	**0.28 J**
Methyl ethyl ketone	300	560	-	NA	NA	NA	NA	< 0.14	< 0.14	< 0.14	< 0.14	**4.14**
Tert Butyl Alcohol	100	NLE	-	NA	NA	NA	NA	< 1.82	**10.49**	< 1.82	< 1.82	< 1.82
Toluene	600	110	-	NA	NA	NA	NA	**0.23 J**	< 0.27	< 0.27	**1.02**	**0.77**
Semivolatile Organic Compounds (µg/l)												
Bis(2-Ethylhexyl)phthalate	3	5.6	-	NA	NA	NA	NA	< 1.28	**1.94**	< 1.28	< 1.28	< 1.28
Naphthalene	300	0.17	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	100	NLE	-	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (µg/l)												
Aluminum	200	2,000	121,000	**480**	< 33	**360**	< 33	< 592	< 16100	< 266	< 13400	< 11000
Antimony	6	0.78	20.7	< 10	< 6.6	< 10	< 6.6	< 0.7	< 0.7	< 0.7	< 0.7	**1.13**
Arsenic	3	0.052	89.3	**1.8 J**	< 2.6	**1.3 J**	**2.6 J**	< 2.7	**5.24**	< 2.7	**3.94**	**4.01**
Barium	6,000	380	699	**62**	**62**	**60**	**67**	**66.2**	**189**	**165**	**225**	**224**
Beryllium	1	2.5	2.1	< 0.3	< 1.3	< 0.3	< 1.3	**0.454**	**0.249**	< 0.1	**2.12**	**1.98**
Cadmium	4	0.92	9.5	**7.8**	< 0.7	**3.9**	< 0.7	**0.274**	**1.46**	**1.15**	**0.284**	**0.917**
Calcium	NLE	NLE	45,400	**117,000**	**127,000**	**82,700**	**93,200**	< 3300	< 290000	< 284000	< 33200	< 63400
Chromium	70	NLE	191	**2.4 J**	< 1.6	< 2	< 1.6	< 0.692	< 45.5	< 0.64	< 69.8	< 105
Cobalt	100	0.6	18.3	**11**	**9.5**	**21**	**22**	**3.79**	**1.75**	**0.755**	**9.62**	**10.5**
Copper	1,300	80	65.6	**31**	< 3.3	**56**	< 3.3	**1.72**	**27.7**	**6.58**	**10.7**	**137**
Iron	300	1,400	431,000	**3,200**	**2,600**	**2,800**	**2,800**	< 323	**17,100**	< 323	**138,000**	**25,200**
Lead	5	15	22.7	**11**	**4.9 J**	**12**	< 2	< 0.7	**3.31**	< 0.7	< 0.7	**829**
Magnesium	NLE	NLE	62,700	**9,400**	**10,300**	**8,000**	**9,100**	**5,370**	**14,000**	**12,900**	**22,000**	**6,600**
Manganese	50	43	331	**520**	**580**	**820**	**940**	< 46.4	< 62.7	< 43.5	< 502	< 765
Mercury	2	0.063	0.26	< 0.2	< 0.1	< 0.2	< 0.1	NA	NA	NA	NA	NA
Nickel	100	39	187	< 7.3	< 6.6	**9.3 J**	**9 J**	< 7.38	< 7.18	< 0.3	< 16.6	< 24
Potassium	NLE	NLE	137,000	**11,800**	**12,800**	**10,100**	**11,200**	< 2850	< 72600	< 68500	< 6720	< 2500
Selenium	40	10	29.6	< 7.3	< 6.6	< 7.3	< 6.6	< 4.89	< 2.7	< 2.7	< 2.7	< 2.7
Silver	40	9.4	ND	< 1.4	< 1.3	< 1.4	< 1.3	NA	NA	NA	NA	NA
Sodium	50,000	NLE	21,500	**33,400**	**36,100**	**43,900**	**49,500**	**20,900**	**3,070,000 E**	**3,110,000 E**	**156,000**	**6,790**
Vanadium	NLE	8.6	108	< 2	< 1.6	**3.6 J**	**3.2 J**	< 0.5	**95.3**	**17.6**	**56.9**	**68.8**
Zinc	2,000	600	233	**200**	< 6.6	**190**	**7.5 J**	**23.6**	**62.7**	**20**	**171**	**145**

TABLE 6
DETECTED GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUNDWATER QUALITY
CRITERIA AND USEPA TAPWATER RSLS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	**NJ Ground Water Quality Criteria**	**2017-06 RSL Tap Water (HQ=0.1)**	**Weston 1995 Background (Main Post)**	P57-A9	PAR-57-MW01				
Sample ID				P57-A-9	PAR57-GW-MW01-15.1	PAR57-GW-MW01-15.1 DISSOLVED	PAR57-GW-MW101-15.1	PAR57-GW-MW101-15.1 DISSOLVED	PAR-57-GW-MW01-12.5
Sample Date				12/11/2007	11/23/2015	11/23/2015	11/23/2015	11/23/2015	5/23/2016
Sample Round									
Filtered				Total	Total	Dissolved	Total	Dissolved	Total
Volatile Organic Compounds (µg/l)									
Carbon disulfide	700	81	-	**0.1 J**	NA	NA	NA	NA	NA
Methyl ethyl ketone	300	560	-	< 0.14	NA	NA	NA	NA	NA
Tert Butyl Alcohol	100	NLE	-	< 1.82	NA	NA	NA	NA	NA
Toluene	600	110	-	**0.21 J**	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/l)									
Bis(2-Ethylhexyl)phthalate	3	5.6	-	< 1.28	NA	NA	NA	NA	NA
Naphthalene	300	0.17	-	NA	NA	NA	NA	NA	NA
Phenanthrene	100	NLE	-	NA	NA	NA	NA	NA	NA
Inorganics (µg/l)									
Aluminum	200	2,000	121,000	< 43400	**989**	< 50	**1,010**	< 50	**260**
Antimony	6	0.78	20.7	< 0.7	< 30	< 30	< 30	< 30	< 10
Arsenic	3	0.052	89.3	**6.73**	**6.7 J**	**8.3 J**	**8.7 J**	**6.7 J**	**11**
Barium	6,000	380	699	**26.8**	**49.8**	**46.9**	**55.7**	**50.6**	**55**
Beryllium	1	2.5	2.1	**10.9**	< 2.5	< 2.5	< 2.5	< 2.5	< 0.3
Cadmium	4	0.92	9.5	**14.3**	< 2.5	< 2.5	< 2.5	< 2.5	< 0.7
Calcium	NLE	NLE	45,400	< 73300	**169,000**	**191,000**	**228,000**	**192,000**	**144,000**
Chromium	70	NLE	191	< 3.57	**8.8 J**	**0.316 J**	**9 J**	**0.445 J**	< 2
Cobalt	100	0.6	18.3	**147**	< 25	< 25	< 25	< 25	< 2
Copper	1,300	80	65.6	**43.4**	< 10	< 10	< 10	< 10	< 3.6
Iron	300	1,400	431,000	**17,700**	**31,300 J**	**35,200 J**	**35,800 J**	**32,900 J**	**74,000**
Lead	5	15	22.7	**3.07**	< 2.5	< 2.5	**2.6 J**	< 2.5	< 2.2
Magnesium	NLE	NLE	62,700	**37,500**	**12,200 J**	**14,200 J**	**14,300 J**	**13,800 J**	**27,400**
Manganese	50	43	331	< 2710	**644 J**	**746 J**	**771 J**	**740 J**	**630**
Mercury	2	0.063	0.26	NA	**0.057 J**	**0.049 J**	< 0.1	< 0.1	< 0.2
Nickel	100	39	187	< 372	**2.9 J**	**1.4 J**	**2.6 J**	**1.6 J**	< 7.3
Potassium	NLE	NLE	137,000	< 5480	**7,450**	**7,970**	**8,930**	**8,380**	**5,700**
Selenium	40	10	29.6	< 2.7	< 5	< 5	< 5	< 5	< 7.3
Silver	40	9.4	ND	NA	**2.8 J**	**3.1 J**	**2.5 J**	**2.6 J**	< 1.4
Sodium	50,000	NLE	21,500	**26,000**	**30,400**	**30,700**	**28,100**	**31,300**	**45,900**
Vanadium	NLE	8.6	108	**3.07**	**3.2 J**	< 25	**3 J**	< 25	**4.2 J**
Zinc	2,000	600	233	**1,580**	**10.2 J**	< 10	**9.6 J**	**7.2 J**	< 7.3

TABLE 6
DETECTED GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUNDWATER QUALITY
CRITERIA AND USEPA TAPWATER RSLS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	**NJ Ground Water Quality Criteria**	**2017-06 RSL Tap Water (HQ=0.1)**	**Weston 1995 Background (Main Post)**	PAR-57-MW01 *(continued)*		
Sample ID				PAR-57-GW-MW01-12.5 DISSOLVED	PAR-57-GW-MW01-17.5	PAR-57-GW-MW01-17.5 DISSOLVED
Sample Date				5/23/2016	5/24/2016	5/24/2016
Sample Round						
Filtered				Dissolved	Total	Dissolved
Volatile Organic Compounds (µg/l)						
Carbon disulfide	700	81	-	NA	NA	NA
Methyl ethyl ketone	300	560	-	NA	NA	NA
Tert Butyl Alcohol	100	NLE	-	NA	NA	NA
Toluene	600	110	-	NA	NA	NA
Semivolatile Organic Compounds (µg/l)						
Bis(2-Ethylhexyl)phthalate	3	5.6	-	NA	NA	NA
Naphthalene	300	0.17	-	NA	NA	NA
Phenanthrene	100	NLE	-	NA	NA	NA
Inorganics (µg/l)						
Aluminum	200	2,000	121,000	< 33	**250**	< 33
Antimony	6	0.78	20.7	< 6.6	< 10	< 6.6
Arsenic	3	0.052	89.3	**23**	**9.6**	**17**
Barium	6,000	380	699	**57**	**49**	**52**
Beryllium	1	2.5	2.1	< 1.3	< 0.3	< 1.3
Cadmium	4	0.92	9.5	< 0.7	< 0.7	< 0.7
Calcium	NLE	NLE	45,400	**153,000**	**138,000**	**152,000**
Chromium	70	NLE	191	< 1.6	< 2	< 1.6
Cobalt	100	0.6	18.3	< 1.6	< 2	< 1.6
Copper	1,300	80	65.6	< 3.3	< 3.6	< 3.3
Iron	300	1,400	431,000	**75,300**	**55,200**	**60,200**
Lead	5	15	22.7	< 2	< 2.2	< 2
Magnesium	NLE	NLE	62,700	**28,800**	**24,700**	**26,500**
Manganese	50	43	331	**670**	**560**	**630**
Mercury	2	0.063	0.26	< 0.1	< 0.2	< 0.1
Nickel	100	39	187	< 6.6	< 7.3	< 6.6
Potassium	NLE	NLE	137,000	**6,400**	**6,400**	**7,100**
Selenium	40	10	29.6	**15 J**	< 7.3	**6.9 J**
Silver	40	9.4	ND	< 1.3	< 1.4	< 1.3
Sodium	50,000	NLE	21,500	**47,900**	**43,100**	**45,200**
Vanadium	NLE	8.6	108	**2.8 J**	**3.2 J**	**2.9 J**
Zinc	2,000	600	233	< 6.6	< 7.3	< 6.6

TABLE 6
DETECTED GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUNDWATER QUALITY
CRITERIA AND USEPA TAPWATER RSLS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	**NJ Ground Water Quality Criteria**	**2017-06 RSL Tap Water (HQ=0.1)**	**Weston 1995 Background (Main Post)**	PAR-57-MW02				
Sample ID				PAR57-GW-MW02-15.25	PAR57-GW-MW02-15.25 DISSOLVED	PAR57-GW-MW02-20.25	PAR57-GW-MW02-20.25 DISSOLVED	PAR-57-GW-MW02-15.8
Sample Date				11/24/2015	11/24/2015	11/24/2015	11/24/2015	5/24/2016
Sample Round								
Filtered				Total	Dissolved	Total	Dissolved	Total
Volatile Organic Compounds (µg/l)								
Carbon disulfide	700	81	-	NA	NA	NA	NA	NA
Methyl ethyl ketone	300	560	-	NA	NA	NA	NA	NA
Tert Butyl Alcohol	100	NLE	-	NA	NA	NA	NA	NA
Toluene	600	110	-	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/l)								
Bis(2-Ethylhexyl)phthalate	3	5.6	-	NA	NA	NA	NA	NA
Naphthalene	300	0.17	-	NA	NA	NA	NA	NA
Phenanthrene	100	NLE	-	NA	NA	NA	NA	NA
Inorganics (µg/l)								
Aluminum	200	2,000	121,000	**12,800**	**9,070**	**11,400**	**9,230**	**24,600**
Antimony	6	0.78	20.7	< 30	< 30	< 30	< 30	< 50
Arsenic	3	0.052	89.3	**10.3**	**8.5 J**	**8.9 J**	**7.8 J**	**5.7**
Barium	6,000	380	699	**31.6**	**27**	**27**	**25**	**120**
Beryllium	1	2.5	2.1	**7**	**6.2**	**6.8**	**6.4**	**3.6**
Cadmium	4	0.92	9.5	**5.8**	**5.3**	**5.2**	**5.1**	**15**
Calcium	NLE	NLE	45,400	**66,900**	**232,000**	**63,400**	**65,600**	**219,000**
Chromium	70	NLE	191	**8.2 J**	**1.9 J**	**5.3 J**	**1.9 J**	< 10
Cobalt	100	0.6	18.3	**113**	**111**	**103**	**104**	**280**
Copper	1,300	80	65.6	**17 J**	**5.6 J**	**13.5 J**	**5.4 J**	**31 J**
Iron	300	1,400	431,000	**36,600 J**	**30,900 J**	**34,000 J**	**31,200 J**	**141,000**
Lead	5	15	22.7	< 2.5	< 2.5	< 2.5	< 2.5	< 11
Magnesium	NLE	NLE	62,700	**25,600 J**	**25,000 J**	**24,500 J**	**23,700 J**	**77,700**
Manganese	50	43	331	**2,690 J**	**2,560 J**	**2,460 J**	**2,420 J**	**8,500**
Mercury	2	0.063	0.26	< 0.1	**0.048 J**	< 0.1	< 0.1	< 0.2
Nickel	100	39	187	**224**	**222**	**223**	**219**	**610**
Potassium	NLE	NLE	137,000	**6,580**	**6,080**	**6,070**	**5,760**	**19,500**
Selenium	40	10	29.6	< 5	< 5	< 5	< 5	< 37
Silver	40	9.4	ND	**3.1 J**	**2.8 J**	**2.5 J**	**2.6 J**	< 7
Sodium	50,000	NLE	21,500	**71,300**	**67,900**	**71,400**	**73,100**	**280,000**
Vanadium	NLE	8.6	108	**5.6 J**	< 25	**3 J**	< 25	**30**
Zinc	2,000	600	233	**851**	**858**	**788**	**792**	**1,900**

TABLE 6
DETECTED GROUNDWATER SAMPLING RESULTS -
COMPARISON TO NJDEP GROUNDWATER QUALITY
CRITERIA AND USEPA TAPWATER RSLS
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	**NJ Ground Water Quality Criteria**	**2017-06 RSL Tap Water (HQ=0.1)**	**Weston 1995 Background (Main Post)**	PAR-57-MW02 *(continued)*		
Sample ID				PAR-57-GW-MW02-15.8 DISSOLVED	PAR-57-GW-MW02-20.8	PAR-57-GW-MW02-20.8 DISSSOLVED
Sample Date				5/24/2016	5/24/2016	5/24/2016
Sample Round						
Filtered				Dissolved	Total	Dissolved
Volatile Organic Compounds (µg/l)						
Carbon disulfide	700	81	-	NA	NA	NA
Methyl ethyl ketone	300	560	-	NA	NA	NA
Tert Butyl Alcohol	100	NLE	-	NA	NA	NA
Toluene	600	110	-	NA	NA	NA
Semivolatile Organic Compounds (µg/l)						
Bis(2-Ethylhexyl)phthalate	3	5.6	-	NA	NA	NA
Naphthalene	300	0.17	-	NA	NA	NA
Phenanthrene	100	NLE	-	NA	NA	NA
Inorganics (µg/l)						
Aluminum	200	2,000	121,000	**3,100**	**3,800**	**4,600**
Antimony	6	0.78	20.7	< 6.6	< 10	< 6.6
Arsenic	3	0.052	89.3	**4.8 J**	**6.1**	**6.6 J**
Barium	6,000	380	699	**36**	**44**	**32**
Beryllium	1	2.5	2.1	**3.3 J**	**4.4**	**4.3**
Cadmium	4	0.92	9.5	**3.5 J**	**2.7**	**4.8 J**
Calcium	NLE	NLE	45,400	**66,100**	**109,000**	**65,100**
Chromium	70	NLE	191	< 1.6	< 2	< 1.6
Cobalt	100	0.6	18.3	**82**	**37**	**95**
Copper	1,300	80	65.6	**4.6 J**	**4.9 J**	**7.9 J**
Iron	300	1,400	431,000	**42,800**	**48,100**	**35,900**
Lead	5	15	22.7	**2.1 J**	< 2.2	**2 J**
Magnesium	NLE	NLE	62,700	**23,800**	**24,000**	**24,100**
Manganese	50	43	331	**2,600**	**1,300**	**2,500**
Mercury	2	0.063	0.26	< 0.1	< 0.2	< 0.1
Nickel	100	39	187	**180**	**79**	**200**
Potassium	NLE	NLE	137,000	**6,100**	**6,300**	**6,300**
Selenium	40	10	29.6	< 6.6	< 7.3	< 6.6
Silver	40	9.4	ND	< 1.3	< 1.4	< 1.3
Sodium	50,000	NLE	21,500	**86,000**	**57,300**	**79,400**
Vanadium	NLE	8.6	108	**7.4**	**6.2**	**6.8**
Zinc	2,000	600	233	**560**	**270**	**720**

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

E (or ER) = Estimated result.

R = Rejected, data validation rejected the results.

D = Results from dilution of sample.

U = non-detect, i.e. not detected at or above this value.

J-DL = Elevated sample detection limit due to difficult sample matrix.

U-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Shade values represent a result that is above the NJ Ground Water Quality Criteria ####

NJDEP Interim Specific GWQC values are presented for the NJ GWQS where there is not a Specific Ground Water Quality Criteria. A full list of compounds is available at (http://www.nj.gov/dep/wms/bwqsa/gwqs_interim_criteria_table.htm).

NJDEP Interim Generic GWQC values are presented for the NJ GWQS where there is not a XXXXX or a NJDEP Interim Specific GWQC. Available at (http://www.nj.gov/dep/wms/bwqsa/gwqs_interim_criteria_table.htm).

- Cell Shade values represent a result that is above the USEPA 2017-06 RSL Tap Water (HQ=0.1). ###

- Cell Style values represent a result that is above the Weston 1995 Background (Main Post). ###

n/a = all concentrations were less than the detection limit, therefore, no location of maximum value identified.

Dash (-) = only background concentrations for metals are being used as comparison criteria.

- Cell Shade values represent a result that is above both the NJ Ground Water Quality Criteria and USEPA 2017-06 RSL Tap Water (HQ=0.1). ###

10) Criteria action level source document and web address.

- The NJ Ground Water Quality Criteria refers to the NJDEP Groundwater Quality Standards - Adopted July 22, 2010

http://www.state.nj.us/dep/wms/bwqsa/docs/njac79C.pdf

- The 2017-06 USEPA RSL Tap Water (HQ=0.1) refers to the USEPA's Region 9 Regional Screening Levels (HQ=0.1)

http://www.epa.gov/region9/superfund/prg/

- The Weston 1995 Background (Main Post) refers to the FTMM reports.

TABLE 7
GROUNDWATER SAMPLING SUMMARY OF EXCEEDANCES
PARCEL 57
FORT MONMOUTH, NEW JERSEY

Analyte	Maximum Detected Concentration		Location of Maximum Concentration	Sample Date	Number of Samples	Number of Detections	NJDEP GWQS [1]		2017-06 USEPA RSL Tap Water (HQ=0.1) [2]		Weston 1995 Background (Main Post) [3]		Identification of COPCs	
							Action Level	# of Exceedances	Action Level	# of Exceedances	Action Level	# of Exceedances	Evaluated as COPC in Risk Assessment?	Rationale
Volatile Organic Compounds (µg/l)	(No Detects)													
Semivolatile Organic Compounds (µg/l)														
Naphthalene	0.151		800MW02	2/4/2011	2	2	300	0	0.17	0	-	n/a	No	Less than USEPA Tapwater RSL
Phenanthrene	0.14		800MW02	2/4/2011	2	2	100	0	NLE	NLE	-	n/a	No	No USEPA Tapwater RSL Established
Inorganics (µg/l)														
Aluminum	24,600		PAR-57MW02	5/24/2016	28	22	200	18	2,000	8	121,000	0	**Yes**	Exceeded USEPA Tapwater RSL
Arsenic	23		PAR-57MW01	5/23/2016	28	23	3	19	0.052	23	89.3	0	No	Attributable to glauconitic soils
Barium	120		PAR-57MW02	5/24/2016	28	26	6,000	0	380	0	699	0	No	Less than USEPA Tapwater RSL
Beryllium	7		PAR-57MW02	11/24/2015	28	8	1	8	2.5	8	2.1	8	No	Attributable to glauconitic soils
Cadmium	15		PAR-57MW02	5/24/2016	28	8	4	6	0.92	8	9.5	1	**Yes**	Exceeded USEPA Tapwater RSL
Calcium	232,000		PAR-57MW02	11/24/2015	28	28	NLE	NLE	NLE	NLE	45,400	16	No	Essential human nutrient
Chromium	9	J	PAR-57MW01	11/23/2015	28	8	70	0	NLE	NLE	191	0	No	No USEPA Tapwater RSL Established
Cobalt	280		PAR-57MW02	5/24/2016	28	14	100	5	0.6	14	18.3	8	No	Detected in upgradient well 886MW02
Copper	31	J	PAR-57MW02	5/24/2016	28	12	1,300	0	80	0	65.6	0	No	Less than USEPA Tapwater RSL
Iron	141,000		PAR-57MW02	5/24/2016	28	28	300	23	1,400	20	431,000	0	No	Essential human nutrient; detected in upgradient well 886MW02
Lead	3.7		800MW02	2/4/2011	28	8	5	0	15	0	22.7	0	No	Less than USEPA Tapwater RSL
Magnesium	77,700		PAR-57MW02	5/24/2016	28	28	NLE	NLE	NLE	NLE	62,700	1	No	Essential human nutrient
Manganese	8,500		PAR-57MW02	5/24/2016	28	28	50	24	43	24	331	16	No	Detected in upgradient well 886MW02
Mercury	0.057	J	PAR-57MW01	11/23/2015	28	3	2	0	0.063	0	0.26	0	No	Less than USEPA Tapwater RSL
Nickel	610		PAR-57MW02	5/24/2016	28	20	100	7	39	8	187	6	**Yes**	Exceeded USEPA Tapwater RSL
Potassium	19,500		PAR-57MW02	5/24/2016	28	26	NLE	NLE	NLE	NLE	137,000	0	No	Essential human nutrient
Selenium	15	J	PAR-57MW01	5/23/2016	28	2	40	0	10	1	29.6	0	No	Detected at low frequency
Silver	3.1	J	PAR-57MW01 PAR-57MW02	11/23/2015 11/24/2015	28	8	40	0	9.4	0	ND	8	No	Less than USEPA Tapwater RSL
Sodium	280,000		PAR-57MW02	5/24/2016	28	28	50,000	8	NLE	NLE	21,500	18	No	Essential human nutrient
Vanadium	30		PAR-57MW02	5/24/2016	28	16	NLE	NLE	8.6	1	108	0	No	Attributable to turbidity
Zinc	1,900		PAR-57MW02	5/24/2016	28	22	2,000	0	600	6	233	8	**Yes**	Exceeded USEPA Tapwater RSL

Footnote:

Summary Statistics were obtained from a subset of the Result Sheet(s) and do not reflect values for the whole dataset. The data summarized here represents detected compounds from permanent wells between February 2011 and May 2016.

(1) New Jersey Department of Environmental Protection Ground Water Quality Standards (GWQS), Ground Water Quality Criteria as per N.J.A.C. 7:9-6. Specific Ground Water Quality Criteria - Class IIA and Practical Quantitation Levels. (http://www.state.nj.us/dep/wms/bwqsa/Appendix_Table_1.htm)

(2) U.S. Environmental Protection Agency (USEPA), Regional Screening Levels (RSLs). Available at http://www.epa.gov/sites/production/files/2015-12/documents/master_sl_table_01run_nov2015.pdf

(3) Weston, 1995. Final Site Investigation - Main Post and Charles Wood Areas, Fort Monmouth, New Jersey, December.

µg/L = micrograms per liter

COPC = contaminant of potential concern

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

n/a = not applicable

ND = not detected

NLE = No limit established

RSL values were current at the time that the screening was conducted.

APPENDIX A

Regulatory Correspondence

1. NJDEP letter to the Army dated July 10, 2012, re: *March 2012 Army Response to NJDEP Correspondence Letter Dated October 28, 2008, Fort Monmouth, NJ, PI G000000032*
2. NJDEP letter to the Army dated August 27, 2012, re: *March 2012 Request for Designation of No Further Action for Ground Water at Parcel 57 & Parcel 80, Fort Monmouth, NJ, PI G000000032*
3. NJDEP letter to the Army dated December 30, 2015, re: *Revisions 1 – Final Environmental Condition of Property Supplemental Phase II Site Inspection Work Plan Addendum for Parcels 28, 38, 39, 49, 57, 61 and 69 dated November 2015, Fort Monmouth, Oceanport, Monmouth County, PI G000000032*
4. NJDEP letter to the Army dated August 5, 2015, re: *Main Post Phase 2 Property Category Determination – Recategorization of p/o Parcel 57, Fort Monmouth, New Jersey, PI G000000032*
5. NJDEP letter to the Army dated April 14, 2016, re: *Final ECP Parcel 57 Round 2 Work Plan Addendum, Fort Monmouth, Oceanport, Monmouth County, PI G000000032*

Excerpts of NJDEP comments on Parcel 57

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
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BOB MARTIN
Commissioner

July 10, 2012

Wanda Green
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re: March 2012 Army Response to NJDEP Correspondence Letter Dated October 28, 2008
Fort Monmouth, NJ
PI G000000032

Dear Ms. Green:

A review of the above referenced report, received March 27, 2012 and submitted in response to the Department's comments regarding the Draft Site investigation Report of July 21, 2008 by Shaw Environmental, Inc., has been completed by this office. Many of the parcel comments involved suspected USTs; in addition to that information provided in this submittal and the July 2008 SI, a review and comparison of Appendix G, Appendix O, and Figures 15 and 16 of the January 2007 ECP Report was conducted by this office in an attempt to ascertain the location and status of all tanks located within the parcels. Unless otherwise noted, comments and questions are provided only for each parcel referenced in the submittal and are generally presented by parcel.

Parcel 13 – Former Barracks (Buildings 2004-2016)
Geophysical surveys were performed, and sampling was conducted throughout that area at which USTs were known to or may have been present. No USTs were found; all soils analytical results were below cleanup criteria applicable to the site; no additional action for the parcel is necessary.

Parcel 14 – Former Buildings and Housing Area Northwest Portion of CWA
As indicated in the Department's correspondence of May 30, 2012, the geophysical surveys performed and sampling conducted throughout that area at which USTs were or may have been present were sufficient to adequately characterize the area. No USTs were found; all soils analytical results collected were below cleanup criteria applicable to the site. The parcel was re-categorized from Category 2 to Category 1.

Although it is understood the additional investigation undertaken in June of 2009 revealed the presence of the two above referenced USTs located above Semaphore Ave, it is unclear what efforts were made to investigate the nine potential USTs/anomalies noted on Figure 3.12-2 south of Echo Avenue? Are they all to be included in the Building 750 submittal?

Additional questions regarding USTs within the parcel remain. As above, documentation for closure approval or NFA is not available for confirmation on the following USTs.

No geophysical surveys, sampling or at least reports appear to have been performed or submitted for the following USTs - UST 68, 635, 637, 642, 643, 645, 647, 648, 649, 650, 651, 652, 653, 654, 656-97, 656-98, 657-90, 658-100, 660, 662, 663, 665, 667, 689-102.

Appendix O indicates USTs which do not appear to be "closed" per Appendix G which were/are also present in areas outside the geophysical survey, including those at Building 676, several along Sherrill Avenue north of Building 600, east of Brewer Ave by Buildings 545 and 554, Building 555, and several by Building 557.

Although Appendix G indicates closure reports were submitted, it also indicates no Departmental response was received for the following USTs - UST-682-106, UST 656-104, UST 659-101, UST 114-1, UST 645-78, UST 789-126.

USTs 750 – report pending
UST 501-76 – Appendix G indicates NFAed July 10, 1998, however confirmation unavailable
UST 551-80 – Appendix G indicates NFAed August 29, 2000, however, confirmation unavailable
UST 695 – Appendix indicates NFA August 24, 2000, however, confirmation unavailable

Parcel 52 – Building 699 – Army Exchange Services Gas Station
No comments based on submittal; Army acknowledges Department's March 18, 2011 comments; remedial efforts are ongoing.

Parcel 57 – Former Coal Storage & Railroad Unloading – 800 Area
Three surface soil samples contained B/Ns at concentrations above the NRDCSCC. The Department concurred with the general recommendation to conduct additional sampling, and required the submittal of a Remedial Investigation Workplan. The March 2012 submittal, however, states the exceedences were related to the asphalt pavement under which the samples were collected.

As with Parcel 49, it is agreed elevated levels of BN constituents related to asphalt rather than a discharge may be encountered beneath asphalt paving. However, information has not been submitted to document these sample results are not reflective of site operations, particularly given the nature of operations in the area. Delineation is necessary.

PCBs analyses was required due to the proximity of the railroad tracks/unloading area, as indicated in the Department's June 15, 2007 letter, rather than historical operations at Parcel 57.

As PCBs are often associated with rail road tracks and spurs, analysis for same is appropriate and remains a requirement.

Ground Water
Although the previous proposal for delineation of ground water exceedences was approved, the current submittal indicates NFA is warranted due to naturally occurring background conditions. The Department is conducting further review of the information provided.

Parcel 61 - Building 1075 – Patterson Health Clinic
Soil sampling conducted at the parcel indicated elevated levels of three base neutral compounds in a soil sample collected beneath an area of former asphalt paving at the southeastern corner of Building 1075. The Department is in agreement the PAHs are not reflective of a discharge nor of operations performed at the site. No additional action for same is necessary.

As discussed, the analyses for PCBs as indicated in the Department's October 2008 correspondence is not required, based upon a review of areas of concern located within the parcel.

UST 1076-209 – Although Appendix G indicates the closure report was being prepared, recent conversation indicates no submittal of the report is anticipated as the tank was a "clean closure." This would, of course, not allow for comment or designation of NFA for this tank. Additionally, information previously submitted indicates this tank was installed at a location at which a leaking UST was removed and remediated. It does not appear closure information for that UST was submitted.

Parcel 69 – Building 900 – Former Vehicle Repair/Motor Pool
The previous Departmental comments indicated soil sampling was inadequate for designation of NFA as analytical parameters did not include PCBs. Although it is understood your position is that PCBs are not suspected to have been disposed of in the former waste oil AST at Building 900, the Technical Requirements for Site Remediation, both those in effect at the time of sampling, as well as those currently in effect, require the inclusion of PCBs in the analytical parameters for sampling of soil when waste oil is involved.

Regarding analytical parameters for sediment sampling, that will be addressed as part of the ongoing facility wide ecological assessment.

One ground water sample previously indicated an exceedence of PCE. Per this submittal, the Army plans to resample the ground water at the location of temporary well point P69GW-1. Previous Departmental correspondence, however, stated the submittal of a ground water remedial investigation workplan was required for NJDEP review and approval. If resampling of a single location, in anticipation of a "clean" result is performed, rather than several delineation sampling points, please ensure the resultant submittal includes adequate rationale/justification to confirm the area of greatest possible contamination was sufficiently targeted.

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
Trenton, NJ 08625-0028
Phone #: 609-633-1455
Fax #: 609-633-1439

BOB MARTIN
Commissioner

August 27, 2012

Wanda Green
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re: March 2012 Request for Designation of No Further Action for Ground Water at
Parcel 57 & Parcel 80
Fort Monmouth, New Jersey
PI G000000032

Dear Ms. Green:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced submittal as regarding the request for no additional action for the elevated levels of various constituents in the ground water at the two referenced parcels. Although the previous proposal for delineation of the exceedences was approved (in October of 2008), the current submittal indicates no additional action is warranted due to naturally occurring background conditions as well as sample turbidity. No additional documentation or information was provided in substantiation of the proposal; insufficient information has therefore been provided to allow for adequate evaluation of the proposal for the parcels.

Parcel 57 exhibited elevated levels of several metals in ground water samples collected from two temporary well points. Insufficient evidence has been provided at this time to determine none of the metals are related to activities conducted on the parcel. Were the metals ever handled, used or disposed of at the parcel? What investigation was conducted to allow for this determination? Additional information/technical rationale must be provided in support of the position the exceedences are reflective of naturally occurring conditions and sample turbidity, rather than a discharge.

Parcel 80 exhibited elevated levels of beryllium in the ground water. Was beryllium ever used or disposed of at this parcel, and what investigation was conducted to allow for this determination? As above, the technical rationale to support the position beryllium was not present due to a discharge, but rather, due to naturally occurring conditions, must be provided.

Please contact this office if you have any questions.

Sincerely,

Linda S. Range
Bureau of Case Management

C: Joe Pearson, Calibre Systems
Rick Harrison, FMERA
Julie Carver, Matrix

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

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BOB MARTIN
Commissioner

May 19, 2015

John Occhipinti
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re: *Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan for Parcels 28, 38, 39, 49, 57, 61, and 69 dated February 2015*
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Occhipinti:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received February 5, 2015, prepared by Parsons Government Services Inc. (Parsons), on behalf of the U.S. Army Engineering and Support Center, Huntsville (USAESCH). As indicated in the report, activities are to be performed with the goal of Decision Document acceptance in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Contingency Plan (NCP), 40 CFR Part 300, and "to the extent possible to meet the requirements of New Jersey Administrative Code (NJAC) 7:26E Technical Requirements for Site Remediation".

The workplan describes Site Investigation activities to be performed at the ECP Parcel referenced above. Comments and questions are as follows:

ECP Parcel 28

Page 1-15, Line 33 – The arsenic noted at P28-SB3-C was considered representative of naturally occurring conditions due to site specific information for that particular area of concern, rather than relative to the "CWA Background Concentration" (CWBC) referenced on line 33 and the Weston Study alluded to throughout this and previous submittals, and the determination was made *only* for that area of concern. Although naturally occurring levels of various constituents may be present throughout various areas of the Fort, as this office has indicated (and the Army acknowledged), the background study previously performed for the property was not accepted by

(that sampling has apparently not been performed). Nor do the reasons cited on page 1-20 explain the presence of PCBs above standard which were noted at two of the original five elevated PAH locations as well as a third location.

The proposal indicates the five locations noted in the 2008 SI as exhibiting historical PAH exceedances will be resampled to confirm the original data set. The sampling intervals are acceptable, however, please ensure sampling is performed in 6" increments. The sampling locations noted on Figure 1.7, however, do not all correlate to locations as noted on Figure 3.10-1 of the referenced 2008 SI. Specifically, original sampling locations P49-SB4 and P49-SS13 are not replicated by FTMM-49-SS-03 or FTMM-49-SS-01.

As regarding the resampling of the three locations exhibiting PCBs above standard, the proposal is acceptable for confirmation sampling and horizontal delineation, however, it does not appear to allow for the necessary vertical delineation?

GROUND WATER
Page 1-21 – Although it is possible the metals found in monitor wells are reflective of naturally occurring conditions in this area, the Department has not agreed the metals noted at Parcel 49 are representative of background conditions.

As regarding the benzene and bromodichloromethane, the installation and sampling of the two permanent monitor wells as proposed is acceptable.

Finally, the January '07 ECP Report references Table 4.2-22 in the 1995 Weston SI, which indicates 0.68 ppm PCBs was noted in soil during sampling by a pole mounted transformer on the northwest side of Building 292. No information appears to have been submitted indicating this was addressed.

ECP Parcel 57
Page 1-23, line 35 – It is believed the NJDEP letter referenced in this sentence is the March 29, 2012 letter which referred to naturally occurring background conditions determined to be present at Parcel 28. That determination was specific to Parcel 28 only. The Main Post Background Concentrations (MPBC), line 38, as with the CWBC, were not accepted; background determinations are made on an area specific basis. As indicated in the Department's August 23, 2012 letter, insufficient evidence has been provided to determine the metals found in the parcel's monitor wells are unrelated to activities conducted within the parcel. Were the metals (or materials containing the metals) ever handled, used or disposed of at this parcel? What investigation was conducted to allow for this determination? Additional information/technical rationale was (is) to be provided in support of the position that exceedences are reflective of naturally occurring conditions and sample turbidity, rather than a discharge.

Section 3.2.1.4 -

- PCBs – The proposal for PCB sampling is approved.
- PAHs – The proposal for PAH sampling is approved, however, please ensure sampling is performed in 6" increments.

Table 3.1 – Location and Extent of Contamination – The table narrative indicates the SVOCs found in the soil samples are attributed to anthropogenic sources (e.g. asphalt). This has not yet been demonstrated to the Department, particularly as PCBs have been found in conjunction with the PAHs in two of those locations.

ECP Parcel 61
As indicated in the submittal, this office previously agreed no additional action was necessary.

ECP Parcel 69
Soil - A review of the historic data revealed no analytical results for petroleum hydrocarbons, which has always been a required parameter for characterization of waste oil AOCs. Therefore, although PCB sampling at each location is acceptable, regulations specifically require sampling at each of the locations proposed for EPH analyses, with 25% of those samples with EPH detected further analyzed for parameters as per Table 2-1 of the Technical Requirements for Site Remediation (PCBs in this instance).

Ground Water – The PCE sampling, as proposed, is approved.

Table 3.1 – Location and Extent of Contamination – The narrative indicates "COCs were not detected in soil…", however, the required analyses for PCBs has not yet been performed.

Please contact this office with any questions.

Sincerely,

Linda S. Range

C: Joe Pearson, Calibre
James Moore, USACE
Rick Harrison, FMERA
Joe Fallon, FMERA
Frank Barricelli, RAB

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
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BOB MARTIN
Commissioner

August 5, 2015

John E. Occhipinti
Department of the Army
Assistant Chief of Staff for Installation Management
US Army Fort Monmouth
PO148
Oceanport, NJ 07757

Re: Main Post Phase 2 Property Category Determination - *Recategorization of p/o Parcel 57*
Fort Monmouth, New Jersey
PI G000000032

Dear Mr. Occhipinti:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced submittal, dated June 26, 2015, received in this office on July 8, 2015. As indicated in the submittal, the concurrence by this office for re-categorization of a portion of (part of) Parcel 57 to a Category 1 is requested.

Parcel 57 is currently classified as a Category 7; additional sampling is to be performed on that portion of the property at which coal storage, fuel unloading, and a railroad were noted as formerly present. No industrial activities or handling/storage of petroleum products, however, have been associated with that portion of the parcel noted on Figure 2 of the submittal as proposed for reclassification to Category 1. It is agreed, therefore, Category 1 is appropriate for that area of Parcel 57 specifically as indicated on Figure 2. The balance of Parcel 57 remains a Category 7 at this time.

Please contact this office with any questions.

Sincerely,

Linda S. Range

Linda S. Range

C: Joe Pearson, Calibre
James Moore, USACE

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
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BOB MARTIN
Commissioner

April 14, 2016

William Colvin
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re: *Final ECP Parcel 57 Round 2 Work Plan Addendum*
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Colvin:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received March 29, 2016, prepared by Parsons Government Services Inc. (Parsons), to supplement the soil and ground water sampling previously completed at Parcel 57. The workplan includes results of the most recent sampling, conducted from September to November of 2015, and describes additional sampling activities proposed for further delineation of the PAHs and PCBs at the ECP Parcel referenced above. Comments and questions are as follows:

PAHs

The proposal is acceptable with the exception of the following locations.

- PAR-57-SS-23 – no delineation to the east is apparent; is contamination assumed to extend to the eastern parcel boundary (and into Parcel 65)?
- PAR-57-SS-09 – it is not clear near surface sampling was performed to the west of this location; what is considered the westerly point of delineation for surficial contamination in the area of PAR-57-SS-09/P57-A1-A?

PCBs

The soil sampling proposal is acceptable. If PCBs above the Default Impact to Ground Water Soil Screening Level (or a site specific Impact to Ground Water Site Remediation Standard subsequently developed) are found to extend to within 2' of the ground water table, a ground water investigation will be necessary.

Ground Water

The proposal regarding metals is acceptable. It is understood various sources for any noted exceedances will be evaluated, including upgradient ground water quality, natural glauconitic soils and/or fill used during infrastructure development. Please keep in mind, however, if the determination is made the ground water has been impacted by the fill material (historic fill), a CEA will be necessary (see http://nj.gov/dep/srp/guidance/srra/historic_fill_guidance.pdf).

Finally, as you are likely aware, although the proposal is for collection of both filtered and unfiltered samples, the NJDEP requires metals analysis to be performed on unfiltered ground water samples. This is pursuant to the requirements of the Safe Drinking Water Act and the Clean Water Act and is to obtain a representative sample as it actually occurs in the aquifer and to maintain consistency in sample handling for samples collected for both inorganic and organic analysis. Therefore, although you may of course perform the collection of both filtered and unfiltered samples, only unfiltered analytical results can be used for regulatory compliance.

Please contact this office with any questions.

Sincerely,

Linda S. Range

C: Joe Pearson, Calibre
James Moore, USACE
Rick Harrison, FMERA
Joe Fallon, FMERA
Frank Barricelli, RAB

APPENDIX B

Soil Boring Logs, Well Construction Details, and Well Development and Sampling Forms

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI (Parcel 57)
PROJECT LOCATION: Oceanport, NJ
PROJECT NUMBER: 748810-06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: Not observed.
DATE: 09/18/15
TIME: —
MEAS. FROM: —

INSPECTOR: Dennis Miller (PARSONS)
DRILLER: Joe Bamak (ECDI)
WEATHER: Clear, Sunny, 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 09/18/15; 1040
DATE/TIME FINISH: 09/18/15; 1045
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57 - SS - 01
LOCATION DESCRIPTION
LOCATION PLAN
Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				0.0	0.0-0.5': Dry, gray/black ASPHALT.		
	0.5-1.0' @ 1104			0.2	0.5-1.0': Dry, m.dense tan/gray med. to M/C SAND, little subang. M/F gravel.		
1	1.0-1.5' @ 1107			0.5	1.0-1.2': Moist, d. brown dense silty-sand.		
				1.0	1.2-1.5': Moist, dense black M/F SAND. odor.		Med. H/C odor
2	2.0-2.5' @ 1110		4.0'/5.0'	0.5	1.5-1.8': Moist, m.dense gray/brown M/F SAND, little silt.		
				0.3	1.8-2.2': Moist, m.dense Mottled (Brown/ gray/tan/black) M/F to M/C Sand, trace silt, trace organics		
3				0.3			
				0.3	2.2-2.5': Moist, v.dense gray/brown silty-sand.		
4			NR	—	2.5-4.0': Moist, m.dense/loose gray/brown/tan M/F to med. SAND, little silt.		
			NR	—	4.0-5.0': No Recovery.		
5					End of Boring: 5.0' bgs.		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI (Parcel 57)
PROJECT LOCATION: Oceanport, NJ
PROJECT NUMBER: 748810-06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: Not Observed.
DATE: 09/18/15
TIME: —
MEAS. FROM: —

INSPECTOR: Dennis Miller (PARSONS)
DRILLER: Joe Barnak (ECDI)
WEATHER: Clear, Sunny, 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 09/18/15; 1050
DATE/TIME FINISH: 09/18/15; 1055
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57 - SS - 02
LOCATION DESCRIPTION
LOCATION PLAN
Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				0.0	0.0-0.6': Dry, gray/black ASPHALT.		
				0.1	0.6-1.3': Dry, gray/white gravelly sub-base.		
1	1.3-1.8' @ 1155			0.2			
			3.8'/5.0'	0.2	1.3-1.8': Moist, loose black/d.brown/d.gray Med. to M/C Silty-Sand, med. strong odor.		Med. Strong odor.
2	2.3-2.8' @ 1158			0.2			
				0.1	1.8-2.9': Moist, M.dense/dense gray to d. gray M/F SAND, trace silt.		
3	3.3-3.8' @ 1200			0.1	2.9-3.8': Moist, dense orange/brown/tan M/F SAND, trace silt.		
			NR	—	3.8-5.0': No Recovery.		
4				—			
				—			
5					End of Boring: 5.0' bgs.		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI (Parcel 57)
PROJECT LOCATION: Oceanport, NJ
PROJECT NUMBER: 748810-06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: Not observed.
DATE: 09/18/15
TIME: —
MEAS. FROM: —

INSPECTOR: Dennis Miller (PARSONS)
DRILLER: Joe Barnak (ECDI)
WEATHER: Clear, Sunny, 65°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 09/18/15; 1156
DATE/TIME FINISH: 09/18/15; 1159
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57 - SS - 03
LOCATION DESCRIPTION
LOCATION PLAN
Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			↑	0.7	0.0-0.3': Dry, loose brown/tan M/F SAND, little organics (grass/roots)		
	0.5-1.0' @ 1235			1.2	0.3-0.5': Dry, gravelly-SAND (sub-base).		
1	1.0-1.5' @ 1238		2.7'/5.0'	0.6	0.5-1.3': Moist, m. dense brown M/F SAND.		
				1.0			
2	2.2-2.7' @ 1240		↓	0.3	1.3-2.7': Moist, m. dense brown M/F SAND, trace silt.		
			NR	—	2.7-5.0': No Recovery.		
3				—			
				—			
4				—			
			↓	—			
5					End of Boring: 5.0' bgs.		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI (Parcel 57)
PROJECT LOCATION: Oceanport, NJ
PROJECT NUMBER: 748810-06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: Not observed.
DATE: 09/18/15
TIME: —
MEAS. FROM: —

INSPECTOR: Dennis Miller (PARSONS)
DRILLER: Joe Barnak (ECDI)
WEATHER: Clear, Sunny, 60's
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 09/18/15 ; 1201
DATE/TIME FINISH: 09/18/15 ; 1204
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57 - SS - 04
LOCATION DESCRIPTION:
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				2.4	0.0-0.5': Dry, gray/black ASPHALT.		
				0.2	0.5-1.0': Dry, sub-base/ Sandy-Gravel.		
1	1.0-1.5' @ 1315			0.1	1.0-3.0': Dry, m.dense Mottled (brown/tan/gray) M/F to med. SAND, some med. ang. gravel.		
				0.0			
2	2.0-2.5' @ 1318		4.0'/5.0'	0.1			
				0.2			
3	3.0-3.5' @ 1321			0.7	3.0-3.5': Moist, dense fine Silty-Sand little clay, little gravel.		
				0.1	3.5-4.0': Dry, white/gray CONCRETE.		
4			NR	—	4.0-5.0': No Recovery.		
			NR	—			
5					End of Boring: 5.0' bgs.		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI (Parcel 57)
PROJECT LOCATION: Oceanport, NJ
PROJECT NUMBER: 748810-06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: Not Observed.
DATE: 09/18/15
TIME: —
MEAS. FROM: —

INSPECTOR: Dennis Miller (PARSONS)
DRILLER: Joe Bamak (ECDI)
WEATHER: Clear, Sunny, High-60's
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 09/18/15; 1340
DATE/TIME FINISH: 09/18/15; 1344
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57 - SS - 05
LOCATION DESCRIPTION:
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				0.1	0.0-0.5': Dry. gray/black ASPHALT.		
	0.5-1.0' @ 1355			0.0	0.5-0.6': Lens of dry, black med. SAND.		
1				0.0	0.6-2.0': Dry, m.dense black/brown/tan med. to M/F SAND, some med. subround gravel.		
	1.5-2.0' @ 1359			0.0			
2			4.5'/5.0'	0.0	2.0-4.5': Moist, dense Mottled (orange/brown/tan) M/F SAND, little silt, little subround-subang. gravel.		
	2.5-3.0' @ 1404			0.0			
3				0.0			
				0.0			
4				0.0			
			NR	—	4.5-5.0': No Recovery.		
5					End of Boring: 5.0' bgs.		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)		
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15	
Loose: 4-10	V. Dense:: >50		Soft: 2-4	V. Stiff: 15-30	
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30	

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI (Parcel 57)
PROJECT LOCATION: Oceanport, NJ
PROJECT NUMBER: 748810-06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: Not Observed.
DATE: 09/18/15
TIME: —
MEAS. FROM: —

INSPECTOR: Dennis Miller (PARSONS)
DRILLER: Joe Barnak (ECDI)
WEATHER: Clear, Sunny, High-70's
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 09/18/15; 1350
DATE/TIME FINISH: 09/18/15; 1355
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57 - SS - 06
LOCATION DESCRIPTION
LOCATION PLAN
Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				1.1	0.0-0.5': Dry, gray/black ASPHALT.		
	0.5-1.0' @ 1415			0.0	0.5-0.7': Dry, m.dense black fine SAND.		
1				0.0	0.7-1.4': Dry/Moist, m.dense brown/gray/tan med. SAND, trace wood, little subang. gravel.		
	1.5-2.0' @ 1418		3.5'/5.0'	0.0			
2				0.0	1.4-2.5': Moist, dense d.gray Silty-Sand, trace wood.		
	2.5-3.0' @ 1421			0.0			
3				0.0	2.5-2.7': Moist/Wet, m.dense black med. to M/C SAND.		
			NR	—	2.7-3.5': Moist, m.dense d.gray/brown M/F Silty-Sand.		
4				—	3.5-5.0': No Recovery.		
				—			
5					End of Boring: 5.0' bgs.		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI (Parcel 57)
PROJECT LOCATION: Oceanport, NJ
PROJECT NUMBER: 748810-06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: Not Observed.
DATE: 09/18/15
TIME: —
MEAS. FROM: —

INSPECTOR: Dennis Miller (PARSONS)
DRILLER: Joe Barnak (ECDI)
WEATHER: Clear, Sunny, High-70's
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 09/18/15;
DATE/TIME FINISH: 09/18/15;
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57 - SS - 07
LOCATION DESCRIPTION
LOCATION PLAN
Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			↑	0.0	0.0-0.5': Dry, gray/black ASPHALT.		
	0.5-1.0' @ 1435			0.0	0.5-0.9': Dry, m.dense black med. SAND, little med. subang. gravel.		
1				0.4			
	1.5-2.0' @ 1439			0.0	0.9-2.0': Dry/Moist, dense brown/gray SAND, little med. subround gravel.		
2			4.5'/5.0'	0.0			
	2.5-3.0' @ 1442			0.0	2.0-4.0': Dry/Moist, m.dense gray/brown M/F SAND, little med. subround gravel, trace red brick.		
3				0.0			
				0.0			
4				0.0	4.0-4.5': Moist, dense silty-sand, some med to m/c subang gravel.		
			NR	—	4.5-5.0': No Recovery.		
5					End of Boring: 5.0' bgs.		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI (FTMM68)
PROJECT LOCATION: Oceanport, NJ
PROJECT NUMBER: 748810 - 02180
GROUNDWATER OBSERVATIONS
WATER LEVEL:
DATE:
TIME:
MEAS. FROM:

INSPECTOR: Dennis Miller (Parsons)
DRILLER: Joe Barnak (ECDI)
WEATHER:
CONTRACTOR: ECDI
RIG TYPE: Geoprobe (R) 7822 DT
DATE/TIME START: 09/21/15: 0822
DATE/TIME FINISH: 09/21/15: 0831
WEIGHT OF HAMMER: —
DROP OF HAMMER: —
TYPE OF HAMMER: —

BORING ID: FTMM-57-SS-08
LOCATION DESCRIPTION
LOCATION PLAN
Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				0.0	0.0 - 0.7': Concrete.		
					0.7 - 0.9': Dry, M. dense brown / gray Med. sand and m/f angular gravel.		
1	0.9-1.4' @ 0830				0.9 - 1.5': Dry/Moist, M. dense/dense orange-brown M/F sand some M/F subround gravel.		
			3.0/5.0'				
2	1.9-2.4' @ 0852						
	2.5-3.0' @ 0855				1.5-3.0': Moist, brown/d. brown M. dense/dense M/F sand little subround-subang M/F gravel.		
3	a		NR	-			
			NR	-			
4			NR	-	3.0-5.0': NR.		
			NR	-			
5							
6							
7							
8							
9							
0							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

Form_Boring_Log_Master_P1_P2.xlsx

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Dick Lotzo
DRILLER: Ken Atwood
WEATHER: 65° F, Overcast
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 0825
DATE/TIME FINISH: 10/1/15 @ 0900
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-55-09
LOCATION DESCRIPTION: North of Building 801
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60"/37"	8.9	6" Asphalt		
	FTMM-57-55-09-0.5-1.0			10.7	0"-11" Moist, Dark Brown, Loose, F-M Sand, Little Silt, Little F-M Gravel, No Coal/Asphalt		
1				3.9			
				12.4	11"-37" Moist, Red-Brown, Dense, F-M Sand, Little Clay, No Coal/ Asphalt		
2	FTMM-57-55-09-2.0-2.5			15.9			
			V	12.6			
3			NR	—			
			NR	—			
4			NR	—			
			NR	—			
5			60"/33"	0.8	60"-68" Dry, Light Gray, Loose, Weathered Concrete, Trace Gravel, No Coal/Asphalt		
	FTMM-57-55-09-5.5-6.0			19.3			
6				6.2	68"-73" Moist, Dark Brown-Black, Dense, F-C Sand, Some F Gravel, Little Coal		
				7.5			
7				6.3	73"-93" Wet, Orange Brown, Loose, F-M Sand, Trace Silt, No Coal/Asphalt		
			V	4.2			
8			NR	—			
			NR	—			
9			NR	—			
			NR	—			
10					10' EOB		

Remarks:

Sample Types
S -- Split-Spoon
U -- Undisturbed Tube
C -- Rock Core
A -- Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense:	30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense::	>50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35 -50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

Boring_Log_Master_P1_P2-68.xlsx

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE	INSPECTOR: Nick Leizos	BORING/WELL ID: FTMM - 57-55-10
PROJECT NAME: FTMM - RI	DRILLER: Ken Atwood	LOCATION DESCRIPTION: NE of building 801
PROJECT LOCATION: FTMM - Parcel 57	WEATHER: 65°F, Overcast	
PROJECT NUMBER: 748810- 0018	CONTRACTOR: East Coast Drilling, Inc. (ECDI)	
GROUNDWATER OBSERVATIONS	RIG TYPE: Geoprobe(R) 7822DT	LOCATION PLAN
	DATE/TIME START: 10/1/15 @ 0905	Oceanport, New Jersey
WATER LEVEL: N/A	DATE/TIME FINISH: 10/1/15 @ 0920	
DATE: N/A	*WEIGHT OF HAMMER:* N/A	
TIME: N/A	*DROP OF HAMMER:* N/A	
MEAS. FROM: N/A	*TYPE OF HAMMER:* N/A	

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-55-10-0.0-0.5	60"/40"		0.0	0"-14" Dry, Loose, Light Brown, F-M Sand, Little F-M Gravel, Little Organics, No Coal/Asphalt		
				0.0			
1				0.6	14"-19" Dry, Dark, Brown, F-C Sand, F-C Gravel, Little Silt, No Coal/Asphalt		
				0.6			
2				15.6	19"-25" Moist, Red-Brown, Dense, F-M Sand, Some Clay, No Coal/Asphalt		
				15.7			
3	FTMM-57-55-10-3.0-3.5			27.3	25"-40" Moist, Gray-Orange Mottled, Hard, Clay, Some F Sand, No Coal/Asphalt		
			NR	—			
4			NR	—			
			NR	—			
5			60"/56"	5.0	60"-93" Moist, Gray-Orange Mottled, Soft, Clay, Little F Sand, No Coal/Asphalt		
				0.0			
6				1.8			
				1.0			
7	FTMM-57-55-10-7.0-7.5			15.0			
				0.0	93"-106" Wet, Orange-Brown, Soft, Clay, And F Sand, No Coal/Asphalt		
8				1.5			
				0.8			
9				0.3			
				0.1			
10					10' EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Boring_Log_Master_P1_P2-68.xlsx

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 0018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Dick Letzos
DRILLER: Ken Atwood
WEATHER: 68°F, Rain, 0-15 mph, N/E
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 0935
DATE/TIME FINISH: 10/1/15 @ 1000
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS-11
LOCATION DESCRIPTION: Parking Lot West of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-11-0.0-0.5	60"/41"		0.0	5" Asphalt		
				0.0	0"-5" Dry, Dark Brown Loose, F-C Sand, Some F-M Gravel, Trace Coal		
1				0.0			
				1.4	5"-37" Moist, Dark Gray, Loose, F-M Sand, Little F Gravel, Little Silt, No Coal/Asphalt		
2				3.4			
				2.7	37"-41" Moist, Olive Green, Loose, F Sand, Trace Clay, No Coal/Asphalt		
3	FTMM-57-SS-11-3.0-3.5			2.5			
			NR	—			
4			NR	—			
			NR	—			
5			60"/50"	37.2	60"-74" SAA		
				31.5			
6				33.9	74"-88" Moist, Olive-Orange Mottled, Hard, Clay, And F Sand, No Coal/Asphalt		
				73.6			
7	FTMM-57-SS-11-7.0-7.5			74.9			
				54.9	88"-110" Wet, Gray-Olive Mottled, Soft, Clay, And F Sand, No Coal/Asphalt		
8				111.8			
				25.0			
9				22.7			
			NR	—			
10					10' EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Boring_Log_Master_P1_P2-68.xlsx

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Nick Lucas
DRILLER: Ken Atwood
WEATHER: 70°F, Rain, Wind 10-15
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1020
DATE/TIME FINISH: 10/1/15 @ 1030
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-55-12
LOCATION DESCRIPTION: NW Corner of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-55-12-0.0-0.5		60"/60"	0.0	0"-3" Moist, Dark Brown, Loose, F-M Sand, Some Silt, Some Organics, No Coal/Asphalt		
				6.9			
1				35.2	3"-24" Dry, Light-Brown, Loose, F-C Sand, Some, F-M Gravel, Little organics, Trace Coal, Trace Silt		
				15.5			
2				37.4			
				25.9	24"-35" Moist, Dark Brown, Dense, F-M Sand, Some Clay, Little F-M Gravel, Trace Coal		
3	FTMM-57-55-12-3.0-3.5			25.0			
				21.0	35"-50" Moist, Orange, Loose, F-M Sand, Little Silt, No Coal/ Asphalt		
4				28.7			
			NR	—			
5			60"/48"	0.0	60"-81" Moist, Gray, Loose, F-M Sand, Little F-M Gravel, Little Silt, No Coal/Asphalt		
				3.9			
6				8.5			
				0.0	84"-90" Moist, Light Brown-Black, Loose, F-C Sand, Some F-C Gravel, Little Coal, Little Clay		
7	FTMM-57-55-12-7.0-7.5			0.8			
				0.0			
8				0.0	90"-108" Wet, Olive Green, Very Dense, F Sand, And Clay, No Coal/Asphalt		
			NR	—			
9			NR	—			
			NR	—			
10					10' EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 060018

INSPECTOR: Nick Cotes
DRILLER: Ken Atwood
WEATHER: 70°F, Overcast
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1035
DATE/TIME FINISH: 10/1/15 @
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS-13
LOCATION DESCRIPTION: Parking lot west of Building 1007
LOCATION PLAN: Oceanport, New Jersey

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-13-0.0-0.5		60"/40"	0.0	4" Asphalt		
				0.0	0"-8" Moist, Dark-Brown, Loose, F-C Sand, Little F-M Gravel, Little Silt, Trace Coal		
1				0.0			
				0.0	8"-33" Moist, Light-Brown, Loose, FM Sand, Little F-C Gravel, Trace Silt, No Coal/Asphalt		
2				0.0			
				0.0	33"-40" Moist, Gray-Orange Mottled, Hard, Clay, Little F Sand, No Asphalt/Coal		
3	FTMM-57-SS-13-3.0-3.5			0.0			
			NR	—			
4			NR	—			
			NR	—			
5			60"/50"	0.0	60"-83" Moist, Orange-Brown, Loose, F-M Sand, Trace Clay, No Coal/Asphalt		
				0.3			
6				0.0			
	FTMM-57-SS-13-6.5-7.0			0.0			
7				0.3	83"-110" Wet, Light Gray-Orange Mottled, Loose, F-C Sand, No Coal/Asphalt		
				0.0			
8				0.0			
				0.0			
9			NR	—			
			NR	—			
10					110" EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - 57
PROJECT NUMBER: 748810- 066148

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Nick Costos
DRILLER: Ken Atwood
WEATHER: 70°F, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1150
DATE/TIME FINISH: 10/1/15 @ 1305
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM-57-SS-14
LOCATION DESCRIPTION: SW corner of Parking Lot west of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-14-0.0-0.5		60"/49"	0.2	5" Asphalt		
				0.4	0"-4" Dry, Dark Brown, Loose, F-C Sand, And F-M Gravel, Little Silt, Trace Asphalt		
1				1.6			
				0.3	4"-35" Dry, Light Gray, Loose, F-M Sand, Some F-C Gravel, Little Concrete, Little Silt, Trace Brick, No Coal, Trace Asphalt		
2				0.2			
				0.2			
3	FTMM-57-SS-14-3.0-3.5			0.0			
				0.1	35"-49" Moist, Brown, Dense, F-M Sand, Some Silt, Little F-M Gravel, No Coal/Asphalt		
4			NR	—			
			NR	—			
5	FTMM-57-SS-14-5.0-5.5		60"/46"	0.0	60"-63" Moist, Red-Brown, Loose, F-C Sand, Little F-M Gravel, No Coal, No Asphalt		
				6.0			
6				0.2			
				0.0	63"-80" Wet, Light Brown, Loose, F-C Sand, Some F-C Gravel, No Coal/Asphalt		
7				0.0			
				0.1	80"-85" Wet, Red-Brown, Hard, Clay, Little F-M Sand, No Coal/Asphalt		
8				0.0			
				0.0	85"-106" Wet, Dark Gray, Hard, Clay, Little F Sand, No Coal/Asphalt		
9			NR	—			
			NR	—			
10					10' EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 66018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Nick Lotzos
DRILLER: Ken Atwood
WEATHER: 70°F, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1150
DATE/TIME FINISH: 10/1/15 @ 1335
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS-15
LOCATION DESCRIPTION: Parking Lot West of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-15-0.0-0.5		60"/43"	0.0	0"-3" Moist, Dark Brown, Loose, F-C Sand, Some F-M Gravel, Trace Asphalt		
				0.4			
1				0.0	3"-7" Dark Green, Moist, Loose, F-M Sand, Little Silt, No Coal/Asphalt		
				0.0			
2				0.0	7"-25" Moist, Brown, Loose, F-C Sand, And F-C Gravel, Little Silt, No Coal/Asphalt		
				0.0			
3	FTMM-57-SS-15-3.0-3.5			0.0	25"-31" Moist, Dense, Dark Green, F-M Sand, Little Silt, No Coal/Asphalt		
			V	0.0			
4			NR	—	31"-43" Moist, Orange-Gray Mottled, Dense, F Sand, Little Clay, No Coal/Asphalt		
			NR	—			
5			60"/54"	0.2	60"-73" Moist, Red-Brown-Black Mottled, Loose, F-C Sand, Some F-M Gravel, Trace Coal?		
	FTMM-57-SS-15-5.5-6.0			0.0			
6				0.0	73"-114" Wet, Tan-Light Brown, Loose, F-C Sand, Little F-M Gravel (Rounded), No Coal/Asphalt		
				0.0			
7				0.1			
				0.0			
8				0.0			
				0.0			
9			V	0.0			
			NR	—			
10					10' EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Nick Loizos
DRILLER: Ken Atwood
WEATHER: 70°F, Rain - Overcast
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1340
DATE/TIME FINISH: 10/1/15 @ 1355
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS-16
LOCATION DESCRIPTION: Parking Lot West of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-16-0.0-0.5		60"/46"	0.3	0"-6" Asphalt 6"-5" Dry, Black, Loose, F-C Sand, Some F-M Gravel, Little Asphalt, Little Silt		
				0.1			
1				0.0			
	FTMM-57-SS-16-1.5-2.0			0.9	5"-9" Moist, Dense, Gray, F-C Sand, Little Clay, Trace F Gravel, Trace Concrete		
2				0.4	9"-40" Moist, Green-Orange Mottled, Dense, F-M Sand, Little Clay, Trace F-C Gravel * 20"-23" Black Sand/Gravel lense containing Coal		
				0.0			
3				0.0			
				0.0	40"-46" Crushed Concrete		
4			NR	—			
			NR	—			
5			60"/46"	0.0	60"-68" Moist, Olive Green, Dense, F-M Sand, Little Clay, Trace F Gravel		
				0.0			
6	FTMM-57-SS-16-6.0-6.5			0.0	68"-70" Crushed Concrete		
				0.0	70"-76" Moist, Light Gray-Orange Mottled, Dense, F Sand, Little Clay, No Coal/Asphalt		
7				0.0			
				0.0			
8				0.0			
				0.0	76"-106" Wet, Light Brown, Loose, F-C Sand, Some F-C Gravel (Rounded), No Coal/ Asphalt		
9			NR	—			
			NR	—			
10					106" EOB		

Remarks:

Sample Types
S -- Split-Spoon
U -- Undisturbed Tube
C -- Rock Core
A -- Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)				Fine Grained (Silt & Clay)			
V. Loose:	0-4	Dense:	30-50	V. Soft:	<2	Stiff:	8-15
Loose:	4-10	V. Dense::	>50	Soft:	2-4	V. Stiff:	15-30
M. Dense:	10-30			M. Stiff:	4-8	Hard:	> 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Dick Lotzos
DRILLER: Ken Atwood
WEATHER: 74°F, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1255
DATE/TIME FINISH: 10/1/15 @ 1310
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-55-17
LOCATION DESCRIPTION: Parking Lot West of Buildings 1000-1000A
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-55-17-0.0-0.5		60"/5"	0.6	4" Asphalt, 5" Gray, Loose, F-C Sand, 0"-13" Crushed Concrete, Little Silt, Trace Coal		
				0.0			
1				0.0	13"-24" Moist, Olive Green, Loose, F-M Sand, Trace F Gravel, Trace Clay, No Coal/Asphalt		
				0.0			
2				0.2	24"-35" Crushed Concrete		
				0.0	35"-59" Moist, Red-Brown, Dense, F-M Sand, Little Clay, No Coal/Asphalt		
3	FTMM-57-55-17-3.0-3.5			0.0			
				0.0			
4				0.0			
				0.0			
5			60"/53"	0.0	60"-64" SAA		
	FTMM-57-55-17-5.5-6.0			0.3	64"-67" Crushed Concrete		
6				0.0	67"-70" Moist, Red-Brown, Dense, F-M Sand, Trace Clay, No Coal/Asphalt		
				0.0			
7				0.0	70"-93" Wet, Red-Brown-Gray Mottled, Loose, F-M Sand Some Clay, No Coal/ Asphalt		
				0.0			
8				0.0			
				0.0			
9				0.0	93"-113" Wet, Black, Loose, F-M Sand, Trace Clay, No Coal/ Asphalt		
			NR	—			
10					10' EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Dick Lentz
DRILLER: Ken Atwood
WEATHER: 70°F, Overcast
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1325
DATE/TIME FINISH: 10/1/15 @ 1345
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS-18
LOCATION DESCRIPTION: East of Building 801
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-18-0.0-0.5		60"/44"	0.0	4" Asphalt		
				0.0	0"-10" Moist, Dark Gray, Loose, F-C Sand, Some F-C Gravel, Trace Silt, Trace Coal		
1				0.2			
				0.3	10"-34" Moist, Brown, Loose, F-C Sand, Little Clay, Trace F Gravel, No Coal/Asphalt		
2				0.0			
				0.0	34"-44" Moist, Gray-Orange mottled, Dense, F Sand, Some Clay, No Coal/Asphalt		
3	FTMM-57-SS-18-3.0-3.5			6.0			
				0.0			
4			NR	—			
			NR	—			
5	FTMM-57-SS-18-5.0-5.5		60"/60"	0.0	60"-65" Moist, Gray-Orange Mottled, Dense, F-C Sand, Some Clay, No Coal/Asphalt		
				0.0			
6				0.0			
				0.0	65"-120" Wet, Dark Gray-Orange, Loose Mottled, F-C Sand, Some F-M Gravel (Rounded), No Coal/Asphalt		
7				0.0			
				0.0			
8				0.0			
				0.0			
9				0.0			
				0.0			
10					10" EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Dick Catzod
DRILLER: Ken Atwood
WEATHER: 75° F, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1405
DATE/TIME FINISH: 10/1/15 @ 1425
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS-19
LOCATION DESCRIPTION: NE of Building 801
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-19-0.0-0.5	0.5	60"/49"	0.0	4" Asphalt		
				5.9	0"-30" Dry, Dark Gray, Loose, F-C Sand, And F-M Gravel, Little Clay, Trace Coal, Trace Concrete		
1				0.9			
				0.5			
2				3.5	30"-39" Dry, Orange-Brown, Dense, F-M Sand, Little F-C Gravel, Little Silt, No Coal/Asphalt		
				0.6			
3	FTMM-57-SS-19-3.0-3.5	3.5		0.5	39"-49" Moist, Black-Green Mottled, Loose, F Sand, Little Wood, Trace Clay,		
			V	0.0			
4			NR	—	31"-34" Loose w/ F-C Sand + Coal		
			NR	—			
5			60"/60"	0.3	60"-73" Moist, Olive Green, ~~Soft~~, Clay, Some F Sand, Trace Wood, No Coal/Asphalt		
				0.5			
6				0.0			
	FTMM-57-SS-19-6.5-7.0			0.0	73"-83" Moist, Light Brown, Loose, F Sand, Some Clay, No Coal/Asphalt		
7				0.0			
				0.0			
8				0.0	83"-120" Wet, SAA		
				0.0			
9				0.0			
			V				
10							

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Dale Lorenz
DRILLER: Ken Atwood
WEATHER: 75°F, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/1/15 @ 1435
DATE/TIME FINISH: 10/1/15 @ 1500
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-55-20
LOCATION DESCRIPTION: South of Building 975
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-55-20-0.0-0.5		60"/47"	0.0	5" Asphalt		
				0.0	0"-19" Dry, Brown, Loose, F-C Sand, Some Salt, Little F-C Gravel, Little organics, No Coal/Asphalt		
1				0.9			
				3.1	19"-43" Moist, Gray, Loose, F-M Sand, Little Clay, Trace F-M Gravel, No Coal/Asphalt		
2				6.9			
				6.1			
3	FTMM-57-55-20-3.0-3.5			0.0	23"-28" Railroad Tie (Wood w/ Creosote)		
			NR	—			
4			NR	—			
			NR	—			
5	FTMM-57-55-20-5.0-5.5		60"/60"	0.0	60"-67" Moist, Olive Green, Dense F-M Sand, Little Clay, Trace F Gravel, No Coal/Asphalt		
				0.1			
6				0.0			
				0.0	67"-120" Wet, Green-Orange Mottled, Hard, Clay, Some F Sand, No Coal/Asphalt		
7				0.0			
				0.0			
8				0.0			
				0.0			
9				0.0			
				0.0			
10					10' EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 26018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Dick Lotz
DRILLER: Ken Atwood
WEATHER: 55°F, Rain, Wind 10-15
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/5/15 @ 0835
DATE/TIME FINISH: 10/5/15 @ 0855
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-55-31
LOCATION DESCRIPTION: Parking Lot West of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-55-31-0.0 -0.5	60"/41"		0.9	4" Asphalt		
				0.8	0"-16" Dry, Dark Brown, Loose, F-C Sand, Little F-M Gravel, Little Silt, Trace Asphalt		
1				0.0			
				0.0	16"-41" Moist, Red-Brown, Soft, Clay, Some F Sand, Trace F Gravel, No Coal/Asphalt		
2				0.0			
				0.0			
3	FTMM-57-55-31-3.0 -3.5			0.0			
			NR	0.0			
4			NR	0.0			
			NR	0.0			
5			60"/45"	0.0	60"-75" SAA		
				0.0			
6				0.0			
	FTMM-57-55-31-6.5 -7.0			0.0			
7				0.0			
				0.0	75"-105" Wet, Light Brown, Loose, F-C Sand, Little Clay, No Coal/Asphalt		
8				0.0			
				0.0			
9			NR	—			
			NR	—			
10					10' EOB		

Remarks:

Sample Types
S -- Split-Spoon
U -- Undisturbed Tube
C -- Rock Core
A -- Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35 -50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Nick Lorenzo
DRILLER: Ken Atwood
WEATHER: 65°F, Rain, Wind 10-15
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/5/15 @ 0905
DATE/TIME FINISH: 10/5/15 @ 1015
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS-22
LOCATION DESCRIPTION: SW corner of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-22-0.0	0.5	60"/41"	0.0	0"-31" Moist, Dark Brown, Loose, F-M Sand, Little F Gravel, Trace Organics, No Coal/Asphalt		
				0.0			
1				0.0			
				0.0	31"-41" Moist, Light Gray-Brown Mottled, Loose, F-C Sand, Some F-C Gravel, Little Concrete, No Coal/Asphalt		
2				0.0			
				0.0			
3	FTMM-57-SS-22-3.0	3.5		0.0			
			NR	—			
4			NR	—			
			NR	—			
5			60"/46"	0.0	60"-93" Moist, Orange-Brown, Loose, F-M Sand, Trace Silt, No Coal/Asphalt		
				0.0			
6				0.0			
				0.0			
7				0.0			
	FTMM-57-SS-22-7.0	7.5		0.0			
8				0.0	93"-106" Wet, Light Brown-Tan, Loose, F-C Sand, Little F Gravel, No Coal/Asphalt		
				0.0			
9			NR	—			
			NR	—			
10					10' EOB		

Remarks:

Sample Types
S -- Split-Spoon
U -- Undisturbed Tube
C -- Rock Core
A -- Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Dick Lotzos
DRILLER: Vern Atwood
WEATHER: 38°F, Rain, Wind 0-15
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/8/15 @ 0930
DATE/TIME FINISH: 10/8/15 @ 0940
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-55-33
LOCATION DESCRIPTION: NW corner of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-55-33-0.0-0.5		60"/44"	0.0	0"-11" Dry, Dark Brown, Loose, F Sand, Some Silt, Little Organics, Trace F-M Gravel, No Coal/Asphalt		
				0.1			
1				0.0	11"-39" Moist, Brown, Dense, F-M Sand, Some Silt, Some F-M Gravel, No Coal/Asphalt		
				0.0			
2				0.0			
				0.0	39"-44" Moist, Olive Green, Dense, F Sand, Little Clay, Trace F Gravel, No Coal/Asphalt		
3	FTMM-57-55-33-3.0-3.5			0.0			
				0.0			
4			NR	—			
			NR	—			
5			60"/46"	0.0	60"-108" Moist, Olive Green, Hard, Clay, Some F Sand, No Coal/Asphalt		
				0.0			
6				0.0			
				0.0			
7				0.0			
				0.0			
8	FTMM-57-55-33-8.0-8.5			0.0			
				0.0	108"-108" Wet, SAA		
9			NR	—			
			NR	—			
10					10' EOB		

Remarks:

Sample Types
S -- Split-Spoon
U -- Undisturbed Tube
C -- Rock Core
A -- Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)		
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15	
Loose: 4-10	V. Dense:: >50		Soft: 2-4	V. Stiff: 15-30	
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30	

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 2

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

INSPECTOR: Nick Lucas
DRILLER: Ken Atwood
WEATHER: 60°S, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/2/15 @ 1340
DATE/TIME FINISH: 10/2/15 @ 1355
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-55-24
LOCATION DESCRIPTION: NE of Building 1007
LOCATION PLAN: Oceanport, New Jersey

GROUNDWATER OBSERVATIONS
WATER LEVEL: ≈9'
DATE: 10/2/15
TIME: 1415
MEAS. FROM: 36S (from soil core)

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-55-24-0.0-0.5	0.5	60"/49"	0.0	0"-33" Moist, Dark Brown, Loose, F-C Sand, Some F-C Gravel, Trace Organics, Trace Concrete, No Coal/Asphalt		
				0.0			
1				0.0			
				0.0			
2				0.0	33"-34" Moist, Black, Loose, F-C Sand, And Coal		
				0.0	34"-43" Moist, Brown, Loose, F-M Sand, Little F-M Gravel (Rounded), No Coal/Asphalt		
3	FTMM-57-55-24-3.0-3.5			0.0			
				0.0			
4			WR	-	43"-49" Moist, Olive Green, Hard, Clay, Little F-C Gravel, Little F Sand, No Coal/Asphalt		
			WR	-			
5			60"/60"	0.0	60"-73" SAA		
				0.0	73"-104" Moist, Olive Green, Hard, Clay, Some F Sand, No Coal/Asphalt		
6				0.0			
				0.0			
7				0.0			
				0.0			
8				0.0			
	FTMM-57-55-24-8.5-9.0			0.0			
9				0.0	104"-120" Wet, Loose, Olive Green, F-M Sand, Little Clay, No Coal/Asphalt		
				0.0			
10							

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

PARSONS Page 2 of 2

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018
GROUNDWATER OBSERVATIONS
WATER LEVEL: SEE PG.1
DATE:
TIME:
MEAS. FROM:

INSPECTOR: Nick Costas
DRILLER: Vern Atwood
WEATHER: 60°F, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/5/15 @ 1340
DATE/TIME FINISH: 10/5/15 @ 1355
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS- 34
LOCATION DESCRIPTION: SEE PG.1
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
10			60"/60"	0.0	130"-146" SAA		
				0.0			
11				0.0	146"-170" Wet, Orange Brown, Loose, F-C Sand, Little F-M Gravel (Rounded), No Coal/Asphalt		
				0.0			
12				0.0			
				0.0			
13				0.0			
				0.0			
14				0.0			
			NR	-			
15			60"/60"	0.0	180"-193" wet, Black, Soft, Clay, Little F Sand, No Coal/ Asphalt		
				0.0			
16				0.0	193"-203" Wet, Orange, Soft, Clay, Trace F Sand, No Coal/ Asphalt		
				0.0			
17				0.0			
				0.0	203"-240" Wet, Tan, Loose, F-C Sand, Some F Gravel (Rounded), Trace Silt, No Coal/Asphalt		
18				0.0			
				0.0	(NL) ~~160"-180"~~		
19				0.0			
				0.0			
20					20" EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: N/A
DATE: N/A
TIME: N/A
MEAS. FROM: N/A

INSPECTOR: Nick Lozos
DRILLER: Ken Atwood
WEATHER: 60's, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/8/15 @ 1305
DATE/TIME FINISH: 10/8/15 @ 1330
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57-SS-35
LOCATION DESCRIPTION: East of Building 1027
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0	FTMM-57-SS-35-0-0.5		60"/40"	0.1	0"-11" Dry, Gray, Loose, F-C Sand, and, F-C Gravel, Little Silt, Trace Concrete, No Coal/Asphalt		
				0.1			
1				0.0			
				0.0	11"-19" Moist, Red-Brown, Loose, F-M Sand, Little F Gravel, Trace Silt, No Coal/Asphalt		
2				0.0			
				0.0	19"-40" Moist, Olive Green, Soft, Clay, Some F Sand, No Coal/Asphalt		
3	FTMM-57-SS-35-30-3.5			0.0			
			NR	—			
4			NR	—			
			NR	—			
5	FTMM-57-SS-35-5.0-5.5		60"/39"	0.0	60"-74" Wet, Olive Green, Soft, Clay, Some F Sand, Trace F Gravel (Rounded) No Coal/Asphalt		
				0.0			
6				0.0			
				0.0	74"-80" Wet, Black, Loose, F-C Sand, Little F Gravel (Rounded), Little Silt, No Coal/Asphalt		
7				0.0			
			NR	—			
8			NR	—	80"-89" Wet, Olive Green, Soft, Clay, Little F Sand, No Coal/Asphalt.		
			NR	—			
9			NR	—			
			NR	—			
10					10' EOB		

Remarks:

Sample Types	Consistency vs. Blowcount / Foot				
S -- Split-Spoon	Granular (Sand & Gravel)		Fine Grained (Silt & Clay)		and - 35-50%
U -- Undisturbed Tube	V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	some - 20-35%
C -- Rock Core	Loose: 4-10	V. Dense:: >50	Soft: 2-4	V. Stiff: 15-30	little - 10-20%
A -- Auger Cuttings	M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30	trace - <10%
					moisture, density, color, gradation

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06018

GROUNDWATER OBSERVATIONS
WATER LEVEL: 11.3'
DATE: 10/5/15
TIME: 1010
MEAS. FROM: BGS (From soil core)

INSPECTOR: Dick Lewis
DRILLER: Ken Atwood
WEATHER: 65° F, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/5/15 @ 0945
DATE/TIME FINISH: 10/5/15 @ 1015
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - S7-GW-MW01
LOCATION DESCRIPTION: NW corner of Building 1007
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60"/44"	0.0	0"-7" Moist, Dark Brown, Loose, F-M Sand, Some Silt, Little Organics, No Coal/Asphalt		
				0.6			
1				0.0			
				0.1	7"-38" Moist, Red-Brown, Dense, F-C Sand, Some Silt, Little F-C Gravel, Trace Coal		
2				0.6			
				0.0			
3				0.0	38"-44" Moist, Olive Green, Soft, Clay, Some F Sand, No Coal/Asphalt		
				0.0			
4			NR	—			
			NR	—			
5			60"/50"	0.3	60"-110" SAA		
				0.0			
6				0.0			
				0.0			
7				0.0			
				0.0			
8				0.0			
				0.0			
9				0.0			
			NR	—			
10							

Remarks:

Sample Types
S -- Split-Spoon
U -- Undisturbed Tube
C -- Rock Core
A -- Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)		
V. Loose: 0-4	Dense:	30-50	V. Soft: <2	Stiff:	8-15
Loose: 4-10	V. Dense::	>50	Soft: 2-4	V. Stiff:	15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard:	> 30

and - 35 -50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 2 of 2

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - RI
PROJECT LOCATION: FTMM - Parcel 57
PROJECT NUMBER: 748810- 06015
GROUNDWATER OBSERVATIONS
WATER LEVEL:
DATE: SEE PG.1
TIME:
MEAS. FROM:

INSPECTOR: Nick Lazor
DRILLER: Ken Atwood
WEATHER: 58°F, Rain
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 10/3/15 @ 0945
DATE/TIME FINISH: 10/3/15 @ 1015
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: FTMM - 57 - GW - MW01
LOCATION DESCRIPTION: SEE PG.1
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
10			60"/53"	0.0	120"-134" SAA		
				0.0			
11				0.0	134"-173" Wet, Olive Green, Silt, Clay, some F Sand, No Coal/Asphalt		
				0.0			
12				0.0			
				0.0			
13				0.0			
				0.0			
14				0.0			
			WR	—			
15			60"/60"	0.0	160"-233" SAA		
				0.0	233"-238" Wet, Black, Hard, Clay, some Organics, Trace F Sand, No Coal/Asphalt	PEAT	
16				0.0			
				0.0			
17				0.0	238"-240" Wet, Gray, Loose, F-C Sand Little F Gravel (Rounded), No Coal/ Asphalt		
				0.0			
18				0.1			
				0.9			
19				0.0			
				0.0			
20					20' EOB		

Remarks:

Sample Types
S -- Split-Spoon
U -- Undisturbed Tube
C -- Rock Core
A -- Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

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PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~3.5
DATE: 4/22/16
TIME: 0840
MEAS. FROM: BGS

INSPECTOR: CW
DRILLER: JB
WEATHER: 60°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16 0830
DATE/TIME FINISH: 4/22/16 0840
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-26
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/58	0	0-6" Asphalt, millings, gravel		
	6.5-7				6"-40" Moist, M. dense, grey-green mf SAND, some silt, trace f gravel	I	
1							
2					40"-58" Saturated, M. dense, grey-green, MC SAND, little silt, trace f gravel		
3						II	
	3.5-4						
4							
5			58/58	0	0-35" SAA		
					35-44" grey/TAN, SAA		
6					44"-56" wet, light Brown/TAN, soft Clay, some f SAND	III	
7							
	7.5-8				56-58" wet, light Brown/TAN MC SAND		
8							
9							
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~5
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-27
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0905							
0	0.0.5		60/60	0	0-8" Brown, MF SAND, some silt, trace f gravel	I	
	~~0-0.5~~				8-34" Brown, MF SAND, some Rock frags, some F gravel little Brick		
1							
2					34"-48" moist, light grey/light Brown mottled F SAND and clay.	III	
3							
0910	3.5-4				48-60 moist, light grey/light Brown mottled MF SAND, trace clay		
4							
5			60/60	0	0-36" saturated, light tan, MC SAND	III	
6					36"-50" saturated, orange, MC SAND, little silt		
7					50-60" Dark grey, f SAND and silt,		
0915	7.5-8						
8							
9							
0					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: nG
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: SD
WEATHER: 70°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-28
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/60	0	0-5" Asphalt + millings		
0930	0.5-1				5"-26" Brown, mf SAND, some Rock frags, some f gravel, trace brick	I	
1							
2					26"-60" moist, Brown/grey/orange Brown mf SAND, little silt		
3							
0935	3.5-4					II	
4							
5			60/60	0	0-15" SAA		
6					15-24" Saturated, light Brown mC SAND, trace silt	III	
7					24"-36" moist, light grey/light Brown/ Red. Brown, mottled f SAND, some clay		
0940	7.5-8						
8					36"-60" wet, light brown/Red-Brown/ light orange mf SAND, little silt		
9							
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~6
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: DB
WEATHER: 65°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-29
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

	DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0955	0	0.5-1		60/60	0	0-6" Asphalt + millings 6-33" Brown, mF SAND, some f gravel, little Rock frags, trace silt 33-60" light Brown, TAN, mF SAND, little f gravel, moist	I	
	1							
	2							
	3						III	
1000		3.5-4						
	4							
	5			60/60	0	0-10" SAA 10"-25" ~~light~~ Wet, light Brown, M. Dense, mF SAND, trace f gravel 25"-36" wet, light TAN, M. Dense f SAND, trace silt 36"-60" wet, light tan, loose mC SAND	III	▽
	6							
	7							
1005		7.5-8						
	8							
	9							
	0					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: 7'
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JTB
WEATHER: 65°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PR2-57-SB-30
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/58	0	0-6" Asphalt + Millings		
1135	0.5-1				6"-60" B. light Brown, mf SAND, some mf, mol	I	
1							
2							
3						III	
1140	3.5-4						
4							
5			60/60	0	0-28" SAA, saturated @ 23"		
6					28-60" Wet, light Brown MC SAND, little f gravel.	III	SP
7							
1145	7.5-8						
8							
9							
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~3
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 75°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-01
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				0	0-6" gravel	I	
1400	0.5-1				6-60" ~~dust~~, orange-light brown, MC SAND, trace silt, trace f gravel saturated @ 35"	III	
1							
2							
3							▽
1405	3.5-4						
4							
5				0	0-60" saturated, SAA	III	
6							
7							
1410	7.5-8						
8							
9							
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: —
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 75°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-32
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				0	0-6" Asphalt + Millings		
1250	0.5-1				6-35" moist, M-Orange, gray, mF SAND, some silt		
1					35"-60" moist, gray/Brown/orange-Brown mF SAND, trace fgravel	II	
2							
3							
1255	3.5-4						
4							
5				0	0-46" SAA, wet @ 28"		
6					46"-60" moist, orange/light gray mottled f SAND, some silt, trace clay	III	
7							
1300	7.5-8						
8							
9							
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~6
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 65°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-33
LOCATION DESCRIPTION:
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/60	0	0-6" Asphalt + Millings		
1100	0.5-1				6-30" Brown, M. Dense, Mst SAND, little f gravel trace silt	I	
1							
					30"-60" Moist, light Brown/lightorange MC SAND, little silt		
2						III	
3							
1105	3.5-4						
4							
5			60/60	0	0-13" SAA		
					13-60" Saturated, light Brown/~~light~~ Brown, MC SAND, little mf gravel	III	▼
6							
7							
1110	7.5-8						
8							
9							
10					end of Boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~6.5
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: Cool
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-34
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/60	0	0-6" Asphalt + millings		
1025	0.5-1				6"-25" Brown, Mf SAND, some Rock Frags, little silt	I	
1							
2					25-60" Brown-light orange, Mf SAND, little Rock FRAGS, little silt, little f gravel	III	
3							
1030	3.5-4						
4							
5			60/60	0	0-20" SAA		
					20"-60" Wet, light Brown/Brown MC SAND, trace silt	III	∇
6							
7							
1035	7.5-8						
8							
9							
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~5
DATE: 4/22/16
TIME:
MEAS. FROM:

INSPECTOR: LW
DRILLER: JB
WEATHER: 75°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/22/16
DATE/TIME FINISH: 4/22/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-35
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				0	0-6"	I	
1330	0.5-1				6-60" moist, orange-Brown, MC SAND, trace silt		
1					~~60~~		
2						II	
3							
1345	3.5-4						
4							▼
5				0	0-50" Saturated, SAA		
					30-60" wet, grey/Brown, MC SAND, trace silt	II	
6							
7							
1410	7.5-8						
8							
9							
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: -4.5'
DATE: 4/21/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JPS
WEATHER: 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16 0935
DATE/TIME FINISH: 4/21/16 0950
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-36
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			58/58	0	0-4" Asphalt + millings		
					4"-53" Moist, Brown, M. Dense, MF SAND, little Rock frags, Brick, gravel.	I	
1							
2					53"-56" Moist, grey/Brown, Mottled f SAND, some clay		
3					56-58" saturated, light TAN, MC SAND, trace silt	III	
4							▽
1000	4.5-5						
5			60/60	0	0-17" Saturated, SAA	II	
					17-28" Wet, Grey, soft, clay and f SAND		
6							
1005	6.5-7				28"-37" Wet, Dark grey, soft clay and MF SAND		
7							
					37"-48" saturated, grey, MC SAND, trace silt		
8							
					48"-56" saturated, orange-Brown SAA		
9							
					56-60" TAN, SAA		
10							

Remarks: end of boring

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~4
DATE: 4/21/16
TIME: 0925
MEAS. FROM:

INSPECTOR: TW
DRILLER: TB
WEATHER: 50°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16 0910
DATE/TIME FINISH: 4/21/16 0925
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PtR-57-SB-37
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0				0	0-2" Asphalt		
0915	0.5-1				2"-26" Brown, M. dense, MC SAND, Rock frags, Brick frags, Wood	I	
1							
2					26"-35" Moist, Brown, M. dense mf SAND, Some f gravel, little Brick/crushed Rock		
0917 Dup	2.5-3						
3							
4					35-60" Moist, light Brown, M. dense, mf SAND, little f gravel, ~~trace silt~~		▽ saturated @ 48"
0920	4.5-5						
5				3	0-16" Saturated, SAA		
6					16"-26" Saturated, Dark gray, mf SAND, Some silt, trace clay	II	
6							
0923	6.5-7						
7					26"-46" Saturated, Dark gray, MC SAND, trace silt		
8							
9					46"-52" Saturated, Orange-Brown, MC SAND, trace silt		
0					52-60" Saturated, light TAN, MC SAND, trace silt		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: 7.5'
DATE: 4/21/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 60's f
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16
DATE/TIME FINISH: 4/21/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-38
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/58	0	0-5" Asphalt		
1300	0.5-1				5-33" Brown, m. dense, mf SAND, some f gravel, trace brick	I	
1							
2					33-45" Brown/orange brown, m. dense m. fine SAND, trace f gravel, little silt		
1303	2.5-3						
3							
					45-58" Moist, light grey/light grey f mottled SAND, some silt, little clay		
4							
1305	4.5-5						✓
5			60/60	0	0-20" wet, light brown/TAN, MC SAND	III	
6					20"-24" moist, grey, soft clay some F SAND		
1308	6.5-7						
7					28-41" moist, grey, mf SAND, some silt, little clay	II	
8					41"-55" wet, light grey, MC SAND		
9					55-60" moist, grey/brown f SAND some silt, organic		
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: —
DATE:
TIME:
MEAS. FROM:

INSPECTOR: KW
DRILLER: JB
WEATHER: 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16
DATE/TIME FINISH: 4/21/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: Parcel Tank - 39
LOCATION DESCRIPTION: Parcel 57 34
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			6"/5"	0	0-3" Asphalt + millings		
1040	0.5-1				3-11" moist, Brown, mf, SAND some f gravel	I	
1					11"-32" moist, dark gray-green, mf SAND, some silt		
2							
1043	2.5-3				32"-60" moist, Dark gray-green/ orange brown, mf, mottled SAND, some silt	II	
3							
4							
1045	4.5-5						
5			60/60	0	0-19" SAA		
					19"-24" moist, grey/orange-Brown mottled f SAND, some CLAY		
6							
1048	6.5-7				24"-30" moist, grey, soft Clay, some f SAND	II	
7					30"-41" moist, grey, soft Clay and mf SAND		
8							
					41"-50" moist, DARK gray/Brown, M. Dense, mf SAND little silt		
9							
0					50"-57" moist, Brown, f SAND, some silt, organic		
					57-60" wet, gray, mf SAND		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~6
DATE: 4/21/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 63°F Clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16
DATE/TIME FINISH: 4/21/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR57-SB-40
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/56"	0	0-4" Stone		
1335	0.5-1				4"-56" Brown, moist, MF SAND, some f gravel, little f. brick, little silt	I	
1							
2							
1333	2.5-3						
3							
4							
1335	4.5-5						
5			60/60	0	0-15" Moist, grey, soft clay and f SAND		▼
6					15"-45" Dark grey, wet, MC SAND, trace silt	II	
1338	6.5-7						
7					45-51" Wet, orange-brown, MC SAND, trace silt		
8							
9					51-60" Wet, light tan, MC SAND, trace silt	III	
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ns
DATE: 4/21/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JTB
WEATHER: 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16
DATE/TIME FINISH: 4/21/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-41
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/57	0	0-4" Asphalt + millings		
1405	0.5-1				4-30" Brown, m.dense mf SAND, little silt, little f gravel, little Rock frags	I	
1							
2							
1408	2.5-3				30"-41" moist, Brown/orange-brown/grey mf SAND, little f gravel		
3							
4					41"-50" moist, light grey, f SAND, some clay		
1410	4.5-5				50-57" moist, light brown/TAN, mc SAND, trace silt		▽
5			60/60	0	0-9" saturated, SAA		
					9-22" moist, grey, soft clay and f SAND	II	
6							
1413	6.5-7				22-35" wet, grey, soft, f SAND, some clay		
7							
					35"-55" saturated, grey, mc SAND, trace silt		
8							
					55-60" wet, orange-brown, mc SAND, trace silt		
9							
0					end of boring.		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~7
DATE: 4/21/16
TIME: 0850
MEAS. FROM: BGS

INSPECTOR: CW
DRILLER: JB
WEATHER: 50°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16 0835
DATE/TIME FINISH: 4/21/16 0850
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-42
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

	DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
	0			6/60	0	0-2" Asphalt		
0845		0.5-1				2"-49" Moist, Brown, M. dense, mf SAND, some F gravel, little rock frags, little silt	I	
	1							
	2							
0847		2.5-3				49"-60" moist, orange-brown, M. Dense, mf SAND, little f gravel		
	3							
	4							
0850		4.5-5						
	5			60/60	0	0-22" SAA		
						22-23" Moist, light gray, f SAND and clay		
	6						II	
0853		6.5-7				23"-32" Saturated, TAN, loose, MC SAND.		▽
	7							
						32"-34" Brown, SAA		
	8							
						34"-60" gray, SAA		
	9							
	10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~5
DATE: 4/21/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 60°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16
DATE/TIME FINISH: 4/21/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-113
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/57	0	0-3" Asphalt + milling's		
1230	0.5-1				3-16" light Brown, M. Dense, mf SAND, Some f gravel + brick	I	
1							
2					16"-42" Brown, M. Dense, mf SAND, little f gravel + brick, little silt		
1235	2.5-3						
3							
					42"-57" Moist, M. Dense, orange-brown/ gray, mf SAND, little silt	Brown/	
4							
1238	4.5-5						
5				0	0-5" SAA, Saturated	III	
					5-15" saturated, light Brown, MC SAND, trace silt		
6					15-19" wet, Dark gray, MC SAND, trace silt		
1238	6.5-7						
7					19"-30" moist, gray, soft Clay, Some f SAND	II	
8					30"-46" Moist, Dark gray/Brown M. Dense, mf SAND, little silt		
9					46-52" Moist, Dark gray, M. Dense mf SAND		
10					52'-60' Moist, Brown, f SAND, Some silt, organic		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 1 of 1

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~4.5
DATE: 4/21/16
TIME:
MEAS. FROM:

INSPECTOR: CW
DRILLER: JB
WEATHER: 60°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 4/21/16
DATE/TIME FINISH: 4/21/16
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-57-SB-44
LOCATION DESCRIPTION: Parcel 57
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/58	0	0-6" Asphalt + millings		
1130	0.5-1				6"-33" moist, Brown, mf SAND, some f gravel, some Rock frags, little brick	I	
1							
2					33"-58" moist, light brown, mf SAND, some Rock frags, some mf gravel. saturated @ 51"		
1133	2.5-3					III	
3							
4							▼
1135	4.5-5						
5				0	0-16" saturated, light Brown/grey mf SAND, some mf gravel, little silt		
6							
1138	6.5-7				16"-40" saturated, grey, mf SAND AND gravel		
7							
					40"-55" saturated, grey/Brown mottled, mf SAND, some silt,	II	
8							
9					55-60" saturated, Black, mf SAND, some silt, mica		
10					end of boring		

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

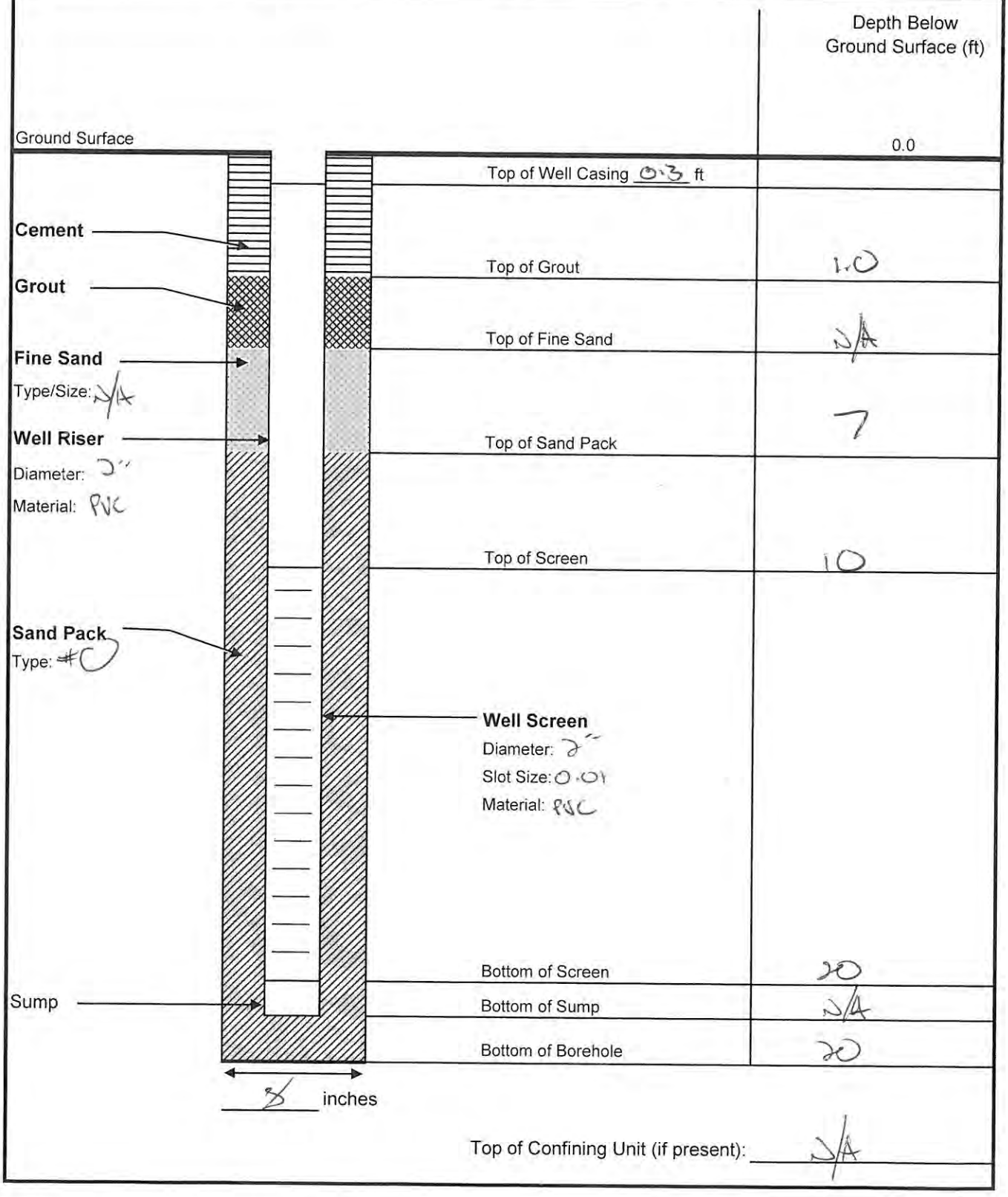
and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

Well Construction Detail (Single Cased - Road Box)

Client: USACE

Well ID: SFTMM-57-GW-MW01 NJBWA Permit No. E2015 10654

Date Well Installed: 10/2/15 Location: Parcel 57



WELL DEVELOPMENT REPORT

CLIENT: FTMM	WELL ID: 57-MW-01
PROJECT NAME: FTMM	DATE: 10/6/15
LOCATION: Oceanport, NJ	PROJECT NO.: 148810-03000

DRILLING METHOD (s):	HSA	INSPECTOR:	Parsons
PUMP METHOD (s):	whale pump	CONTRACTOR:	ECDI
SURGE METHOD (s):		CREW:	C. WATSON
INSTALLATION DATE:	10/5/15	START DEVELOPMENT DATE:	10/6/15
		END DEVELOPMENT DATE:	10/6/15

WATER DEPTH (TOC):	11.83 ft	INSTALLED POW DEPTH(TOC):	20 ft
WELL DIA. (ID CASING):	2" ft	MEASURED POW DEPTH(TOC):	20 ft
BORING DIAMETER:	8" ft	SILT THICKNESS:	— ft
		POW AFTER DEVELOPMENT:	20 ft

DIAMETER FACTORS (GAL/FT):

DIAMETER (IN):	2	3	4	5	6	7	8	9	10	11	12
GALLONS/ FT:	0.163	0.367	0.654	1.02	1.47	2.00	2.61	3.30	4.08	4.93	5.87

STANDING VOLUME INSIDE WELL = WATER COLUMN X WELL DIAMETER FACTOR = 1.33 GAL. = A

STANDING WATER IN ANNULAR SPACE =
WATER COL. BELOW SEAL(ft) X (BORING DIAM. FACTOR - WELL DIAM. FACTOR) X 0.3 = 7.34 GAL. = B

SINGLE STANDING WATER VOLUME = A + B = ... 8.67 GAL. = C

MINIMUM VOLUME TO BE REMOVED = 5 X C ..... 43.36 GALS.

ACTIVITY	START TIME	END TIME	ELAPSED TIME	GALLONS REMOVED	pH (std)	CONDUCTIVITY ( )	TEMP ( )	COLOR	TURBIDITY (ntu)	OTHER
Pump	1410	1420	10	5	6.53	\	18.09	Brown	3329	
Pump	1420	1430	20	15	6.87	\	18.10	light brown	19.6	
Surge	1430	1440	30	23	6.94	\	18.07	clear	126	
pump	1440	1450	40	33	6.91	\	18.06	clear	18.9	
surge	1450	1500	50	42	6.92	\	18.10	clear	22.1	
pump	1500	1510	60	45	6.90	\	18.13	clear	6.4	
TOTALS/FINAL										

COMMENTS:

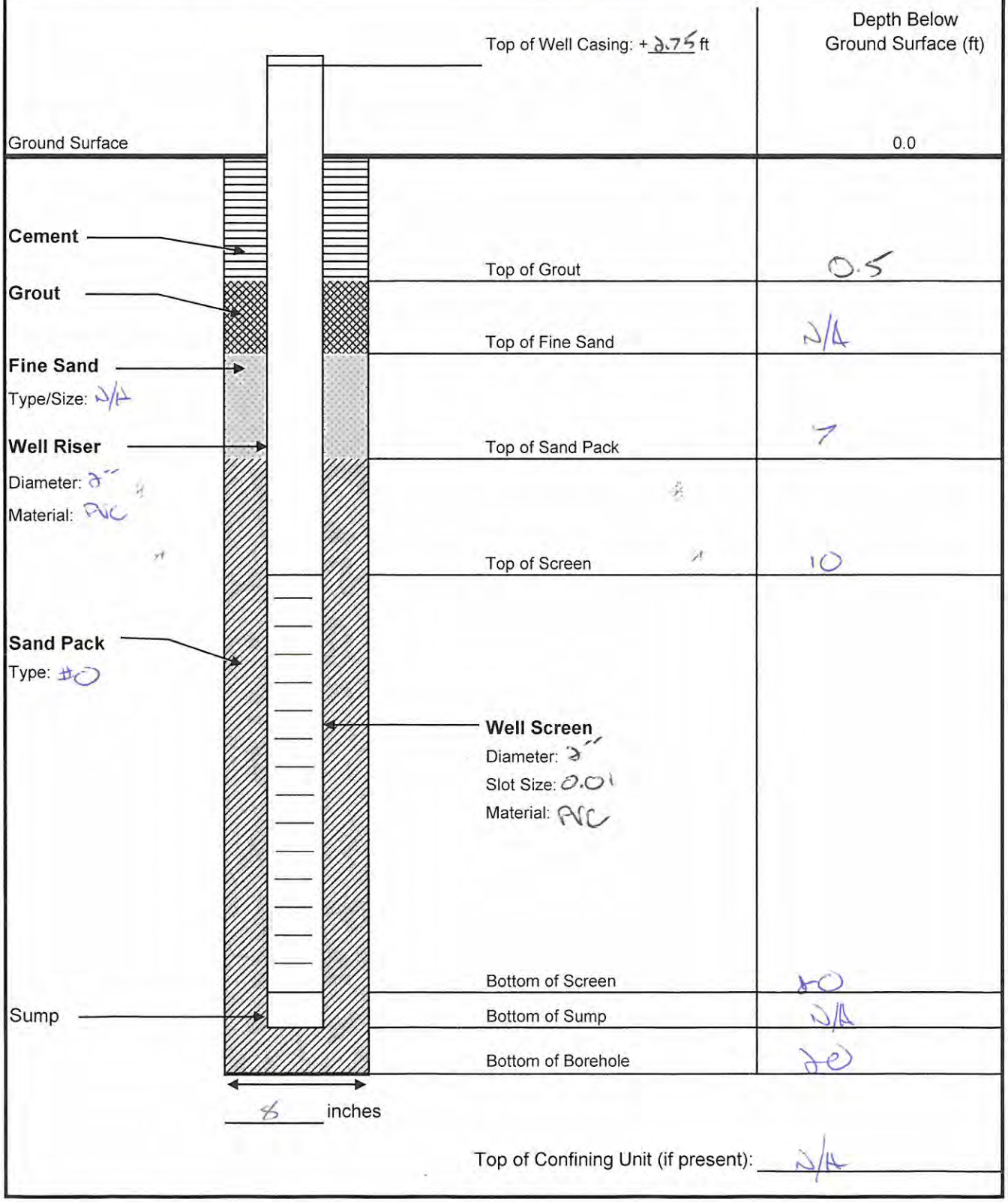
PARSONS

Well Construction Detail (Single Cased - Stickup)

Client: USACE

Well ID: FTMM-57-GW-MW03 NJBWA Permit No. E20151065 5

Date Well Installed: 10/5/15 Location: Parcel 57



Well_Detail_Single_Cased.xls

PARSONS Page 1 of 1

WELL DEVELOPMENT REPORT

CLIENT: FTMM ~~AE~~ WELL ID: FTMM-57-MW-02

PROJECT NAME: RI DATE: 10/7/15

LOCATION: Leeuwport, NJ PROJECT NO. :

DRILLING METHOD (s): HSA INSPECTOR: PARSONS

PUMP METHOD (s): whale pump CONTRACTOR: ECDI

SURGE METHOD (s): CREW: C. Watson

INSTALLATION DATE: 10/2/15 START DEVELOPMENT DATE: 10/7/15

END DEVELOPMENT DATE:

WATER DEPTH (TOC): 12.11 ft INSTALLED POW DEPTH(TOC): 20 ft

WELL DIA. (ID CASING): 2" ~~ft~~ MEASURED POW DEPTH(TOC): 23.6 (stick up) ft

BORING DIAMETER: 5" ~~ft~~ SILT THICKNESS: - ft

POW AFTER DEVELOPMENT: 23.6 ft

DIAMETER FACTORS (GAL/FT):

DIAMETER (IN):	(2)	3	4	5	6	7	8	9	10	11	12
GALLONS/ FT:	0.163	0.367	0.654	1.02	1.47	2.00	2.61	3.30	4.08	4.93	5.87

STANDING VOLUME INSIDE WELL = WATER COLUMN X WELL DIAMETER FACTOR = 1.49 GAL. = A

STANDING WATER IN ANNULAR SPACE =

WATER COL. BELOW SEAL(ft) X (BORING DIAM. FACTOR - WELL DIAM. FACTOR) X 0.3 = 8.43 GAL. = B

11.49 x (2.61 - 0.163) x 0.3

SINGLE STANDING WATER VOLUME = A + B = ... 9.92 GAL. = C

MINIMUM VOLUME TO BE REMOVED = 5 X C ..... 49.6 GALS.

ACTIVITY	START TIME	END TIME	ELAPSED TIME	GALLONS REMOVED	pH (std)	CONDUCTIVITY ( )	TEMP ( )	COLOR	TURBIDITY (ntu)	OTHER
Pumping	09:00	0905	5min	5	4.30	\	18.81	Brown	N/A	out of Range
	0905	0910	10min	10	4.34	\	18.56	Brown	N/A	out of Rang
	0910	0915	15min	15	4.50	\	18.17	Brown	N/A	out of Range
	0915	0925	25min	20	4.65	\	18.17	Brown	1141	
	0925	0935	35min	25	4.76	\	18.18	Brown	930	
	0935	0945	45min	35	4.81	\	18.18	Brown	801	
	0945	0955	55min	50	5.02	\	18.15	TAN	760	
	0955	1005	65min	60	5.17	\	18.16	clear/TAN	88.2	
	~~1005~~	1010	70min	65	5.24	\	18.16	clear/TAN	50.1	
	1010	1020	80min	75	5.20	\	18.16	clear/TAN	29.6	
	1020	1040	100min	95	5.21	\	18.16	clear	12.9	
~~TOTALS/FINAL~~	1040	1045	115min	105	5.22	\	18.16	clear	11.7	

COMMENTS:

LOW FLOW GROUND WATER SAMPLING - DATA SHEET

SHEET 1 OF 1

PROJECT SITE/LOCATION: ~~FTMM~~ Parcel 57 CONSULTING FIRM: PARSONS
DATE: 11/23/15 FIELD PERSONNEL: A. DiIonno
WEATHER: 40°F, Cloudy

MONITOR WELL #: FTMM-57-MW01 WELL DEPTH: 19.90 feet PUMP INTAKE DEPTH: 15.1 ft to TOC
WELL PERMIT #: E2015100054 WELL DIAMETER: 2 inches SCREENED/OPEN INTERVAL: 10-20 ft to TOC

PID/FID READINGS:
BACKGROUND: 0.0 ppm
BENEATH OUTER CAP: 0.0 ppm
BENEATH INNER CAP: 0.0 ppm

GAUGING/PUMPING INFORMATION:
INITIAL DEPTH TO WATER (BEFORE PUMP INSTALLATION): 10.13 ft to TOC
DEPTH TO PRODUCT: N/A ft to TOC ; PRODUCT THICKNESS: N/A ft
MAKE/MODEL OF PUMP: QED Sample Pro 1.75" Bladder Pump

WATER QUALITY METER INFORMATION:
INSTRUMENT MAKE/MODEL: YSI 6920
SERIAL #: 01M0724AB
TEMP. CORRECTION VALUE: -0.11°C

Time	PURGING	SAMPLING	pH (units) READING	pH (units) CHANGE	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY (mS/cm) CHANGE	REDOX POTENTIAL (mV) READING	REDOX POTENTIAL (mV) CHANGE	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN (mg/L) CHANGE	TURBIDITY (NTU) READING	TURBIDITY (NTU) CHANGE	TEMPERATURE (degrees C) READING	TEMPERATURE (degrees C) CHANGE	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)	
1002	X		6.02		1.369		-74.9		4.93		909.3		13.20		200	10.27	
1007	X		6.45		1.469		-87.2		3.77		1117.4		15.48		100	10.03	
1012	X		6.65		1.394		-89.2		3.69		1116.9		15.41		100	10.80	- Clean Turbidity optics
1017	X		6.65		1.355		-85.5		3.55		1246		15.09		100	10.90	
1022	X		6.64		1.287		-88.2		3.41		87.8		14.87		100	10.85	
1027	X		6.63		1.235		-91.7		3.13		74.6		14.79		100	10.85	
1032	X		6.62		1.199		-96.9		2.81		68.5		14.92		100	10.85	
1037	X		6.62		1.174		-96.8		2.55		54.5		14.80		100	10.85	
1042	X		6.61		1.163		-98.1		2.41		53.1		14.56		100	10.85	
1047	X		6.61		1.143		-96.1		2.26		40.6		14.50		100	10.85	
1052	X		6.59		1.140		-95.9		2.19		38.1		14.49		100	10.85	
1057	X	X	6.59		1.135		-96.3		2.11		36.2		14.24		100	10.85	

SAMPLING INFORMATION:
Sample ID: FTMM-57-GW-MW01-15.1
Sample Time: 1057
Comments: —

QA/QC INFORMATION:
Duplicate Collected?: Yes & Split
MS/MSD Collected?: No
Filtering?: Yes

ADDITIONAL OBSERVATIONS/COMMENTS:
Clarity: Clear
Odor: None
Other: —

*INDICATOR PARAMETERS HAVE STABILIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:
pH: ± 0.1 units ; Spec. Conductivity: ± 3% ; ORP: ± 10mV ; D.O.: ± 10% ; Turbidity: ± 10% (or <1 NTU) ; Temperature: ± 3%. ; Water Level Change: < 0.3 ft

ANALYST NAME & SIGNATURE: Alex DiIonno Alex DiIonno DATE: 11/23/15
REVIEWER NAME & SIGNATURE: DATE:

SHEET 1 OF 1

PROJECT SITE/LOCATION: FTMM Parcel 57 CONSULTING FIRM: PARSONS
DATE: 11/24/15 FIELD PERSONNEL: C. Watson
WEATHER: 38°F clear

MONITOR WELL #: PAR57-MW02 WELL DEPTH: 22.75 feet PUMP INTAKE DEPTH: 15.25 ft to TOC
WELL PERMIT #: WELL DIAMETER: 2 inches SCREENED/OPEN INTERVAL: 12.75 ~ 22.75 ft to TOC

PID/FID READINGS:
BACKGROUND: 0 ppm
BENEATH OUTER CAP: 0 ppm
BENEATH INNER CAP: 0 ppm

GAUGING/PUMPING INFORMATION:
INITIAL DEPTH TO WATER (BEFORE PUMP INSTALLATION): 12.43 ft to TOC
DEPTH TO PRODUCT: — ft to TOC ; PRODUCT THICKNESS: — ft
MAKE/MODEL OF PUMP: QED sample Pro

WATER QUALITY METER INFORMATION:
INSTRUMENT MAKE/MODEL:
SERIAL #:
TEMP. CORRECTION VALUE:

Time	PURGING	SAMPLING	pH (units)		SPECIFIC CONDUCTIVITY (mS/cm)		REDOX POTENTIAL (mV)		DISSOLVED OXYGEN (mg/L)		TURBIDITY (NTU)		TEMPERATURE (degrees C)		PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
			READING	CHANGE	READING	CHANGE	READING	CHANGE	READING	CHANGE	READING	CHANGE	READING	CHANGE		
1040	X		5.28		1.074		73.8		5.97		174.7		14.95		225	12.51
1045	X		5.22		1.054		87.5		4.27		173.2		15.78		225	12.52
1050	X		4.99		1.051		116.8		5.83		114.0		16.06		225	12.52
1055	X		4.70		1.042		130.4		5.59		80.5		15.81		225	12.52
1100	X		4.69		1.030		143.4		6.02		23.3		16.12		225	12.52
1105	X		4.69		1.029		146.5		6.09		22.8		15.98		225	12.51
1110	X		4.68		1.027		149.7		6.04		22.2		15.97		225	12.52
1115		X	4.67		1.028		144.8		6.10		21.9		15.89		225	12.52

SAMPLING INFORMATION:
Sample ID: PAR57-GW-MW02-15.25
Sample Time: 11:15
Comments: —

QA/QC INFORMATION:
Duplicate Collected?: No
MS/MSD Collected?: No
Filtering?: unfiltered

ADDITIONAL OBSERVATIONS/COMMENTS:
Clarity: clear
Odor: none
Other: —

*INDICATOR PARAMETERS HAVE STABILIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:
pH: ± 0.1 units ; Spec. Conductivity: ± 3% ; ORP: ± 10mV ; D.O.: ± 10% ; Turbidity: ± 10% (or <1 NTU) ; Temperature: ± 3%. ; Water Level Change: < 0.3 ft

ANALYST NAME & SIGNATURE: DATE: 11/24
REVIEWER NAME & SIGNATURE: DATE:

SHEET 1 OF 1

PROJECT SITE/LOCATION: PAR 57 CONSULTING FIRM: PARSONS
DATE: 11/24/15 FIELD PERSONNEL: C-Watson
WEATHER: 40's F Clear

MONITOR WELL #: PAR57-MW02 WELL DEPTH: 22.75 feet PUMP INTAKE DEPTH: 20.25 ft to TOC
WELL PERMIT #: WELL DIAMETER: 2 inches SCREENED/OPEN INTERVAL: 12.75-22.75 ft to TOC

PID/FID READINGS:
BACKGROUND: 0 ppm
BENEATH OUTER CAP: 0 ppm
BENEATH INNER CAP: 0 ppm

GAUGING/PUMPING INFORMATION:
INITIAL DEPTH TO WATER (BEFORE PUMP INSTALLATION): 12.52 ft to TOC
DEPTH TO PRODUCT: — ft to TOC ; PRODUCT THICKNESS: — ft
MAKE/MODEL OF PUMP: QED Sample Pro

WATER QUALITY METER INFORMATION:
INSTRUMENT MAKE/MODEL:
SERIAL #:
TEMP. CORRECTION VALUE:

Time	PURGING	SAMPLING	pH (units) READING	pH CHANGE	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE	REDOX POTENTIAL (mV) READING	REDOX POTENTIAL CHANGE	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE	TURBIDITY (NTU) READING	TURBIDITY CHANGE	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1130	X		3.95		1.258		201.7		5.61		79.4		16.13		225	12.52
1135	X		4.12		1.135		215.1		4.83		84.8		16.46		225	12.52
1140	X		4.54		1.044		180.9		6.15		4.3		17.21		225	12.52
1145	X		4.59		1.035		167.4		5.48		3.2		17.37		225	12.52
1150	X		4.56		1.033		171.5		5.41		3.0		17.39		225	12.52
1155	X		4.57		1.037		168.9		5.38		2.8		17.40		225	12.52
1200		X	4.57		1036		170.4		5.37		2.9		17.38		225	12.52

SAMPLING INFORMATION:
Sample ID: PAR57-GW-MW02-20.25
Sample Time: 1200
Comments: —

QA/QC INFORMATION:
Duplicate Collected?: NO
MS/MSD Collected?: NO
Filtering?: Yes

ADDITIONAL OBSERVATIONS/COMMENTS:
Clarity: clear
Odor: none
Other:

*INDICATOR PARAMETERS HAVE STABILIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:
pH: ± 0.1 units ; Spec. Conductivity: ± 3% ; ORP: ± 10mV ; D.O.: ± 10%; Turbidity: ± 10% (or <1 NTU) ; Temperature: ± 3%. ; Water Level Change: < 0.3 ft

ANALYST NAME & SIGNATURE: C Watson DATE: 11/24/15
REVIEWER NAME & SIGNATURE: DATE:

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT:** USACE | **WELL #:** 800MW01

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): ~~15-20~~ 5-15
WELL DIAMETER (in.): 4
WELL PERMIT #:
DATE: 5/23
SAMPLING PERSONNEL NAME: C. Watson
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0
WELL DEPTH (TOC): ~~30~~ 15
FEET OF WATER IN WELL (ft): 9.89
FEET OF SATURATED SCREEN (ft): 9.89
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 5.11
PUMP INTAKE DEPTH (ft below TOC): 10.06

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1300	Y		6.60	NA	0.139	NA	156.0	NA	6.44	NA	20.6	NA	16.58	NA	225	5.20
1315	Y		6.64	0.04	0.139	0	158.1	1.9	6.31	0.13	18.7	1.9	16.14	0.24	225	5.41
1320	Y		6.70	0.06	0.139	0	158.3	0.2	6.20	0.11	12.4	6.3	16.04	0.10	225	5.55
1325	Y		6.71	0.01	0.140	0.001	156.1	2.2	5.96	0.24	11.6	0.8	16.02	0.02	225	5.66
1330	X		6.71	0	0.141	0.001	156.5	0.4	5.82	0.14	10.0	1.6	15.98	0.04	225	5.73
1335	X		6.71	0	0.141	0	156.9	0.4	5.67	0.15	9.81	0.19	15.84	0.14	225	5.77
1340	X		6.71	0	0.142	0.001	157.6	0.7	5.58	0.09	9.46	0.35	15.75	0.09	225	5.80
1345	X		6.71	0	0.142	0	158.0	0.4	5.50	0.08	9.52	0.06	15.72	0.03	225	5.82
1350		X	6.71	0	0.142	0	157.7	0.3	5.39	0.11	8.96	0.56	15.68	0.04	225	5.84 *

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

4.0 Form_LFPS_Record_40 copies.xls

* Draw down greater than 0.3'; however, the screen brackets groundwater so no stagnant water exists.

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT: USACE** | **WELL #: 800MW07**

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): 800MW01-10.06

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
TAL metals	1350	250 mL	Clear	8.96	
Diss. TAL metals	1350	250mL	Clear	8.96	

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: (YES) or NO

DUPLICATE SAMPLE NAME (ID): 800MW01-10.06 (@ 1200)

MS/MSD SAMPLE COLLECTED: (YES) or NO

MS / MSD SAMPLE NAME (ID): 800MW01-10.06-MS
800MW01-10.06-MSD

PURGING AND SAMPLING COMMENTS:

Split collected as well

INVESTIGATION DERIVED WASTE (IDW): GAC Bucket

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL # : 600MW-07

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 4.41 - 19.41
WELL DIAMETER (in.): 4
WELL PERMIT #:
DATE: 5/23/16
SAMPLING PERSONNEL NAME: D. Leitzes
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0
WELL DEPTH (TOC): 19.41
FEET OF WATER IN WELL (ft): 16.2
FEET OF SATURATED SCREEN (ft): 15.0
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 3.21
PUMP INTAKE DEPTH (ft below TOC): 6.9

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1400	X		4.41	NA	0.129	NA	187.1	NA	4.27	NA	10.72	NA	20.05	NA	100	3.43
1405	X		4.37	0.04	0.126	0.003	193.5	6.4	2.85	1.42	9.65	1.07	19.82	0.23	100	3.67
1410	X		4.39	0.02	0.125	0.001	185.3	8.2	2.28	0.57	3.63	6.02	20.38	0.56	100	3.85
1415	X		4.41	0.02	0.126	0.001	181.9	3.4	2.04	0.24	2.94	0.69	20.47	0.09	100	3.90
1420	X		4.40	0.01	0.128	0.002	181.5	0.4	1.77	0.27	2.63	0.31	20.21	0.26	100	3.93
1425	X		4.38	0.02	0.128	0.000	181.5	0.0	1.63	0.14	2.65	0.58	20.18	0.03	100	3.95
1430		X	4.38	0.00	0.128	0.000	181.3	0.2	1.68	0.05	2.67	0.62	20.30	0.12	100	3.97

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

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LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT: USACE** | **WELL # :** SOOMW03

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-57-GW-SOOMW03-6.9 ; PAR-57-GW-SOOMW03-6.9-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Total Metals	1430	(1)x250ml w/HNO3	clear	2.67	TAL Metals
Dissolved Metals	1430	(1)x250ml w/HNO3	clear	2.67	TAL Metals

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

- well water purged w/ bladder pump through GAC
- sample collected @ 1430
- 1st saturated well interval = (3)

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT:** USACE | **WELL #:** 600 MW08

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 4.41 – 19.41
WELL DIAMETER (in.): 4
WELL PERMIT #:
DATE: 6/23/16
SAMPLING PERSONNEL NAME: D. Loizos
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0
WELL DEPTH (TOC): 19.41
FEET OF WATER IN WELL (ft): 16.2
FEET OF SATURATED SCREEN (ft): 15.0
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 3.21
PUMP INTAKE DEPTH (ft below TOC): 11.9

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1440	X		4.42	NA	0.134	NA	185.2	NA	1.44	NA	27.0	NA	20.93	NA	100	3.97
1445	X		4.40	0.02	0.136	0.002	186.1	0.9	0.93	0.51	10.41	16.59	19.40	1.53	100	3.99
1450	X		4.36	0.04	0.135	0.001	187.5	1.4	0.90	0.03	6.97	3.44	19.17	0.23	100	4.02
1455	X		4.37	0.01	0.135	0.000	185.2	2.3	0.87	0.03	0.31	6.66	19.09	0.08	100	4.02
1500	X		4.36	0.01	0.135	0.000	184.3	0.9	0.86	0.01	0.09	0.22	18.89	0.20	100	4.02
1505		X	4.37	0.01	0.135	0.000	183.0	1.3	0.84	0.02	0.69	0.60	18.94	0.05	100	4.02

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

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LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT: USACE** | **WELL # : 300MW03**

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-57-GW-300MW03-11.9 & PAR-57-GW-300MW03-11.9-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Total Metals	1505	(1)x250ml w/HNO_3	clear	0.69	TAL Metals
Dissolved Metals	1505	(1)x250ml w/HNO_3	clear	0.69	TAL Metals

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

- well water purged w/ bladder pump through GAC
- sample collected @ 1505
- 2nd saturated well interval of (3)

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: 800MW03

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 4.41 – 19.41
WELL DIAMETER (in.): 4

WELL PERMIT #:
DATE: 5/23/16
SAMPLING PERSONNEL NAME: D. Lotzos
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0
WELL DEPTH (TOC): 19.41
FEET OF WATER IN WELL (ft): 16.2

FEET OF SATURATED SCREEN (ft): 15.0
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 3.21
PUMP INTAKE DEPTH (ft below TOC): 16.9

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1515	X		4.47	NA	0.136	NA	180.7	NA	1.08	NA	6.96	NA	18.97	NA	100	3.91
1520	X		4.31	0.11	0.135	0.001	185.0	4.3	0.91	0.17	3.14	3.82	17.95	1.02	100	3.97
1525	X		4.32	0.01	0.135	0.000	183.6	1.4	0.89	0.02	1.86	1.28	17.86	0.09	100	4.03
1530	X		4.35	0.03	0.135	0.000	180.6	3.0	0.73	0.16	2.13	0.27	17.70	0.16	100	4.03
1535	X		4.34	0.01	0.135	0.000	181.0	0.4	0.73	0.00	1.95	0.18	17.60	0.10	100	4.03
1540		X	4.34	0.00	0.135	0.000	179.9	1.1	0.75	0.02	1.90	0.05	17.60	0.00	100	4.03

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

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LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: 800 MW07

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-57-GW-800MW07-16.9 & PAR-57-GW-800MW07-16.9-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Total Metals	1540	(1)x250ml w/ HNO_3	clear	1.90	TAL Metals
Dissolved Metals	1540	(1)x250ml w/ HNO_3	clear	1.90	TAL Metals

QAIQC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

- well water purged w/ bladder pump through GAC
- sample collected @ 1540
- 3rd saturated screen interval of (3)

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

PG. 152

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT:** USACE | **WELL #:** 812MW14

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 5-15
WELL DIAMETER (in.): 4

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: A. Lattos
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0
WELL DEPTH (TOC): 14.15
FEET OF WATER IN WELL (ft): 7.75

FEET OF SATURATED SCREEN (ft): 7.75
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 6.40
PUMP INTAKE DEPTH (ft below TOC): 10.37

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1156	X		7.38	NA	0.250	NA	89.2	NA	9.14	NA	347	NA	17.02	NA	200	6.56
1155	X		7.05	0.33	0.210	0.040	98.9	9.7	9.03	0.11	302	55	15.71	1.31	150	6.84
1200	X		6.51	0.54	0.196	0.014	111.5	12.6	9.15	0.12	238	64	15.41	0.30	100	6.71
1205	X		6.53	0.02	0.195	0.001	112.7	1.2	9.01	0.14	212	26	15.68	0.27	100	6.64
1210	X		6.61	0.08	0.195	0.000	111.4	1.3	8.84	0.17	286	74	15.73	0.05	100	6.64
1215	X		6.61	0.00	0.195	0.000	114.8	3.4	8.77	0.07	164	122	15.78	0.05	100	6.64
1220	X		6.62	0.01	0.195	0.000	116.5	1.7	8.76	0.01	189	25	15.73	0.15	100	6.64
1225	X		6.64	0.02	0.197	0.002	121.5	5.0	8.81	0.05	231	42	16.15	0.22	100	6.64
1230	X		6.67	0.03	0.197	0.000	123.7	2.2	8.70	0.11	175	56	16.25	0.10	100	6.64
1235	X		6.61	0.01	0.198	0.001	128.3	4.6	8.69	0.01	207	32	16.44	0.19	100	6.64
1240	X		6.60	0.01	0.202	0.004	132.9	4.6	8.52	0.17	212	5	16.46	0.02	100	6.64
1245	X		6.60	0.00	0.201	0.001	138.3	5.4	8.51	0.01	323	111	16.43	0.03	100	6.64

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

Pg. 2 of 2

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT:** USACE | **WELL #:** 57MW14

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 5-15
WELL DIAMETER (in.): 4
WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: J. Lotzo
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0
WELL DEPTH (TOC): 14.15
FEET OF WATER IN WELL (ft): 7.75
FEET OF SATURATED SCREEN (ft): 7.75
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 6.40
PUMP INTAKE DEPTH (ft below TOC): 10.27

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1250	X		6.60	NA	0.202	NA	141.2	NA	8.55	NA	235	NA	16.41	NA	100	6.64
1255	X		6.60	0.00	0.200	0.002	143.3	2.1	8.50	0.05	276	41	16.36	0.05	100	6.64
1300	X		6.60	0.00	0.201	0.001	143.6	0.3	8.51	0.01	289	13	16.39	0.03	100	6.64
1305	X		6.60	0.00	0.199	0.002	145.2	1.6	8.46	0.05	315	26	16.40	0.01	100	6.64
1310	X		6.60	0.00	0.198	0.001	157.2	12	8.44	0.02	300	15	16.70	0.30	100	6.64
1315	X		6.60	0.00	0.198	0.000	153.1	4.1	8.45	0.01	276	24	16.65	0.05	100	6.64
1320	X		6.61	0.01	0.199	0.001	151.6	1.5	8.45	0.00	231	45	16.58	0.07	100	6.64
1325	X		6.62	0.01	0.198	0.001	150.2	1.4	8.45	0.00	198	33	16.60	0.02	100	6.64
1330	X		6.60	0.02	0.198	0.000	151.2	1.0	8.43	0.02	207	9	16.73	0.07	100	6.64
1335	X		6.60	0.00	0.200	0.002	149.9	1.3	8.41	0.02	271	64	16.71	0.02	100	6.64
1340	X		6.60	0.00	0.199	0.001	149.9	0.0	8.41	0.00	302	31	16.66	0.05	100	6.64
1345	X		6.60	0.00	0.199	0.000	149.7	0.2	8.41	0.00	280	22	16.64	0.02	100	6.64

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS	CLIENT: USACE	WELL # : SBMW14

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): SBMW14-10.27 ; SBMW14-10.27-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
TAL Metals (Total)	1345	(1)x250ml w/HNO3	orange	280	
TAL Metals (Dissolved)	1345	" "	orange	280	

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: (YES) or NO

DUPLICATE SAMPLE NAME (ID): SBMW14-10.27

MS/MSD SAMPLE COLLECTED: (YES) or NO

MS / MSD SAMPLE NAME (ID): SBMW14-10.27-MS
SBMW14-10.27-MSD

PURGING AND SAMPLING COMMENTS:

- Dup sample time = 280
- QC sample collected ; analyzed by Envirotest
- Purge stopped @ 2hrs → turbidity did not drop or stabilize

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT:** USACE | **WELL #:** PAR-57-MW01

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 10-20
WELL DIAMETER (in.): 2
WELL PERMIT #:
DATE: 5/23/16
SAMPLING PERSONNEL NAME: C. Watson
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0
WELL DEPTH (TOC): 20
FEET OF WATER IN WELL (ft): 10.15
FEET OF SATURATED SCREEN (ft): 10
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 9.85
PUMP INTAKE DEPTH (ft below TOC): 12.5

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1450	X		6.59	NA	1.193	NA	-55.9	NA	3.93	NA	701	NA	16.91	NA	200	10.10
1455	X		6.58	0.02	1.198	0.005	-66.8	10.9	0.74	3.19	127	574	14.61	2.3	200	10.23
1500	X		6.60	0.02	1.199	0.001	-70.1	3.3	0.50	0.24	98.6	28.4	14.09	.52	200	10.38
1505	X		6.61	0.01	1.209	0.010	-70.8	0.7	0.36	0.14	77.8	20.8	14.00	0.09	200	10.60
1510	X		6.63	0.02	1.200	0.009	-71.5	0.7	0.30	0.06	56.8	21	13.97	0.03	200	10.66
1515	X		6.63	Q	1.196	0.004	-72.4	0.9	0.27	0.03	42.9	13.9	13.96	0.01	200	10.70
1520	X		6.65	0.02	1.193	0.003	-66.8	5.6	0.25	0.02	20.7	22.2	13.90	0.06	200	10.76
1525	X		6.64	0.01	1.191	0.002	-64.2	2.6	0.25	Q	13.8	6.9	13.85	0.05	200	10.80
1530	X		6.65	0.01	1.190	0.001	-63.2	1.0	0.24	0.01	10.3	3.5	13.84	0.01	200	10.85
1535	X		6.65	Q	1.189	0.001	-67.4	4.2	0.24	Q	9.76	0.54	13.81	0.03	200	10.91
1540		X	6.65	Q	1.189	0.000	-66.9	0.5	0.23	0.01	9.44	0.32	13.82	0.01	200	10.97

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

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LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: PAR-57-MW-01

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-57-MW-01-12.5

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
TAL metals	1540	250 mL	Clear	9.44	
Diss. TAL Metals	1540	250 mL	Clear	9.44	

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT: USACE** | **WELL #:** PAR-57-MW07

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 10-20
WELL DIAMETER (in.): 2

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: C. WATSON
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0
WELL DEPTH (TOC): 20
FEET OF WATER IN WELL (ft): 10.15
FEET OF SATURATED SCREEN (ft): 10
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 9.85
PUMP INTAKE DEPTH (ft below TOC): 17.5

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
0945	X		6.14	NA	1.126	NA	-81.1	NA	1.84	NA	47.5	NA	13.68	NA	200	10.11
0950	X		6.20	0.06	1.119	0.007	-80.6	0.5	1.01	0.83	35.9	2.1	13.72	0.04	200	10.27
0955	X		6.27	0.07	1.109	0.010	-81.3	0.6	0.50	0.51	28.7	6.7	13.87	0.15	200	10.33
1000	X		6.30	0.03	1.091	0.018	-80.4	0.9	0.43	0.07	15.3	13.4	13.85	0.02	200	10.40
1005	X		6.33	0.03	1.075	0.016	-76.0	4.4	0.39	0.04	7.61	7.69	13.83	0.02	200	10.51
1010	X		6.33	Q	1.074	0.001	-75.9	0.1	0.33	0.06	7.35	0.26	13.84	0.01	200	10.58
1015	X	X	6.34	0.01	1.074	Q	-73.7	2.2	0.32	0.01	6.82	0.53	13.82	0.02	200	10.65
1020		X	6.34	Q	1.073	0.001	-71.8	1.9	0.32	Q	6.89	0.07	13.80	0.02	200	10.72

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: PAP-57-MW01

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAP-57-MW01-17.5

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
TAL metals	1020	250 mL	Clear	6.89	
Diss TAL Metals	1020	250mL	Clear	6.89	

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

INVESTIGATION DERIVED WASTE (IDW): GAC Bucket

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT: USACE** | **WELL #: PAR-57-MW02**

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 13.3-23.3
WELL DIAMETER (in.) 2

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: C. Watson
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0
WELL DEPTH (TOC): 23.3
FEET OF WATER IN WELL (ft): 10.85

FEET OF SATURATED SCREEN (ft): 10
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 12.45
PUMP INTAKE DEPTH (ft below TOC): 15.8

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1035	✓		4.80	NA	1.117	NA	112.0	NA	4.43	NA	729	NA	15.77	NA	250	12.55
1040	✓		4.65	0.25	1.109	0.008	199.9	86.9	1.50	2.93	326	403	14.79	2.02	250	12.56
1045	✓		4.77	0.12	1.040	0.069	203.7	3.8	0.75	0.75	144	182	14.31	0.48	250	12.57
1050	✓		5.04	0.37	1.000	0.040	170.0	33.7	0.50	0.25	99.8	44.2	14.18	0.21	250	12.57
1055	✓		5.22	0.18	0.973	0.037	156.8	13.2	0.47	0.03	72.5	27.3	14.14	0.04	250	12.57
1100	✓		5.23	0.01	0.969	0.004	141.4	15.4	0.42	0.05	64.3	8.2	14.32	0.18	250	12.56
1105	✓		5.23	Q	0.965	0.004	140.8	0.6	0.39	0.03	46.8	17.5	14.32	Q	250	12.57
1110	✓		5.22	0.01	0.962	0.003	137.9	2.9	0.51	0.12	30.3	16.5	14.26	0.06	250	12.57
1115	✓		5.23	0.01	0.960	0.002	137.0	0.9	0.36	0.15	17.6	12.7	14.33	0.07	250	12.57
1120	✓		5.23	Q	0.960	Q	136.8	0.2	0.36	Q	12.9	4.7	14.35	0.02	250	12.57
1125	✓		5.23	Q	0.959	0.001	135.0	1.8	0.36	Q	10.1	2.8	14.39	0.04	250	12.57
1130	✓		5.23	Q	0.959	Q	133.6	1.4	0.34	0.02	10.6	8.5	14.42	0.03	250	12.57

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

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LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT: USACE** | **WELL # : PAR-57-MW02**

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 13.3-23.3
WELL DIAMETER (in.): 2

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: N. WATSON
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm):
WELL DEPTH (TOC): SEE P. 1
FEET OF WATER IN WELL (ft):
FEET OF SATURATED SCREEN (ft):
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC):
PUMP INTAKE DEPTH (ft below TOC): 15.8

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1135	X		5.23	NA	0.959	NA	132.0	NA	0.35	NA	9.86	NA	14.40	NA	250	12.57
1140	X		5.22	0.01	0.958	0.01	132.3	0.3	0.34	0.01	10.0	0.2	14.44	0.04	250	12.57
1145		X	5.23	0.01	0.958	0	132.1	0.2	0.34	0	9.61	0.4	14.45	0.01	250	12.57

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

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LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | **CLIENT: USACE** | **WELL #: PAR-57-MW02**

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-57-GW-MW02-15.8 + MW02-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
TAL Metals	1145	250 mL	Clear	9.6	
TAL Metals	1145	250 mL	Clear	9.6	

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: PAR-57-MW02

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 13.3-23.3
WELL DIAMETER (in.): 2

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: C. WATSON
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0
WELL DEPTH (TOC): 23.3
FEET OF WATER IN WELL (ft): 10.85

FEET OF SATURATED SCREEN (ft): 10
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 12.45
PUMP INTAKE DEPTH (ft below TOC): 20.8

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units)		SPECIFIC CONDUCTIVITY (mS/cm)		REDOX POTENTIAL (mv)		DISSOLVED OXYGEN (mg/L)		TURBIDITY (NTU)		TEMPERATURE (degrees C)		PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
			READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*		
1155	X		5.08	NA	0.973	NA	124.7	NA	1.44	NA	106.5	NA	14.77	NA	250	12.56
1200	X		4.89	0.19	0.969	0.004	215.4	90.7	0.48	0.96	39.8	66.7	14.08	0.69	250	12.58
1205	X		4.87	0.02	0.921	0.048	206.5	8.9	0.39	0.09	28.4	11.4	14.12	0.04	250	12.58
1210	X		4.92	0.05	0.917	0.004	200.8	5.7	0.37	0.02	12.8	15.6	14.20	0.08	250	12.58
1215	X		4.93	0.01	0.916	0.001	195.4	5.4	0.35	0.02	9.64	3.16	14.27	0.07	250	12.58
1220	X		4.91	0.02	0.916	0	193.2	2.2	0.34	0.01	9.29	0.35	14.30	0.03	250	12.58
1225		X	4.92	0.01	0.915	0.001	189.6	3.6	0.33	0.01	8.88	0.41	14.29	0.01	250	12.58

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: PAR-57-MW02

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): PAR-57-GW-MW02-20.8

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
TAL metals	1225	250	Clear	8.88	
TAL metals Diss.	1225	250	Clear	8.88	

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID):

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID):

PURGING AND SAMPLING COMMENTS:

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: 866MW03

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 16.85 - 1.85
WELL DIAMETER (in.) 4

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: J. Lotz
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0
WELL DEPTH (TOC): 16.85
FEET OF WATER IN WELL (ft): 11.40

FEET OF SATURATED SCREEN (ft): 11.4
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 5.45
PUMP INTAKE DEPTH (ft below TOC): 9.35

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units)		SPECIFIC CONDUCTIVITY (mS/cm)		REDOX POTENTIAL (mv)		DISSOLVED OXYGEN (mg/L)		TURBIDITY (NTU)		TEMPERATURE (degrees C)		PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
			READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*		
1010	X		7.22	NA	0.890	NA	91.1	NA	4.01	NA	12.8	NA	16.85	NA	200	5.68
1015	X		6.49	0.73	0.871	0.019	87.6	3.5	2.82	1.19	10.16	2.64	16.58	0.27	200	5.71
1020	X		6.39	0.10	0.857	0.014	83.0	0.4	2.26	0.56	8.28	1.88	16.37	0.21	200	5.71
1025	X		6.37	0.02	0.851	0.006	84.1	1.1	2.13	0.13	8.34	0.06	16.34	0.03	200	5.71
1030	X		6.37	0.00	0.846	0.005	84.2	0.1	1.96	0.17	8.10	0.24	16.51	0.17	200	5.71
1035	X		6.37	0.00	0.844	0.004	83.7	0.5	1.96	0.00	7.97	0.13	16.67	0.16	200	5.71
1040		X	6.37	0.00	0.831	0.013	83.6	0.1	1.98	0.02	8.32	0.35	16.65	0.02	200	5.71

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

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LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL #: 866MW03

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): 866MW03-9.35 & 866MW03-9.35-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
TAL Metals	1040	(1)x250ml w/HNO3	clear	8.32	
TAL Metals (Dissolved)	1040	(1)x250ml w/HNO3	clear	8.32	

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

- well water purged w/ bladder pump through GAC
- sample collected @ 1040
- 1st saturated screen interval = (2)

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS | CLIENT: USACE | WELL # : SS66MW003

PROJECT: Fort Monmouth ECP and UHOT Groundwater Sampling
AOC # (AREA): Parcel 57
SCREENED INTERVAL (TOC): 1.55 - 16.85
WELL DIAMETER (in.) 4

WELL PERMIT #:
DATE: 5/24/16
SAMPLING PERSONNEL NAME: D. Lotzos
SAMPLING PERSONNEL NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	4	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0
WELL DEPTH (TOC): 16.85
FEET OF WATER IN WELL (ft): 11.40

FEET OF SATURATED SCREEN (ft): 11.4
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 6.45
PUMP INTAKE DEPTH (ft below TOC): 14.35

PURGING AND SAMPLING

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
1050	X		6.71	NA	0.901	NA	63.7	NA	1.15	NA	36.1	NA	15.60	NA	200	5.71
1055	X		6.87	0.16	0.911	0.021	41.3	22.4	0.70	0.45	19.8	16.3	15.41	0.19	200	5.70
1100	X		6.96	0.09	0.932	0.010	25.2	16.1	0.60	0.10	9.31	10.49	15.42	0.01	200	5.70
1105	X		6.99	0.03	0.931	0.001	17.3	7.9	0.57	0.03	7.21	2.10	15.52	0.10	200	5.70
1110	X		6.92	0.07	0.928	0.003	17.8	0.5	0.58	0.01	6.91	0.30	15.44	0.08	200	5.70
1115		X	6.93	0.01	0.927	0.001	17.1	0.7	0.57	0.01	6.45	0.46	15.52	0.06	200	5.70

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

4.0 Form_LFPS_Record_40 copies.xls

LOW FLOW PURGE AND SAMPLING (LFPS) RECORD - GROUNDWATER

PARSONS	CLIENT: USACE	WELL #: 866MW02

SAMPLING INFORMATION

SAMPLING DEVICE: QED Sample Pro

SAMPLE NAME (ID): 866MW02-14.35 & 866MW02-14.35-Dissolved

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
TAL Metals (Total)	1115	(1)x250ml w/HNO3	clear	6.45	
TAL Metals (Dissolved)	1115	(1)x250ml w/HNO3	clear	6.45	

QA\QC SAMPLES:

DUPLICATE SAMPLE COLLECTED: YES or (NO)

DUPLICATE SAMPLE NAME (ID): _____

MS/MSD SAMPLE COLLECTED: YES or (NO)

MS / MSD SAMPLE NAME (ID): _____

PURGING AND SAMPLING COMMENTS:

- well water purged w/ bladder pump through GAC
- sample collected @ 1115
- dup collected screen interval #(2)

INVESTIGATION DERIVED WASTE (IDW):

Date:									
Volume Transfered to Drum:									
Drum Number:									

APPENDIX C

Historical Information

Spill and Site Remediation
Update Report
Gas / Fuel Oil Discharge
COMMISSARY CONSTRUCTION SITE
Main Post Area
NJDEP Case # 97-1-11-0938-02

United States Army

Fort Monmouth, New Jersey

Spill and Site Remediation Update Report

Gas / Fuel Oil Discharge

COMMISSARY CONSTRUCTION SITE

Main Post Area

NJDEP Case # 97-1-11-0938-02

February 9, 1997

SITE UPDATE REPORT

GAS \ FUEL OIL DISCHARGE

COMMISSARY CONSTRUCTION SITE
MAIN POST AREA
NJDEP CASE NO. 97-1-11-0938-02

FEBRUARY 9, 1997

PREPARED BY:

UNITED STATES ARMY, FORT MONMOUTH, NEW JERSEY
DIRECTORATE OF PUBLIC WORKS
ENVIRONMENTAL OFFICE
BUILDING 173
FORT MONMOUTH, NJ 07703

CHARLES APPLEBY
ENVIRONMENTAL PROTECTION SPECIALIST
NJDEP SUBSURFACE CERT. # 009974

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	1.3 Field Screening	
	1.4 Site Investigation Activities	
	1.5 Hazard Abatement	
2.0	CONCLUSIONS AND RECOMMENDATIONS	9

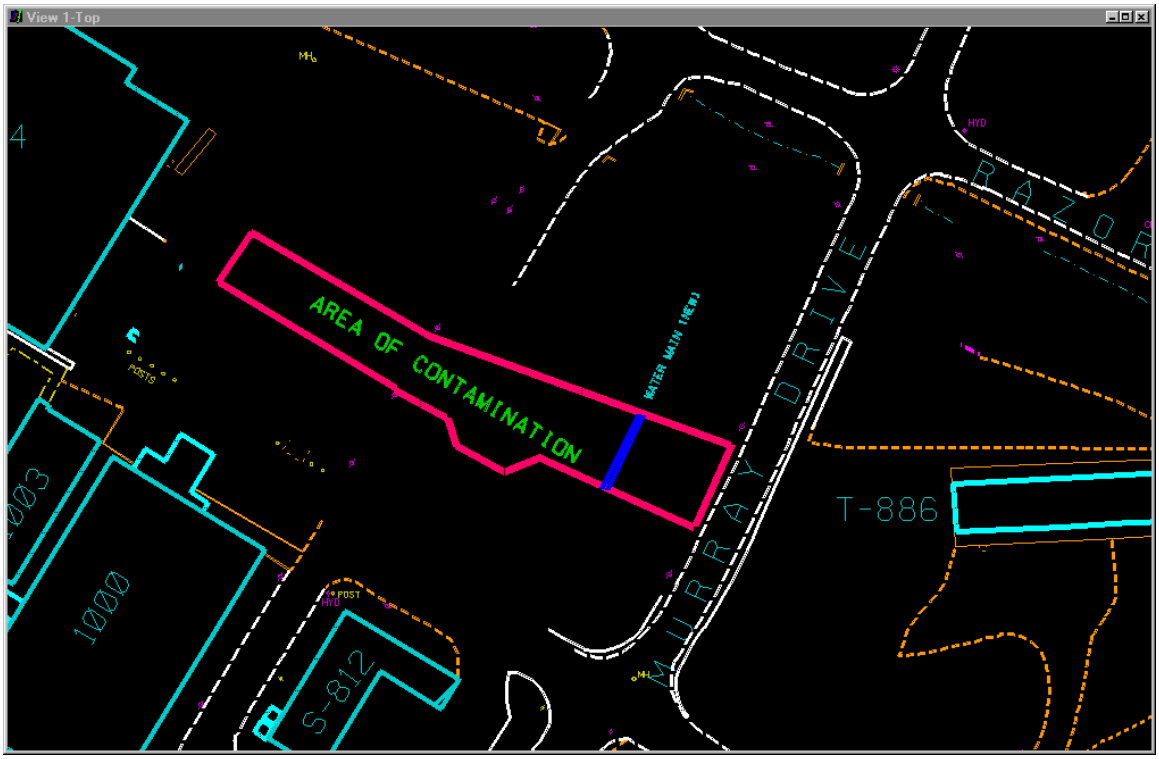
1.0 Discharge Response Actions

On January 3, 1997, an fuel odor was observed coming from excavated soils at the commissary construction site at U.S. Army Fort Monmouth, Fort Monmouth, New Jersey (Figure 1). The Commissary Construction Site includes the subsurface installation of electric, water, sewer, storm drains and communication services as well building and parking facilities. The Fort Monmouth Directorate of Public Works Environmental Office immediately responded to the report. The soil was observed to be contaminated with some type of petroleum product of unknown origin. An area approximately 80ft. by 80ft. was suspected to be contaminated to a depth of 7ft.. Samples from three areas (the highest observed contaminated areas) were taken and were analyzed for TPHC. The highest TPHC sample was 20,400 mg/kg and was from an area 7 ft. below ground surface at the new water main excavation. That sample was also analyzed for TCLP and Total metals and was found to be below NJDEP residential clean-up criteria for all metals except arsenic which was 3.7 mg/kg with an NJDEP standard of 2 mg/kg. The discharge was reported to The New Jersey Department of Environmental Protection (NJDEP), case number 97-1-11-0938-02 was assigned. Due to the contractual delay as well as the Army's commitment to a clean environment it was determined that further site investigation activities would commence and the site would be restored to the best extent possible.

1.1 Site Investigation

The site investigation was performed by licensed U.S. Army personnel in accordance with the NJDEP *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E). In an effort to determine

the cause of the discharge, soils within the area were screened visually for evidence of contamination as well as sampled and analyzed by the Fort Monmouth Environmental Testing Laboratory, an NJDEP Certified Laboratory. Due to the extreme cold no field instruments were operational therefore, when necessary, samples were taken to the laboratory for complete analysis.
Construction plans and other historical data were researched and pertinent information was found. The information includes: drawings of a UST system and piping, an aboveground fuel storage system, and a railroad yard which brought the fuels to a main fueling station area adjacent to the railroad. These drawings provided the locations of all the piping systems and directed us directly to the source of contamination.



1.2 Findings

During the review of historical data it was determined that 1n 1945 a railroad operated within the construction area. Drawings showed that an elaborate fuel distribution system operated on-site and it allowed for the off-loading of fuels from rail car. Heating oil was pumped to a 55 thousand gallon aboveground storage tank and gasoline was pumped to an underground storage tank system located over 420 feet from the railroad are and approx. 200 feet south of the Commissary construction site. Current employees remember the UST system and stated that it was removed in the late 1960's. Only a dirt berm remains from the AST.



Jan. 14, The piping from the UST system was uncovered and traced to the within 15 feet of the railroad track. Several valves were found and the area was found to be contaminated with petroleum in excess of 3,ooo mg/kg TPH. It was observed that the fuel migrated from the piping area to the railroad bed (in some areas 4 feet in depth) which was a highly porous dirty stone material.



Jan 15, soil excavation from the fuel distribution/railroad track area. The contaminated material was excavated and transported to the ID-27 soil pile staging area.



Jan 14, gas pipe excavation from the fuel distribution/railroad track area facing north. This pipe led us to the most contaminated area (the rail-car off-loading area) which is believed to be the source area for the fuel contamination.

1.3 FIELD SCREENING/MONITORING

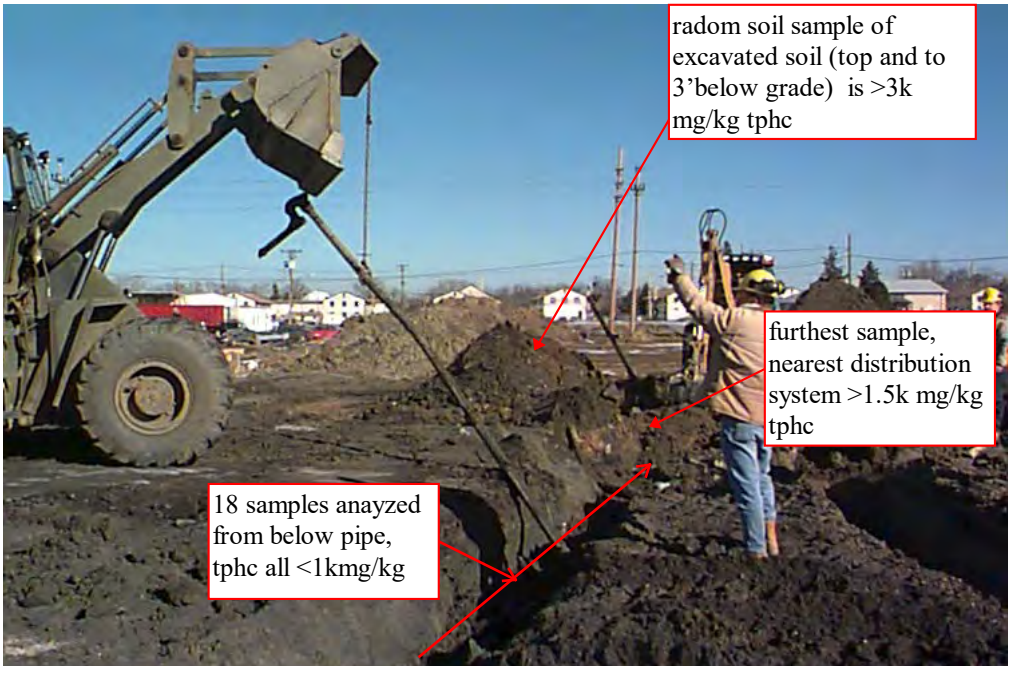
Field screening was performed by a NJDEP Certified Sub-Surface Evaluator using an OVA and visual observations to identify potentially contaminated material. Soil excavated from around the tank and appurtenant piping, as well as the UST excavation sidewalls and bottom, were found to be free of potential contamination.

1.4 SITE INVESTIGATION ACTIVITIES

SOIL SAMPLING

Soil sampling was performed to determine areas needing further excavation and areas needing no further excavation. No field screening was possible due to the cold weather . Samples were collected every five feet along the perimeter and a grid of ten feet by ten feet for the assessment of the bottom of the excavation. The increase above the allowable sampling frequency by the NJDEP for such a site was due to the inability to field screen the site with an OVA or FID.

The site assessment was performed by U.S. Army personnel in accordance with the NJDEP *Technical Requirements* and the NJDEP *Field Sampling Procedures Manual*. The samples were collected using decontaminated stainless steel scoops or taken directly into the sample container. Following soil sampling activities, the samples were chilled and delivered to U.S. Fort Monmouth Environmental Laboratory located in Fort Monmouth, New Jersey for analysis.



Jan. 15, gas pipe excavation / removal from the fuel distribution/railroad track area sample results show a clean excavation and approx. 50 ft. of the pipe-run has been backfilled.



Central excavation area (fuel distribution/railroad track area) sample results show a clean excavation and the area is being backfilled.



West excavation area (railroad track area)

sample results show a clean excavation and the area is being backfilled.

1.5 Hazard Abatement

From January 13th to present, the site has been under remedial excavation activities which have resulted in the removal of approx. 4,000 cubic yards of petroleum contaminated soils.



ID-27 soil pile storage area near the excavation site. The area is covered top and bottom by poly tarps and is bordered by hay-bails to control any soil run-off as a precaution. Approx. 4,000 cubic yards of soil were removed.

2.0 Conclusions and Recommendations

The Directorate of Public Works, Fort Monmouth recommends that a DER be applied for areas under utilities which were not remediated by excavation activities. Additional assessment and possible further activities will be required at the site of the old UST tank field as well as the AST area. The Site of the Commissary construction will be backfilled for completion of the construction project. The DPW Environmental Office will coordinate further activities with the NJDEP.

Parcel 57 Excerpt
Final Site Investigation Report – July 2008

3.14 Parcel 57 – Former Coal Storage and Railroad Unloading – 800 Area

3.14.1 Site Description

Parcel 57 is located in the south-central portion of the MP in the area of Bldgs 1007 and 801. Historic site plans, aerial photographs, and information obtained during personnel interviews indicate a coal storage area and fuel unloading area formerly existed in the south-central portion of the MP along the former RR in the vicinity of Bldgs 1007 and 801. The potential coal storage area was identified in photographs from 1947, 1957, and 1963 (18). A geothermal well field is present north of Bldg 800. Additional information pertaining to this parcel can be found in Section 3.3, Section 5.4, Section 5.13.1, and Appendix G of the Phase I ECP (1).

3.14.2 Previous Investigations

No previous investigations have been conducted in relation to the former coal storage area.

3.14.3 Site Investigation Sampling

In order to determine the impact of historic coal and fuel unloading and storage activities in the area of the former RR, the following soil and groundwater sampling was conducted.

Geoprobe® Investigation

Soil and groundwater samples were collected in December 2007 in Parcel 57 in order to determine if any contamination exists from previous activities associated with the former coal storage area. A total of 15 surface soil samples and 18 subsurface soil samples (including three duplicate samples) were collected from 15 distinct Geoprobe® borings (**Figure 3.14-1**) on 100-ft centers. Surface soil samples for non-VO analysis were collected from the 0- to 6-inch interval bgs. For borings located in paved areas, non-VO surface soil samples were collected from the 0- to 6-inch interval directly below the pavement sub-base. Surface soil samples collected for VO analysis were collected from the 18- to 24-inch interval bgs. Subsurface soil samples were collected from the 6-inch interval directly above the water table. Field screening of the soil boring core was conducted using a PID/FID meter. No visual or olfactory evidence of soil contamination was noted.

A total of six groundwater samples (including one duplicate sample) were collected from five distinct temporary wells (**Figure 3.14.1**). Temporary wells were installed along the northern boundary of the soil boring grid in a downgradient hydrogeologic direction and were constructed of PVC and 5 to 10 ft of factory-slotted screen.

Table 3.14-1 presents a summary of all field activities, and all sample locations are provided on **Figure 3.14-1**. A summary of sampling activities, including sample IDs, collection dates, and analytical parameters, is provided in **Table 3.14-2**.

Table 3.14-1
Parcel 57 Sampling Location, Rationale and Analytical

Sample Location	Sample Media	Sample Location Rationale	Analytical Suite
57SS-A1 through 57SS-C9 (15 samples)	Surface soil	Soil samples were collected from the 0- to 6-inch bgs interval from the Geoprobe® soil boring grid (conducted on 100-ft centers) to investigate the former coal storage location. If the sample location was paved, the sample was collected from the 0- to 6-inch interval below the pavement sub-base.	TCL+30 (w/o pesticides), TAL Metals
57SB-A1 through 57SB-C9 (18 samples – includes 3 duplicate samples)	Subsurface soil	Soil samples were collected from the 6-inch interval directly above the water table (depths ranging from 3.5 to 8.0 ft bgs) from each Geoprobe® soil boring in the grid (conducted on 100-ft centers) to investigate the former coal storage location. Field screening of the entire Geoprobe® soil core was conducted using PID/FID meters.	TCL+30 (w/o pesticides), TAL Metals
57GW-A1, A3, A5, A7, A9 (6 samples – includes 1 duplicate sample)	Groundwater	Groundwater samples were collected from the specified Geoprobe® soil borings in the grid to investigate the former location of coal storage.	TCL+30 (w/o pesticides/PCBs), TAL Metals

3.14.4 Site Investigation Results

Geoprobe® Investigation Results

Surface and subsurface soil samples were analyzed for TCL+30 (without pesticides) and TAL metals. Groundwater samples were analyzed for TCL+30 (without pesticides/PCBs) and TAL metals.

Soil

As presented in **Table 3.14-3**, seven VOs, 22 B/Ns, and 19 metals were detected in Parcel 57 soil samples. All seven VOs were detected at concentrations below NJDEP NRDCSCC. Of the 17 B/Ns, four (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, and benzo[k]fluoranthene) were detected in three surface soil samples, P57-A1-A, P57-C3-A, and P57-C5-A, at concentrations that exceeded NJDEP NRDCSCC and their respective MPBC. All 19 metals were detected at concentrations below NJDEP NRDCSCC. B/Ns are considered COCs in soil at Parcel 57.

Five soil samples contained TICs at elevated concentrations. 1,1-bis(1-methylethyl)-Hydrazine was detected at a concentration of 310 mg/kg in sample P57-A6-A and at a concentration of 330 mg/kg in the duplicate sample collected at P57-A9-C. It was not detected in sample P57-A9-C. 4-hydroxy-4-methyl 2-Pentanone was detected at concentrations of 220 mg/kg, 150 mg/kg, and 230 mg/kg in samples P57-A2-A, P57-A2-C, and P57-A4-C, respectively. Multiple semi-volatile constituents were identified in each of the five samples; however, no TCL organic constituents were identified at concentrations greater than the NRDCSCC in the five samples in which elevated TIC concentrations were identified.

Groundwater

As presented in **Table 3.14-4**, a total of five VOs (acetone, carbon disulfide, methyl ethyl ketone [2-butanone], TBA, and toluene) and one B/N (bis[2-ethylhexyl]phthalate) were detected at concentrations below the NJDEP GWQC in Parcel 57 groundwater samples.

A total of 20 metals were detected in Parcel 57 groundwater samples. Of the 20 metals detected, 11 (aluminum, arsenic, beryllium, cadmium, chromium, cobalt, iron, lead, manganese, nickel, and sodium) were detected above the respective GWQC.

Several natural and anthropogenic factors contribute to the wide range in concentrations of metals in soils, which further impact the concentration of metals in groundwater. Soils derived from glauconitic sands contain abundant aluminum, calcium, potassium, iron, magnesium, manganese, and sodium (among others), which are likely to be present at elevated concentrations in the groundwater, particularly when sediments are entrained in the collected groundwater samples. These native metals included aluminum, barium, calcium, iron, magnesium, manganese, potassium, sodium, and zinc (47). In addition, sodium concentrations can be influenced by saltwater intrusion. The non-native metals detected in groundwater samples collected from the temporary wells in Parcel 57 have been compared to the respective GWQC and MPBCs to determine COCs requiring further evaluation (**Figure 3.14-1**).

Four naturally occurring metal constituents commonly associated with the local soils/geology, aluminum, iron, manganese, and sodium were detected in Parcel 57 groundwater samples collected from temporary wells. As a result of these natural influences, aluminum, iron, manganese, and sodium are not considered COCs in groundwater.

Arsenic was detected at concentrations exceeding the NJDEP GWQC of 3 μg/L in four samples, P57-A3 (5.24 μg/L), P57-A5 (3.94 μg/L), P57-A7 (4.01 μg/L), and P57-A9 (6.73 μg/L). However, these concentrations did not exceed the MPBC of 89.3 μg/L. In addition, arsenic is associated with the native glauconitic sands (48). The elevated arsenic concentrations in the native soil in turn influence the arsenic levels in groundwater. Thus, arsenic is not considered a COC in groundwater. Beryllium was detected at concentrations exceeding the NJDEP GWQC of 1 μg/L in three samples, P57-A5 (2.12 μg/L), P57-A7 (1.98 μg/L), and P57-A9 (10.9 μg/L). Two of the three

beryllium concentrations also exceeded the MPBC of 2.1 μg/L. Cadmium was detected at a concentration exceeding the NJDEP GWQC of 4 μg/L and the MPBC of 9.5 μg/L in one sample, P57-A9 (14.3 μg/L). Chromium was detected at a concentration exceeding the NJDEP GWQC of 70 μg/L in one sample, P57-A7 (105 μg/L). The chromium concentration was below the MPBC of 191 μg/L. Cobalt was detected at a concentration exceeding the NJDEP GWQC of 100 μg/L and the MPBC of 18.3 μg/L in one sample, P57-A9 (147 μg/L). Lead was detected at a concentration exceeding the NJDEP GWQC of 5 μg/L and the MPBC of 22.7 μg/L in one sample, P57-A7 (829 μg/L). Nickel was detected at a concentration exceeding the NJDEP GWQC of 100 μg/L and the MPBC of 187 μg/L in one sample P57-A-9 (372 μg/L).

3.14.5 Summary and Conclusions

Soil samples that exceeded NJDEP NRDCSCC for B/Ns were collected from the 0- to 6-inch interval below the pavement sub-base. The four B/Ns (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, and benzo[k]fluoranthene) that were detected at concentrations above the NRDCSCC and the MPBC are considered COCs in soil.

Five common, naturally occurring metal constituents, aluminum, arsenic, iron, manganese, and sodium, were detected at concentrations greater than the NJDEP GWQC, but these native metals are attributed to the aquifer material and are not site-related. Therefore, these metals are not considered COCs. Five non-native metal constituents, beryllium, cadmium, cobalt, lead, and nickel, were detected at concentrations above the NJDEP GWQC and their respective MPBC. These five metals are considered COCs in Parcel 57 groundwater. Further evaluation of B/Ns identified in surface soil and metals in groundwater is recommended for Parcel 57. The B/N COCs identified in soil at Parcel 57 are PAHs. PAHs are contained in asphalt and are commonly detected in soil under asphalt pavement. Re-collection of samples at locations that are currently paved and/or were paved in the past will be conducted as part of the further evaluation to determine if the PAHs detected in soil are attributable to asphalt.

Table 3.14-2
Parcel 57 Sample and Analytical Summary

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	BN+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
BLANK	TRIP	TRIP BLANK-SO	12/08/07	-	--	--		X							
SOIL	GEOPROBE	P57-B3-A	12/08/07	9:15	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-B3-B	12/08/07	9:15	1.5	2.0		X							
SOIL	GEOPROBE	P57-B3-C	12/08/07	9:35	7.0	7.5		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-B4-A	12/08/07	10:30	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-B4-B	12/08/07	10:30	1.5	2.0		X							
SOIL	GEOPROBE	P57-B4-C	12/08/07	10:45	6.5	7.0		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-C3-A	12/08/07	12:10	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-C3-B	12/08/07	12:10	1.5	2.0		X							
SOIL	GEOPROBE	P57-C3-C	12/08/07	12:20	6.5	7.0		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-C3-C DUPLICATE	12/08/07	12:20	6.5	7.0		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A2-A	12/08/07	12:55	0.0	0.5			X	X	X				
SOIL	GEOPROBE	P57-A2-B	12/08/07	12:55	1.5	2.0		X							
SOIL	GEOPROBE	P57-A2-C	12/08/07	13:05	5.5	6.0		X	X	X	X				
BLANK	FIELD	FIELD BLANK-SO	12/08/07	13:15	--	--		X	X	X	X				
BLANK	TRIP	TRIP BLANK	12/10/07	-	--	--		X							
SOIL	GEOPROBE	P57-C5-A	12/10/07	8:25	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.

Table 3.14-2
Parcel 57 Sample and Analytical Summary

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	B\N+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
SOIL	GEOPROBE	P57-C5-B	12/10/07	8:25	1.5	2.0		X							
SOIL	GEOPROBE	P57-C5-C	12/10/07	8:35	7.0	7.5		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-C4-A	12/10/07	9:20	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-C4-B	12/10/07	9:20	1.5	2.0		X							
SOIL	GEOPROBE	P57-C4-C	12/10/07	9:30	6.5	7.0		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-B5-A	12/10/07	13:35	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-B5-B	12/10/07	13:35	1.5	2.0		X							
SOIL	GEOPROBE	P57-B5-C	12/10/07	13:40	6.5	7.0		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-B5-C DUPLICATE	12/10/07	13:40	6.5	7.0		X	X	X	X				
SOIL	GEOPROBE	P57-A4-A	12/10/07	14:15	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A4-B	12/10/07	14:15	1.5	2.0		X							
SOIL	GEOPROBE	P57-A4-C	12/10/07	14:25	6.5	7.0		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A6-A	12/10/07	14:50	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A6-B	12/10/07	14:50	1.5	2.0		X							
SOIL	GEOPROBE	P57-A6-C	12/10/07	15:00	7.0	7.5		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.

Table 3.14-2
Parcel 57 Sample and Analytical Summary

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	B\N+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
SOIL	GEOPROBE	P57-A8-A	12/10/07	15:35	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A8-B	12/10/07	15:35	1.5	2.0		X							
SOIL	GEOPROBE	P57-A8-C	12/10/07	15:50	6.0	6.5		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
BLANK	FIELD	FIELD BLANK	12/10/07	15:15	--	--		X	X	X	X				
BLANK	TRIP	TRIP BLANK-SO	12/11/07	-	--	--		X							
SOIL	GEOPROBE	P57-A1-A	12/11/07	7:50	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A1-B	12/11/07	7:50	1.5	2.0		X							
SOIL	GEOPROBE	P57-A1-C	12/11/07	8:00	7.5	8.0		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A3-A	12/11/07	8:30	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A3-B	12/11/07	8:30	1.5	2.0		X							
SOIL	GEOPROBE	P57-A3-C	12/11/07	8:40	4.0	4.5		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A5-A	12/11/07	9:25	0.5	1.0			X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A5-B	12/11/07	9:25	1.5	2.0		X							
SOIL	GEOPROBE	P57-A5-C	12/11/07	14:05	7.5	8.0		X	X	X	X				Sample depth in field documentation was recorded from top of soil. Reported bgs depths adjusted to account for surface asphalt and sub-base.
SOIL	GEOPROBE	P57-A7-A	12/11/07	11:15	0.0	0.5			X	X	X				
SOIL	GEOPROBE	P57-A7-B	12/11/07	11:15	1.5	2.0		X							
SOIL	GEOPROBE	P57-A7-C	12/11/07	11:35	5.5	6.0		X	X	X	X				

Table 3.14-2
Parcel 57 Sample and Analytical Summary

Media	Type	Field Sample #	Sample Date	Sample Time	Begin Depth	End Depth	TPHC	VO+15	B\N+15	PCBs	TAL Metals	Cyanide	Mercury	Ammonia/ Nitrate/ Nitrite	COMMENTS/VARIANCES
SOIL	GEOPROBE	P57-A9-A	12/11/07	13:10	0.0	0.5			X	X	X				
SOIL	GEOPROBE	P57-A9-B	12/11/07	13:10	1.5	2.0		X							
SOIL	GEOPROBE	P57-A9-C	12/11/07	13:20	7.5	8.0		X	X	X	X				
SOIL	GEOPROBE	P57-A9-C DUPLICATE	12/11/07	13:20	7.5	8.0		X	X	X	X				
BLANK	FIELD	FIELD BLANK-SO	12/11/07	13:35	--	--		X	X	X	X				
BLANK	TRIP	TRIP BLANK-AQ	12/11/07	13:30	--	--		X							
BLANK	FIELD	FIELD BLANK-AQ	12/11/07	14:00	--	--		X	X		X				
GW	GEOPROBE	P57-A1	12/11/07	14:30	7.0	12.0		X	X		X				
GW	GEOPROBE	P57-A3	12/11/07	15:00	4.0	9.0		X	X		X				
GW	GEOPROBE	P57-A3 DUPLICATE	12/11/07	15:00	4.0	9.0		X	X		X				
GW	GEOPROBE	P57-A5	12/11/07	15:30	4.0	14.0		X	X		X				
GW	GEOPROBE	P57-A7	12/11/07	16:00	4.0	14.0		X	X		X				
GW	GEOPROBE	P57-A9	12/11/07	16:30	8.0	18.0		X	X		X				

X = Sample analyzed for the indicated analytical parameter suite

Table 3.14-3
Fort Monmouth Phase II Site Investigation, Parcel 57
Summary of Analytical Parameters Detected in Soil (mg/kg)

			Analytical Results												
		Sample ID:	P57-A1-A	P57-A1-B	P57-A1-C	P57-A2-A	P57-A2-B	P57-A2-C	P57-A3-A	P57-A3-B	P57-A3-C	P57-A4-A	P57-A4-B	P57-A4-C	P57-A5-A
		Lab ID:	7052503	7052504	7052505	7051712	7051713	7051714	7052506	7052507	7052508	7052112	7052113	7052114	7052509
		Date Sampled:	12/11/2007	12/11/2007	12/11/2007	12/08/2007	12/08/2007	12/08/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007
		Depth (ft. bgs):	0.5-1.0	1.5-2.0	7.5-8.0	0.0-0.5	1.5-2.0	5.5-6.0	0.5-1.0	1.5-2.0	4.0-4.5	0.5-1.0	1.5-2.0	6.5-7.0	0.5-1.0
Chemical	NRDCSCC[2]	IGWSCC[3]	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles															
Acetone	1000	100	NT	0.260 U	**0.400**	NT	0.240 U	0.320 U	NT	**0.420**	**0.300**	NT	**0.043 J**	**0.450**	NT
Benzene	13	1	NT	0.260 U	0.330 U	NT	**0.017 J**	0.320 U	NT	0.260 U	0.250 U	NT	0.330 U	0.290 U	NT
Ethylbenzene	1000	100	NT	0.260 U	0.330 U	NT	**0.023 J**	0.320 U	NT	0.260 U	0.250 U	NT	0.330 U	0.290 U	NT
Toluene	1000	500	NT	0.260 U	0.330 U	NT	**0.077 J**	0.320 U	NT	0.260 U	0.250 U	NT	**0.069 J**	0.290 U	NT
Trichlorofluoromethane	NLE	NLE	NT	0.260 U	0.330 U	NT	0.240 U	0.320 U	NT	0.260 U	0.250 U	NT	0.330 U	0.290 U	NT
Vinyl Acetate	NLE	NLE	NT	0.260 U	0.330 U	NT	0.240 U	0.320 U	NT	0.260 U	0.250 U	NT	0.330 U	0.290 U	NT
Xylenes (Total)	1000	67	NT	0.780 U	0.990 U	NT	**0.350 J**	0.950 U	NT	0.780 U	0.750 U	NT	1.000 U	0.870 U	NT
Semi-Volatiles															
Acenaphthene	10000	100	**1.200**	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	**0.085 J**
Acenaphthylene	NLE	NLE	**0.760 J**	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	**0.077 J**	NT	1.100 U	**0.061 J**
Anthracene	10000	100	**5.600**	NT	1.300 U	**0.055 J**	NT	1.300 U	1.200 U	NT	1.100 U	**0.160 J**	NT	1.100 U	**0.180 J**
Benzo[a]anthracene	4	500	**9.500 JD**	NT	1.300 U	**0.220 J**	NT	1.300 U	**0.100 J**	NT	1.100 U	**0.310 J**	NT	1.100 U	**0.340 J**
Benzo[a]pyrene	0.66	100	**9.900**	NT	1.300 U	**0.210 J**	NT	1.300 U	1.200 U	NT	1.100 U	**0.350 J**	NT	1.100 U	1.100 U
Benzo[b]fluoranthene	4	50	**9.900 JD**	NT	1.300 U	**0.330 J**	NT	1.300 U	1.200 U	NT	1.100 U	**0.470 J**	NT	1.100 U	**0.520 J**
Benzo[g,h,i]perylene	NLE	NLE	**3.400**	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Benzo[k]fluoranthene	4	500	**7.000**	NT	1.300 U	**0.110 J**	NT	1.300 U	1.200 U	NT	1.100 U	**0.160 J**	NT	1.100 U	**0.210 J**
bis(2-Ethylhexyl)phthalate	210	100	1.100 U	NT	**0.080 J**	**0.099 J**	NT	**0.052 J**	1.200 U	NT	**0.086 J**	**0.150 J**	NT	1.100 U	**3.200**
Butyl benzyl phthalate	10000	100	1.100 U	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Chrysene	40	500	**10.000 JD**	NT	1.300 U	**0.270 J**	NT	1.300 U	**0.130 J**	NT	1.100 U	**0.390 J**	NT	1.100 U	**0.430 J**
Dibenzofuran	NLE	NLE	**1.800**	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	**0.032 J**	NT	1.100 U	**0.061 J**
Diethyl phthalate	10000	50	1.100 U	NT	**0.059 JB**	1.200 U	NT	1.300 U	1.200 U	NT	**0.053 JB**	**0.160 JB**	NT	1.100 U	1.100 U
Di-n-butylphthalate	10000	100	**0.210 J**	NT	**0.990 J**	**2.700 B**	NT	**1.800 B**	**0.820 J**	NT	**1.500**	**0.490 JB**	NT	**1.400 B**	**1.300**
Di-n-octyl phthalate	10000	100	1.100 U	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Fluoranthene	10000	100	**25.000 D**	NT	**0.058 J**	**0.420 J**	NT	1.300 U	**0.280 J**	NT	1.100 U	**0.680 J**	NT	1.100 U	**0.900 J**
Fluorene	10000	100	**2.200**	NT	1.300 U	1.200 U	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Indeno[1,2,3-cd]pyrene	4	500	**3.200**	NT	1.300 U	**0.082 J**	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
2-Methylnaphthalene	NLE	NLE	**1.400**	NT	1.300 U	**0.075 J**	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Naphthalene	4200	100	**0.880 J**	NT	1.300 U	**0.051 J**	NT	1.300 U	1.200 U	NT	1.100 U	1.100 U	NT	1.100 U	1.100 U
Phenanthrene	NLE	NLE	**19.000 D**	NT	1.300 U	**0.200 J**	NT	1.300 U	**0.140 J**	NT	1.100 U	**0.510 J**	NT	**0.041 J**	**0.660 J**
Pyrene	10000	100	**22.000 D**	NT	**0.050 J**	**0.410 J**	NT	1.300 U	**0.300 J**	NT	1.100 U	**0.820 J**	NT	**0.034 J**	**1.100 J**
Metals															
Aluminum	NLE	NLE	**7800 B**	NT	**16500 B**	**14500 B**	NT	**35200 B**	**21700 B**	NT	**6490 B**	**14400 B**	NT	**11500 B**	**11000 B**
Arsenic	20	NLE	**17.8**	NT	**9.11**	**7.39**	NT	**11.4**	**12.4**	NT	**2.73**	**6.16**	NT	**8.12**	**6.05**
Barium	47000	NLE	**35.3 B**	NT	**12.2 B**	**49.3 B**	NT	**148 B**	**50.1 B**	NT	**11.3 B**	**42.8 B**	NT	**17.2 B**	**49.1 B**
Beryllium	140	NLE	**0.769**	NT	**0.926**	**0.882**	NT	**1.54**	**1.35**	NT	**0.271**	**0.527**	NT	**1.61**	**0.520**
Cadmium	100	NLE	**0.325**	NT	**0.221**	**0.384**	NT	**0.311**	**0.426**	NT	**0.112**	**0.468**	NT	**0.497**	**0.425**
Calcium	NLE	NLE	**2180 B**	NT	**216 B**	**3190 B**	NT	**468 B**	**18800 B**	NT	**466 B**	**29000 B**	NT	**778 B**	**45400 B**
Chromium (Total)	NLE	NLE	**58.8 B**	NT	**106 B**	**53.5 B**	NT	**217 B**	**110 B**	NT	**22.8 B**	**40.9 B**	NT	**122 B**	**31.3 B**
Cobalt	NLE	NLE	**1.98**	NT	**0.526**	**3.48**	NT	**0.832**	**1.79**	NT	0.338 U	**8.52**	NT	**1.30**	**4.80**
Copper	45000	NLE	**28.6 B**	NT	**9.40 B**	**17.6 B**	NT	**26.4 B**	**12.8 B**	NT	**3.57 B**	**33.1 B**	NT	**7.01 B**	**25.3 B**
Iron	NLE	NLE	**27900 B**	NT	**22800 B**	**24500 B**	NT	**35100 B**	**34600 B**	NT	**8110 B**	**21600 B**	NT	**44000 B**	**19700 B**
Lead	800	NLE	**15.9**	NT	**0.525**	**22.8**	NT	**3.88**	**11.2**	NT	**3.01**	**21.0**	NT	0.351 U	**29.3**
Magnesium	NLE	NLE	**3240 B**	NT	**4000 B**	**3790 B**	NT	**5900 B**	**5000 B**	NT	**832 B**	**5240 B**	NT	**5250 B**	**4970 B**
Manganese	NLE	NLE	**57.7 B**	NT	**42.2 B**	**303 B**	NT	**54.8 B**	**85.9 B**	NT	**19.7 B**	**174 B**	NT	**27.9 B**	**154 B**
Mercury	270	NLE	0.100 U	NT	0.119 U	0.110 U	NT	0.122 U	0.116 U	NT	0.099 U	0.105 U	NT	0.109 U	0.113 U
Nickel (Soluble Salts)	2400	NLE	**7.56**	NT	**4.39**	**10.4**	NT	**50.3**	**14.6**	NT	**2.76**	**17.6**	NT	**44.1**	**11.5**
Potassium	NLE	NLE	**5200 B**	NT	**5190 B**	**4290 B**	NT	**9540 B**	**7720 B**	NT	**1430 B**	**3420 B**	NT	**11800 B**	**2360 B**
Sodium	NLE	NLE	**42.5**	NT	41.667 U	38.480 U	NT	43.926 U	42.214 U	NT	38.483 U	**904**	NT	37.586 U	**434**
Vanadium	7100	NLE	**45.7**	NT	**60.5**	**49.9**	NT	**86.1**	**77.6**	NT	**18.1**	**60.4**	NT	**70.2**	**43.3**
Zinc	1500	NLE	**39.1**	NT	**46.9**	**61.7**	NT	**72.6**	**70.2**	NT	**36.5**	**65.0**	NT	**165**	**74.4**

[1] NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[2] NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[3] NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

Table 3.14-3
Fort Monmouth Phase II Site Investigation, Parcel 57
Summary of Analytical Parameters Detected in Soil (mg/kg)

			Analytical Results												
		Sample ID:	P57-A5-B	P57-A5-C	P57-A6-A	P57-A6-B	P57-A6-C	P57-A7-A	P57-A7-B	P57-A7-C	P57-A8-A	P57-A8-B	P57-A8-C	P57-A9-A	P57-A9-B
		Lab ID:	7052510	7052511	7052115	7052116	7052117	7052512	7052513	7052514	7052118	7052119	7052120	7052515	7052516
		Date Sampled:	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007
		Depth (ft. bgs):	1.5-2.0	7.5-8.0	0.5-1.0	1.5-2.0	7.0-7.5	0.0-0.5	1.5-2.0	5.5-6.0	0.5-1.0	1.5-2.0	6.0-6.5	0.0-0.5	1.5-2.0
Chemical	NRDCSCC[2]	IGWSCC[3]	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles															
Acetone	1000	100	**0.340**	**0.420**	NT	**0.400**	**0.380**	NT	**0.610**	**0.340**	NT	**0.390**	**0.560**	NT	**0.510**
Benzene	13	1	0.250 U	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.280 U	NT	0.260 U	0.270 U	NT	0.260 U
Ethylbenzene	1000	100	0.250 U	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.280 U	NT	0.260 U	0.270 U	NT	0.260 U
Toluene	1000	500	0.250 U	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	**0.024 J**	NT	0.260 U	0.270 U	NT	0.260 U
Trichlorofluoromethane	NLE	NLE	**0.069 J**	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.280 U	NT	0.260 U	0.270 U	NT	0.260 U
Vinyl Acetate	NLE	NLE	0.250 U	0.280 U	NT	0.270 U	0.260 U	NT	0.270 U	0.280 U	NT	**0.210 J**	0.270 U	NT	0.260 U
Xylenes (Total)	1000	67	0.760 U	0.840 U	NT	0.810 U	0.780 U	NT	0.820 U	**0.021 J**	NT	0.770 U	0.810 U	NT	0.790 U
Semi-Volatiles															
Acenaphthene	10000	100	NT	1.200 U	**0.070 J**	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
Acenaphthylene	NLE	NLE	NT	1.200 U	**0.059 J**	NT	1.100 U	1.100 U	NT	**0.069 J**	**0.170 J**	NT	1.100 U	1.200 U	NT
Anthracene	10000	100	NT	1.200 U	**0.150 J**	NT	**0.030 J**	**0.058 J**	NT	**0.039 J**	**0.520 J**	NT	1.100 U	1.200 U	NT
Benzo[a]anthracene	4	500	NT	1.200 U	**0.350 J**	NT	**0.054 J**	**0.240 J**	NT	**0.100 J**	**1.100 J**	NT	1.100 U	**0.089 J**	NT
Benzo[a]pyrene	0.66	100	NT	1.200 U	1.100 U	NT	1.100 U	**0.240 J**	NT	**0.088 J**	4.400 U	NT	1.100 U	**0.080 J**	NT
Benzo[b]fluoranthene	4	50	NT	1.200 U	1.100 U	NT	**0.069 J**	**0.430 J**	NT	**0.072 J**	4.400 U	NT	1.100 U	**0.130 J**	NT
Benzo[g,h,i]perylene	NLE	NLE	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
Benzo[k]fluoranthene	4	500	NT	1.200 U	1.100 U	NT	**0.039 J**	**0.100 J**	NT	**0.077 J**	4.400 U	NT	1.100 U	1.200 U	NT
bis(2-Ethylhexyl)phthalate	210	100	NT	**0.067 J**	1.100 U	NT	**0.044 J**	**1.900**	NT	**0.730 J**	**1.200 J**	NT	**0.110 J**	**0.180 J**	NT
Butyl benzyl phthalate	10000	100	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
Chrysene	40	500	NT	1.200 U	**0.470 J**	NT	**0.077 J**	**0.320 J**	NT	**0.140 J**	**1.500 J**	NT	1.100 U	**0.120 J**	NT
Dibenzofuran	NLE	NLE	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	**0.170 J**	NT	1.100 U	1.200 U	NT
Diethyl phthalate	10000	50	NT	1.200 U	**0.080 JB**	NT	1.100 U	**0.065 JB**	NT	**0.054 JB**	**0.250 JB**	NT	1.100 U	**0.046 JB**	NT
Di-n-butylphthalate	10000	100	NT	**0.300 J**	**1.100 JB**	NT	**0.380 JB**	**1.500**	NT	**0.810 J**	**2.300 JB**	NT	**3.800 B**	**0.340 J**	NT
Di-n-octyl phthalate	10000	100	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	**0.035 JB**	1.200 U	NT
Fluoranthene	10000	100	NT	**0.077 J**	**0.850 J**	NT	**0.130 J**	**0.580 J**	NT	**0.140 J**	**2.400 J**	NT	**0.055 J**	**0.170 J**	NT
Fluorene	10000	100	NT	1.200 U	**0.073 J**	NT	1.100 U	1.100 U	NT	1.100 U	**0.280 J**	NT	1.100 U	1.200 U	NT
Indeno[1,2,3-cd]pyrene	4	500	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
2-Methylnaphthalene	NLE	NLE	NT	1.200 U	**0.091 J**	NT	1.100 U	1.100 U	NT	1.100 U	4.400 U	NT	1.100 U	1.200 U	NT
Naphthalene	4200	100	NT	1.200 U	**0.043 J**	NT	1.100 U	1.100 U	NT	1.100 U	**0.160 J**	NT	1.100 U	1.200 U	NT
Phenanthrene	NLE	NLE	NT	**0.057 J**	**0.670 J**	NT	**0.100 J**	**0.270 J**	NT	**0.050 J**	**2.100 J**	NT	**0.031 J**	**0.100 J**	NT
Pyrene	10000	100	NT	**0.074 J**	**1.300**	NT	**0.150 J**	**0.550 J**	NT	**0.210 J**	**4.000 J**	NT	**0.051 J**	**0.200 J**	NT
Metals															
Aluminum	NLE	NLE	NT	**11000 B**	**10600 B**	NT	**14300 B**	**10300 B**	NT	**6810 B**	**7970 B**	NT	**6370 B**	**12500 B**	NT
Arsenic	20	NLE	NT	**6.04**	**4.58**	NT	**13.2**	**8.01**	NT	**4.58**	**2.84**	NT	**8.05**	**10.3**	NT
Barium	47000	NLE	NT	**45.9 B**	**35.5 B**	NT	**38.6 B**	**34.5 B**	NT	**14.6 B**	**19.0 B**	NT	**5.38 B**	**36.2 B**	NT
Beryllium	140	NLE	NT	**1.02**	**0.346**	NT	**1.23**	**0.529**	NT	**0.524**	**0.259**	NT	**0.556**	**0.933**	NT
Cadmium	100	NLE	NT	**0.203**	**0.435**	NT	**0.359**	**0.329**	NT	**0.185**	**0.247**	NT	**0.0843**	**0.306**	NT
Calcium	NLE	NLE	NT	**1140 B**	**25000 B**	NT	**2040 B**	**9430 B**	NT	**762 B**	**14300 B**	NT	**439 B**	**1720 B**	NT
Chromium	NLE	NLE	NT	**61.5 B**	**22.9 B**	NT	**108 B**	**33.3 B**	NT	**41.0 B**	**17.1 B**	NT	**72.2 B**	**58.9 B**	NT
Cobalt	NLE	NLE	NT	0.347 U	**5.53**	NT	**1.70**	**1.32**	NT	**0.876**	**6.60**	NT	0.337 U	**1.42**	NT
Copper	45000	NLE	NT	**3.02 B**	**26.8 B**	NT	**11.1 B**	**13.0 B**	NT	**7.19 B**	**33.3 B**	NT	**2.90 B**	**16.2 B**	NT
Iron	NLE	NLE	NT	**23100 B**	**16500 B**	NT	**33200 B**	**17800 B**	NT	**15600 B**	**14300 B**	NT	**14100 B**	**27200 B**	NT
Lead	800	NLE	NT	**3.05**	**15.7**	NT	**7.57**	**29.5**	NT	**7.00**	**9.78**	NT	**1.65**	**28.9**	NT
Magnesium	NLE	NLE	NT	**2670 B**	**3790 B**	NT	**4330 B**	**2280 B**	NT	**1780 B**	**3720 B**	NT	**1180 B**	**2850 B**	NT
Manganese	NLE	NLE	NT	**97.6 B**	**118 B**	NT	**73.1 B**	**95.7 B**	NT	**55.9 B**	**140 B**	NT	**9.25 B**	**110 B**	NT
Mercury	270	NLE	NT	0.101 U	0.099 U	NT	0.108 U	0.106 U	NT	0.101 U	0.104 U	NT	0.109 U	0.109 U	NT
Nickel	2400	NLE	NT	**5.57**	**20.0**	NT	**10.3**	**6.45**	NT	**4.43**	**14.5**	NT	**2.27**	**6.97**	NT
Potassium	NLE	NLE	NT	**4170 B**	**1920 B**	NT	**7580 B**	**1970 B**	NT	**3110 B**	**1010 B**	NT	**2750 B**	**5150 B**	NT
Sodium	NLE	NLE	NT	39.424 U	**539**	NT	41.362 U	36.479 U	NT	38.989 U	**429**	NT	38.358 U	38.584 U	NT
Vanadium	7100	NLE	NT	**40.9**	**46.8**	NT	**63.9**	**37.5**	NT	**29.7**	**70.6**	NT	**40.6**	**47.0**	NT
Zinc	1500	NLE	NT	**80.4**	**70.4**	NT	**58.2**	**76.4**	NT	**35.8**	**50.4**	NT	**14.4**	**57.8**	NT

[1] NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[2] NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[3] NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

Table 3.14-3
Fort Monmouth Phase II Site Investigation, Parcel 57
Summary of Analytical Parameters Detected in Soil (mg/kg)

			Analytical Results												
		Sample ID:	P57-A9-C	P57-A9-C DUP	P57-B3-A	P57-B3-B	P57-B3-C	P57-B4-A	P57-B4-B	P57-B4-C	P57-B5-A	P57-B5-B	P57-B5-C	P57-B5-C DUP	P57-C3-A
		Lab ID:	7052517	7052502	7051703	7051704	7051705	7051706	7051707	7051708	7052109	7052110	7052111	7052102	7051709
		Date Sampled:	12/11/2007	12/11/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/08/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/08/2007
		Depth (ft. bgs):	7.5-8.0	7.5-8.0	0.5-1.0	1.5-2.0	7.0-7.5	0.5-1.0	1.5-2.0	6.5-7.0	0.5-1.0	1.5-2.0	6.5-7.0	6.5-7.0	0.5-1.0
Chemical	NRDCSCC[2]	IGWSCC[3]	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles															
Acetone	1000	100	**0.490**	**0.730**	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	**0.280 J**	NT
Benzene	13	1	0.250 U	0.290 U	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Ethylbenzene	1000	100	0.250 U	0.290 U	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Toluene	1000	500	0.250 U	0.290 U	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Trichlorofluoromethane	NLE	NLE	0.250 U	0.290 U	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Vinyl Acetate	NLE	NLE	0.250 U	**0.240 J**	NT	0.260 U	0.330 U	NT	0.260 U	0.280 U	NT	0.270 U	0.350 U	0.300 U	NT
Xylenes (Total)	1000	67	0.750 U	0.870 U	NT	0.790 U	0.980 U	NT	0.790 U	0.840 U	NT	0.810 U	1.060 U	0.900 U	NT
Semi-Volatiles															
Acenaphthene	10000	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	**0.041 J**	NT	1.100 U	**0.066 J**	NT	1.200 U	1.200 U	**0.540 J**
Acenaphthylene	NLE	NLE	1.100 U	1.200 U	1.100 U	NT	1.200 U	**0.071 J**	NT	1.100 U	**0.039 J**	NT	1.200 U	1.200 U	**0.097 J**
Anthracene	10000	100	1.100 U	**0.110 J**	**0.049 J**	NT	1.200 U	**0.200 J**	NT	1.100 U	**0.200 J**	NT	1.200 U	1.200 U	**1.200**
Benzo[a]anthracene	4	500	1.100 U	**0.230 J**	**0.210 J**	NT	1.200 U	**0.600 J**	NT	1.100 U	**0.460 J**	NT	1.200 U	1.200 U	**2.900**
Benzo[a]pyrene	0.66	100	1.100 U	**0.150 J**	1.100 U	NT	1.200 U	**0.480 J**	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	**2.000**
Benzo[b]fluoranthene	4	50	1.100 U	**0.220 J**	1.100 U	NT	1.200 U	**0.790 J**	NT	1.100 U	**0.520 J**	NT	1.200 U	1.200 U	**3.100**
Benzo[g,h,i]perylene	NLE	NLE	1.100 U	**0.100 J**	1.100 U	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	**0.730 J**
Benzo[k]fluoranthene	4	500	1.100 U	**0.093 J**	1.100 U	NT	1.200 U	**0.360 J**	NT	1.100 U	**0.350 J**	NT	1.200 U	1.200 U	**1.900**
bis(2-Ethylhexyl)phthalate	210	100	**0.100 J**	**0.062 J**	**0.150 J**	NT	1.200 U	**0.130 J**	NT	1.100 U	**0.300 J**	NT	1.200 U	**0.087 J**	**0.220 J**
Butyl benzyl phthalate	10000	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	1.100 U	NT	1.100 U	**0.130 J**	NT	1.200 U	1.200 U	1.100 U
Chrysene	40	500	1.100 U	**0.250 J**	**0.250 J**	NT	1.200 U	**0.690 J**	NT	1.100 U	**0.510 J**	NT	1.200 U	1.200 U	**3.000**
Dibenzofuran	NLE	NLE	1.100 U	1.200 U	1.100 U	NT	1.200 U	**0.064 J**	NT	1.100 U	**0.057 J**	NT	1.200 U	1.200 U	**0.260 J**
Diethyl phthalate	10000	50	1.100 U	**0.048 JB**	**0.043 JB**	NT	1.200 U	1.100 U	NT	1.100 U	1.100 U	NT	1.200 U	**0.034 JB**	1.100 U
Di-n-butylphthalate	10000	100	**1.100 J**	**1.000 J**	**1.600 B**	NT	**0.630 JB**	**1.700 B**	NT	**0.610 JB**	**0.760 JB**	NT	**0.910 JB**	**2.700 B**	**2.000 B**
Di-n-octyl phthalate	10000	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	1.100 U	NT	1.100 U	**0.380 JB**	NT	1.200 U	**0.060 JB**	1.100 U
Fluoranthene	10000	100	1.100 U	**0.680 J**	**0.320 J**	NT	1.200 U	**1.400**	NT	1.100 U	**0.990 J**	NT	1.200 U	1.200 U	**7.500**
Fluorene	10000	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	**0.038 J**	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	**0.380 J**
Indeno[1,2,3-cd]pyrene	4	500	1.100 U	1.200 U	1.100 U	NT	1.200 U	**0.150 J**	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	**0.690 J**
2-Methylnaphthalene	NLE	NLE	1.100 U	1.200 U	1.100 U	NT	1.200 U	**0.080 J**	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	**0.075 J**
Naphthalene	4200	100	1.100 U	1.200 U	1.100 U	NT	1.200 U	**0.065 J**	NT	1.100 U	1.100 U	NT	1.200 U	1.200 U	**0.120 J**
Phenanthrene	NLE	NLE	1.100 U	**0.510 J**	**0.180 J**	NT	1.200 U	**0.750 J**	NT	1.100 U	**1.000 J**	NT	1.200 U	1.200 U	**4.700**
Pyrene	10000	100	1.100 U	**0.580 J**	**0.500 J**	NT	1.200 U	**1.600**	NT	1.100 U	**1.600**	NT	1.200 U	1.200 U	**9.400**
Metals															
Aluminum	NLE	NLE	**5540 B**	**5180 B**	**8850 B**	NT	**18800 B**	**10600 B**	NT	**8020 B**	**9520 B**	NT	**19400 B**	**20300 B**	**10400 B**
Arsenic	20	NLE	**2.42**	**1.70**	**7.58**	NT	**11.0**	**5.89**	NT	**6.21**	**5.03**	NT	**7.71**	**9.35**	**2.36**
Barium	47000	NLE	**19.9 B**	**17.0 B**	**20.6 B**	NT	**33.8 B**	**43.6 B**	NT	**39.3 B**	**32.9 B**	NT	**30.5 B**	**32.0 B**	**20.9 B**
Beryllium	140	NLE	**0.462**	**0.475**	**1.25**	NT	**0.917**	**0.517**	NT	**0.516**	**0.540**	NT	**1.06**	**1.18**	**0.494**
Cadmium	100	NLE	**0.135**	**0.126**	**0.193**	NT	**0.261**	**0.318**	NT	**0.414**	**0.289**	NT	**0.317**	**0.534**	**0.163**
Calcium	NLE	NLE	**677 B**	**605 B**	**18300 B**	NT	**467 B**	**42600 B**	NT	**34300 B**	**34400 B**	NT	**607 B**	**598 B**	**292 B**
Chromium	NLE	NLE	**28.0 B**	**28.3 B**	**92.2 B**	NT	**63.6 B**	**39.9 B**	NT	**35.6 B**	**58.4 B**	NT	**127 B**	**135 B**	**46.4 B**
Cobalt	NLE	NLE	0.332 U	0.333 U	**1.94**	NT	**2.47**	**2.82**	NT	**2.93**	**5.07**	NT	**1.64**	**1.58**	**0.756**
Copper	45000	NLE	**2.91 B**	**4.17 B**	**8.00 B**	NT	**12.2 B**	**14.4 B**	NT	**29.9 B**	**21.0 B**	NT	**5.56 B**	**6.99 B**	**4.84 B**
Iron	NLE	NLE	**13300 B**	**13300 B**	**36000 B**	NT	**15300 B**	**15800 B**	NT	**17400 B**	**18500 B**	NT	**37400 B**	**47400 B**	**8230 B**
Lead	800	NLE	**40.7**	**38.0**	**7.69**	NT	**7.04**	**20.3**	NT	**51.4**	**15.0**	NT	**3.03**	**2.82**	**4.81**
Magnesium	NLE	NLE	**1380 B**	**1460 B**	**4560 B**	NT	**2600 B**	**3970 B**	NT	**4980 B**	**4530 B**	NT	**5090 B**	**5330 B**	**1500 B**
Manganese	NLE	NLE	**36.2 B**	**26.9 B**	**58.4 B**	NT	**67.6 B**	**120 B**	NT	**118 B**	**102 B**	NT	**55.2 B**	**54.6 B**	**34.8 B**
Mercury	270	NLE	0.106 U	0.114 U	0.110 U	NT	0.116 U	0.102 U	NT	0.102 U	0.107 U	NT	0.114 U	0.110 U	**0.160**
Nickel	2400	NLE	**2.35**	**2.49**	**6.29**	NT	**11.0**	**8.92**	NT	**8.99**	**9.44**	NT	**8.71**	**8.98**	**5.59**
Potassium	NLE	NLE	**2500 B**	**2640 B**	**8710 B**	NT	**2780 B**	**2710 B**	NT	**2560 B**	**3170 B**	NT	**8330 B**	**8900 B**	**1940 B**
Sodium	NLE	NLE	37.822 U	37.867 U	37.752 U	NT	43.828 U	36.969 U	NT	39.984 U	**48.6**	NT	42.72 U	39.581 U	40.694 U
Vanadium	7100	NLE	**19.4**	**18.2**	**51.2**	NT	**62.7**	**40.8**	NT	**40.0**	**59.1**	NT	**85.3**	**91.4**	**30.9**
Zinc	1500	NLE	**29.4**	**28.8**	**72.5**	NT	**57.9**	**50.5**	NT	**84.8**	**46.2**	NT	**62.6**	**67.0**	**25.2**

[1] NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[2] NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.

[3] NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.

NT = Not tested.

NLE = No limit established.

mg/kg = milligram per kilogram.

Bold = Analyte was detected.

Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

Table 3.14-3
Fort Monmouth Phase II Site Investigation, Parcel 57
Summary of Analytical Parameters Detected in Soil (mg/kg)

			Analytical Results								
		Sample ID:	P57-C3-B	P57-C3-C	P57-C3-C DUP	P57-C4-A	P57-C4-B	P57-C4-C	P57-C5-A	P57-C5-B	P57-C5-C
		Lab ID:	7051710	7051711	7051702	7052106	7052107	7052108	7052103	7052104	7052105
		Date Sampled:	12/08/2007	12/08/2007	12/08/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007
		Depth (ft. bgs):	1.5-2.0	6.5-7.0	6.5-7.0	0.5-1.0	1.5-2.0	6.5-7.0	0.5-1.0	1.5-2.0	7.0-7.5
Chemical	NRDCSCC[2]	IGWSCC[3]	Result	Result	Result	Result	Result	Result	Result	Result	Result
Volatiles											
Acetone	1000	100	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	**0.280 J**	0.320 U
Benzene	13	1	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Ethylbenzene	1000	100	**0.011 J**	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Toluene	1000	500	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Trichlorofluoromethane	NLE	NLE	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Vinyl Acetate	NLE	NLE	0.270 U	0.260 U	0.260 U	NT	0.310 U	0.270 U	NT	0.300 U	0.320 U
Xylenes (Total)	1000	67	0.810 U	0.780 U	0.780 U	NT	0.920 U	0.810 U	NT	0.990 U	0.960 U
Semi-Volatiles											
Acenaphthene	10000	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	**0.078 J**	NT	1.100 U
Acenaphthylene	NLE	NLE	NT	1.100 U	1.100 U	**0.190 J**	NT	1.100 U	**0.100 J**	NT	1.100 U
Anthracene	10000	100	NT	1.100 U	1.100 U	**0.130 J**	NT	1.100 U	**0.430 J**	NT	1.100 U
Benzo[a]anthracene	4	500	NT	**0.100 J**	1.100 U	**0.420 J**	NT	1.100 U	**1.200**	NT	1.100 U
Benzo[a]pyrene	0.66	100	NT	**0.081 J**	1.100 U	**0.470 J**	NT	1.100 U	**0.950 J**	NT	1.100 U
Benzo[b]fluoranthene	4	50	NT	**0.110 J**	1.100 U	**0.650 J**	NT	1.100 U	**1.500**	NT	1.100 U
Benzo[g,h,i]perylene	NLE	NLE	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Benzo[k]fluoranthene	4	500	NT	**0.059 J**	1.100 U	**0.290 J**	NT	1.100 U	**0.480 J**	NT	1.100 U
bis(2-Ethylhexyl)phthalate	210	100	NT	**0.092 J**	**0.090 J**	**0.200 J**	NT	1.100 U	**1.100**	NT	1.100 U
Butyl benzyl phthalate	10000	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Chrysene	40	500	NT	**0.120 J**	1.100 U	**0.520 J**	NT	1.100 U	**1.300**	NT	1.100 U
Dibenzofuran	NLE	NLE	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	**0.058 J**	NT	1.100 U
Diethyl phthalate	10000	50	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Di-n-butylphthalate	10000	100	NT	**2.400 B**	**0.410 JB**	**0.770 JB**	NT	**0.570 JB**	**0.640 JB**	NT	**0.580 JB**
Di-n-octyl phthalate	10000	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Fluoranthene	10000	100	NT	**0.120 J**	**0.041 J**	**0.640 J**	NT	1.100 U	**2.600**	NT	1.100 U
Fluorene	10000	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	**0.110 J**	NT	1.100 U
Indeno[1,2,3-cd]pyrene	4	500	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	**0.330 J**	NT	1.100 U
2-Methylnaphthalene	NLE	NLE	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Naphthalene	4200	100	NT	1.100 U	1.100 U	1.000 U	NT	1.100 U	1.100 U	NT	1.100 U
Phenanthrene	NLE	NLE	NT	**0.033 J**	1.100 U	**0.260 J**	NT	1.100 U	**1.400**	NT	1.100 U
Pyrene	10000	100	NT	**0.160 J**	**0.041 J**	**1.200**	NT	1.100 U	**3.600**	NT	1.100 U
Metals											
Aluminum	NLE	NLE	NT	**11000 B**	**7000 B**	**13100 B**	NT	**11000 B**	**8990 B**	NT	**3580 B**
Arsenic	20	NLE	NT	**4.98**	**3.65**	**5.40**	NT	**11.4**	**4.64**	NT	**2.04**
Barium	47000	NLE	NT	**20.6 B**	**13.4 B**	**40.7 B**	NT	**15.9 B**	**32.7 B**	NT	**6.15 B**
Beryllium	140	NLE	NT	**0.637**	**0.508**	**0.590**	NT	**1.33**	**0.615**	NT	**0.326**
Cadmium	100	NLE	NT	**0.194**	**0.0962**	**0.362**	NT	**0.196**	**0.319**	NT	**0.0535**
Calcium	NLE	NLE	NT	**1660 B**	**1400 B**	**21100 B**	NT	**693 B**	**24100 B**	NT	**280 B**
Chromium	NLE	NLE	NT	**57.7 B**	**42.9 B**	**43.5 B**	NT	**96.4 B**	**54.5 B**	NT	**30.8 B**
Cobalt	NLE	NLE	NT	**1.11**	**1.43**	**8.68**	NT	**1.42**	**3.13**	NT	0.326 U
Copper	45000	NLE	NT	**8.57 B**	**7.79 B**	**29.3 B**	NT	**5.09 B**	**20.0 B**	NT	**3.28 B**
Iron	NLE	NLE	NT	**18400 B**	**16200 B**	**20100 B**	NT	**39500 B**	**19800 B**	NT	**8350 B**
Lead	800	NLE	NT	**5.10**	**4.66**	**30.1**	NT	**1.20**	**51.6**	NT	**1.40**
Magnesium	NLE	NLE	NT	**1940 B**	**1330 B**	**4740 B**	NT	**4300 B**	**3400 B**	NT	**871 B**
Manganese	NLE	NLE	NT	**52.7 B**	**96.2 B**	**127 B**	NT	**39.4 B**	**93.3 B**	NT	**15.3 B**
Mercury	270	NLE	NT	0.100 U	0.101 U	0.098 U	NT	0.096 U	0.099 U	NT	0.099 U
Nickel	2400	NLE	NT	**5.79**	**7.16**	**14.1**	NT	**5.97**	**9.05**	NT	**3.63**
Potassium	NLE	NLE	NT	**3070 B**	**1860 B**	**2760 B**	NT	**9520 B**	**2540 B**	NT	**1960 B**
Sodium	NLE	NLE	NT	35.244 U	37.691 U	**688**	NT	36.431 U	40.061 U	NT	37.124 U
Vanadium	7100	NLE	NT	**46.7**	**36.6**	**65.3**	NT	**60.0**	**65.3**	NT	**24.5**
Zinc	1500	NLE	NT	**39.8**	**43.6**	**53.6**	NT	**61.5**	**58.2**	NT	**28.0**

[1] NJDEP Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.
[2] NJDEP Non-Residential Direct Contact Soil Cleanup Criteria per NJAC 7:26D, 1999. Beryllium, Copper and Lead criteria per NJAC 7:26D, 2008.
[3] NJDEP Impact to Groundwater Soil Cleanup Criteria per NJAC 7:26D, 1999.
DUP = Duplicate Sample.
ft. bgs = Feet below ground surface.
B = The compound was found in the associated method blank as well as in the sample.
D = Sample was diluted.
E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.
J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.
U = The compound was analyzed for but not detected.
NT = Not tested.
NLE = No limit established.
mg/kg = milligram per kilogram.
Bold = Analyte was detected.
Shaded = Concentration exceeds level of concern.
(Surface soil compared to NRDCSCC. Subsurface soil compared to IGWSCC when available, otherwise compared to NRDCSCC).

Table 3.14-4
Fort Monmouth Phase II Site Investigation, Parcel 57
Summary of Analytical Parameters Detected in Groundwater (µg/L)

		Analytical Results					
Sample ID:		P57-A-1	P57-A-3	P57-A-3 DUP	P57-A-5	P57-A-7	P57-A-9
Lab ID:		7053104	7053105	7053103	7053106	7053107	7053108
Date Sampled:		12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007
Screened Interval (ft. bgs):		7-12	4-9	4-9	4-14	4-14	8-18
Chemical	Quality Criteria[1]	Result	Result	Result	Result	Result	Result
Volatiles							
Acetone	6000	0.85 U	0.85 U	0.85 U	0.85 U	**31.13 B**	0.85 U
Carbon disulfide	700	0.44 U	0.44 U	0.44 U	0.44 U	**0.28 J**	**0.10 J**
Methyl ethyl ketone (2-Butanone)	300	0.14 U	0.14 U	0.14 U	0.14 U	**4.14**	0.14 U
Tertiary butyl alcohol	100	1.82 U	**10.49**	1.82 U	1.82 U	1.82 U	1.82 U
Toluene	600	**0.23 J**	0.27 U	0.27 U	**1.02**	**0.77**	**0.21 J**
Semi-Volatiles							
bis(2-Ethylhexyl)phthalate	3	1.28 U	**1.94**	1.28 U	1.28 U	1.28 U	1.28 U
Metals							
Aluminum	200	**592 B**	**16100 B**	**266 B**	**13400 B**	**11000 B**	**43400 B**
Antimony	6	0.70 U	0.70 U	0.70 U	0.70 U	**1.13**	0.70 U
Arsenic	3	2.70 U	**5.24**	2.70 U	**3.94**	**4.01**	**6.73**
Barium	6000	**66.2**	**189**	**165**	**225**	**224**	**26.8**
Beryllium	1	**0.454**	**0.249**	0.100 U	**2.12**	**1.98**	**10.9**
Cadmium	4	**0.274**	**1.46**	**1.15**	**0.284**	**0.917**	**14.3**
Calcium	NLE	**3300 B**	**290000 B**	**284000 B**	**33200 B**	**63400 B**	**73300 B**
Chromium (Total)	70	**0.692 B**	**45.5 B**	**0.640 B**	**69.8 B**	**105 B**	**3.57 B**
Cobalt	100*	**3.79**	**1.75**	**0.755**	**9.62**	**10.5**	**147**
Copper	1300	**1.72**	**27.7**	**6.58**	**10.7**	**137**	**43.4**
Iron	300	323 U	**17100**	323 U	**138000**	**25200**	**17700**
Lead	5	0.700 U	**3.31**	0.700 U	0.700 U	**829**	**3.07**
Magnesium	NLE	**5370**	**14000**	**12900**	**22000**	**6600**	**37500**
Manganese	50	**46.4 B**	**62.7 B**	**43.5 B**	**502 B**	**765 B**	**2710 B**
Nickel (Soluble Salts)	100	**7.38 B**	**7.18 B**	0.300 U	**16.6 B**	**24.0 B**	**372 B**
Potassium	NLE	**2850 B**	**72600 B**	**68500 B**	**6720 B**	**2500 B**	**5480 B**
Selenium	40	**4.89 B**	2.70 U	2.70 U	2.70 U	2.70 U	2.70 U
Sodium	50000	**20900**	**3070000 E**	**3110000 E**	**156000**	**6790**	**26000**
Vanadium	NLE	0.500 U	**95.3**	**17.6**	**56.9**	**68.8**	**3.07**
Zinc	2000	**23.6**	**62.7**	**20.0**	**171**	**145**	**1580**

[1] Higher of Practical Quantitation Limits (PQLs) & Groundwater Quality Criterion (GWQC) per NJAC 7:9-6, 2005 (* Interim GWQC).

DUP = Duplicate Sample.

ft. bgs = Feet below ground surface.

Bold = Analyte was detected.

Shaded = Concentration exceeds Quality Criteria.

µg/L = micrograms per liter.

NLE = No limit established.

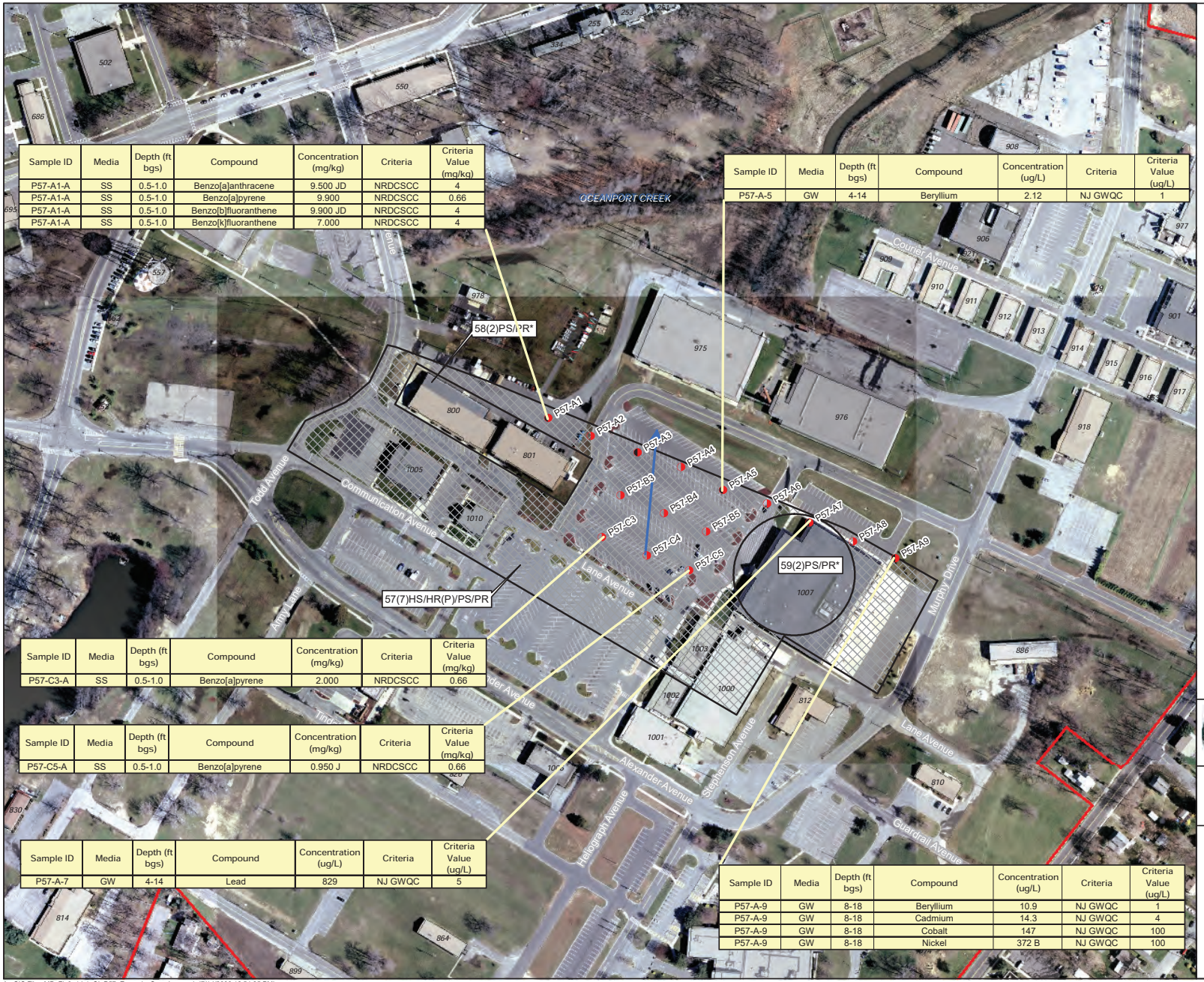
B = The compound was found in the associated method blank as well as in the sample.

D = Sample was diluted.

E = The compound's concentration exceeds the calibration range of the instrument for that specific analysis.

J = Mass spec and retention time data indicate the presence of a compound however the result is less than the MDL but greater than zero.

U = The compound was analyzed for but not detected.



Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P57-A1-A	SS	0.5-1.0	Benzo[a]anthracene	9.500 JD	NRDCSCC	4
P57-A1-A	SS	0.5-1.0	Benzo[a]pyrene	9.900	NRDCSCC	0.66
P57-A1-A	SS	0.5-1.0	Benzo[b]fluoranthene	9.900 JD	NRDCSCC	4
P57-A1-A	SS	0.5-1.0	Benzo[k]fluoranthene	7.000	NRDCSCC	4

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (ug/L)	Criteria	Criteria Value (ug/L)
P57-A-5	GW	4-14	Beryllium	2.12	NJ GWQC	1

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P57-C3-A	SS	0.5-1.0	Benzo[a]pyrene	2.000	NRDCSCC	0.66

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (mg/kg)	Criteria	Criteria Value (mg/kg)
P57-C5-A	SS	0.5-1.0	Benzo[a]pyrene	0.950 J	NRDCSCC	0.66

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (ug/L)	Criteria	Criteria Value (ug/L)
P57-A-7	GW	4-14	Lead	829	NJ GWQC	5

Sample ID	Media	Depth (ft bgs)	Compound	Concentration (ug/L)	Criteria	Criteria Value (ug/L)
P57-A-9	GW	8-18	Beryllium	10.9	NJ GWQC	1
P57-A-9	GW	8-18	Cadmium	14.3	NJ GWQC	4
P57-A-9	GW	8-18	Cobalt	147	NJ GWQC	100
P57-A-9	GW	8-18	Nickel	372 B	NJ GWQC	100

LEGEND

- Geoprobe Soil Sample Location
- Geoprobe Soil & Groundwater Sample Location
- Generalized Groundwater Flow Direction. Direction of Generalized Groundwater Flow derived from qualitative evaluation of surface topography, surface water features, and pre-existing IRP site groundwater potentiometric maps where available.
- Building
- Installation Boundary

ECP PARCEL CATEGORY DEFINITIONS

7 Areas that are not evaluated or require additional evaluation.

* Parcel not included in Site Investigation. Information pertaining to parcels not included in this Site Investigation is presented in the Fort Monmouth Phase I ECP Report (January 2007).

BRAC PARCEL LABEL DEFINITIONS

8(2)PS
- CONTAMINATION DESCRIPTION
  - HS - Hazardous Substance Storage
  - HR - Hazardous Substance Release
  - PS - Petroleum Storage
  - PR - Petroleum Release
  - (P) - Possible Release or Disposal
- CATEGORY NUMBER
- PARCEL NUMBER

N

SCALE: 0 100 200 400 Feet

Base Realignment and Closure 2005

U.S. Army Corps of Engineers

Shaw Shaw Environmental, Inc.

FIGURE 3.14-1

FORT MONMOUTH ECP SITE INVESTIGATION

PARCEL 57 SAMPLE LOCATIONS AND CONSTITUENTS OF CONCERN

MAIN POST
FORT MONMOUTH
NEW JERSEY

ArcGIS File: MP_Fig3_14-1_SI_P57_Exceeds_SampLoc.mxd (7/14/2008 12:54:25 PM)

3-231

Parcel 57 1962 Figure

FIGURE 6



July 2018

E-NJ-03

TS-PIC-85X

43

Installation Assessment Relook Program

Working Document

FORT MONMOUTH COMPLEX

LONG BRANCH, NEW JERSEY

85X-11 SEPTEMBER 1985

EPIC File Copy
Do Not Remove

prepared for

U.S. Army Toxic and Hazardous Materials Agency

Under Interagency Agreement No. RW-21930148-01-8



FIGURE 3
FORT MONMOUTH
MAIN POST

SEPTEMBER 19, 1947

APPROX SCALE 1" 15,000



FIGURE 7
FORT MONMOUTH
MAIN POST

DECEMBER 6,1969

APPROX SCALE 1" 18



FIGURE 8
FORT MONMOUTH
MAIN POST

MARCH 13, 1974

APPROX SCALE 1" = 1,000

APPENDIX D

Laboratory Analytical Reports and Data Tables

(included electronically on the CD of this report)

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	P57-A1		P57-C5		PAR-57-SS-01	PAR-57-SS-02	PAR-57-SS-03	PAR-57-SS-04			PAR-57-SS-05	PAR-57-SS-06	PAR-57-SS-07	PAR-57-SS-08
Sample ID	P57-SS-A1-1.0-1.5	P57-SS-A1-1.5-2.0	P57-SS-C5-1.0-1.5	P57-SS-C5-1.5-2.0	FTMM-57-SS01-0.5-1.0	FTMM-57-SS02-1.3-1.8	FTMM-57-SS03-0.5-1.0	FTMM-57-SS04-1.0-1.5	FTMM-57-SS04-2.0-2.5	FTMM-57-SS04-3.0-3.5	FTMM-57-SS05-0.5-1.0	FTMM-57-SS06-0.5-1.0	FTMM-57-SS07-0.5-1.0	FTMM-57-SS08-0.9-1.4
Sample Depth	1-1.5	1.5-2	1-1.5	1.5-2	0.5-1	1.3-1.8	0.5-1	1-1.5	2-2.5	3-3.5	0.5-1	0.5-1	0.5-1	0.9-1.4
Sample Date	2/1/2010	2/1/2010	2/1/2010	2/1/2010	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/18/2015	9/21/2015
Volatile Organic Compounds (mg/kg)														
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)														
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	**1.45**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**0.72**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	**0.77**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	**1.54**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	**0.43 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	**0.55 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	**0.95**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	**1.16**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	< 0.55	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	**0.39 J**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	**0.99**	< 0.54	< 0.57	< 0.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	**0.9**	< 0.54	< 0.57	**0.49 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	**1.37**	< 0.54	< 0.57	**0.83**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	**83.6 J**	**59.77 J**	**41.69 J**	**116.7 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1016	NA	NA	NA	NA	< 0.037 UJ	< 0.043 UJ	< 0.038 UJ	< 0.21 UJ	< 0.075	< 4.2	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.04 UJ
Aroclor-1221	NA	NA	NA	NA	< 0.075 UJ	< 0.087 UJ	< 0.076 UJ	< 0.43 UJ	< 0.15	< 8.5	< 0.42 UJ	< 0.44 UJ	< 0.43 UJ	< 0.081 UJ
Aroclor-1232	NA	NA	NA	NA	< 0.037 UJ	< 0.043 UJ	< 0.038 UJ	< 0.21 UJ	< 0.075	< 4.2	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.04 UJ
Aroclor-1242	NA	NA	NA	NA	< 0.037 UJ	< 0.043 UJ	< 0.038 UJ	< 0.21 UJ	< 0.075	< 4.2	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.04 UJ
Aroclor-1248	NA	NA	NA	NA	< 0.037 UJ	< 0.043 UJ	< 0.038 UJ	< 0.21 UJ	< 0.075	< 4.2	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.04 UJ
Aroclor-1254	NA	NA	NA	NA	< 0.037 UJ	< 0.043 UJ	< 0.038 UJ	**0.35 J**	**0.25**	**8.8**	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.04 UJ
Aroclor-1260	NA	NA	NA	NA	< 0.037 UJ	< 0.043 UJ	< 0.038 UJ	**0.28 J**	< 0.075	< 4.2	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.04 UJ
Aroclor-1268	NA	NA	NA	NA	< 0.037 UJ	< 0.043 UJ	< 0.038 UJ	< 0.21 UJ	< 0.075	< 4.2	< 0.21 UJ	< 0.21 UJ	< 0.21 UJ	< 0.04 UJ
Inorganics (mg/kg)														
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NA	NA	NA	NA	**89.7**	**77.3**	**87.8**	**78.1**	**87.3**	**77.5**	**78.9**	**77.5**	**77.7**	**82.3**
Wet Chemistry - Solids														
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	PAR-57-SS-09			PAR-57-SS-10			PAR-57-SS-11				PAR-57-SS-12			
Sample ID	FTMM-57-SS09-0.5-1.0	FTMM-57-SS09-2.0-2.5	FTMM-57-SS09-5.5-6.0	FTMM-57-SS10-0.0-0.5	FTMM-57-SS10-3.0-3.5	FTMM-57-SS10-7.0-7.5	FTMM-57-SS11-0.0-0.5	FTMM-57-SS111-3.0-3.5	FTMM-57-SS11-3.0-3.5	FTMM-57-SS11-7.0-7.5	FTMM-57-SS112-0.0-0.5	FTMM-57-SS12-0.0-0.5	FTMM-57-SS12-3.0-3.5	FTMM-57-SS12-7.0-7.5
Sample Depth	0.5-1	2-2.5	5.5-6	0-0.5	3-3.5	7-7.5	0-0.5	3-3.5	3-3.5	7-7.5	0-0.5	0-0.5	3-3.5	7-7.5
Sample Date	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)														
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg														
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**0.77 J**	**0.0023 J**	**10**	**0.27**	**0.0053 J**	< 0.0088	**0.25 J**	**0.015**	**0.01**	**0.0035 J**	**0.24 J**	**4.7 J**	**0.043**	**0.026**
Benzo(a)pyrene	**0.88**	**0.0031 J**	**8**	**0.27**	**0.0049 J**	< 0.0088	**0.21 J**	**0.015**	**0.012**	**0.0039 J**	**0.26 J**	**3.7 J**	**0.039**	**0.02**
Benzo(b)fluoranthene	**1.2 J**	**0.0039 J**	**11**	**0.39**	**0.0058 J**	< 0.0088	**0.27 J**	**0.019**	**0.016**	**0.0048 J**	**0.37 J**	**4.5 J**	**0.054**	**0.026**
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	**0.35 J**	< 0.0076	**3.3**	**0.12**	**0.0031 J**	< 0.0088	**0.11 J**	**0.0042 J**	**0.005 J**	< 0.0087	**0.11 J**	**2 J**	**0.024**	**0.011**
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	**0.29 J**	< 0.0076	**1.8**	**0.075**	< 0.0088	< 0.0088	**0.056 J**	< 0.0075	< 0.0076	< 0.0087	**0.046 J**	**0.85 J**	**0.01**	< 0.0077
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	**0.57 J**	< 0.0076	**4.5**	**0.2**	**0.0031 J**	< 0.0088	**0.14 J**	**0.011**	**0.005 J**	**0.0026 J**	**0.16 J**	**2.3 J**	**0.023**	**0.0093**
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)														
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	**91.4**	**86**	**91.4**	**89.3**	**75.1**	**75.1**	**92.1**	**87.8**	**86.2**	**76.2**	**94.5**	**88.9**	**93.5**	**85.6**
Wet Chemistry - Solids														
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	PAR-57-SS-13			PAR-57-SS-14			PAR-57-SS-15			PAR-57-SS-16			PAR-57-SS-17		
Sample ID	FTMM-57-SS13-0.0-0.5	FTMM-57-SS13-3.0-3.5	FTMM-57-SS13-6.5-7.0	FTMM-57-SS14-0.0-0.5	FTMM-57-SS14-3.0-3.5	FTMM-57-SS14-5.0-5.5	FTMM-57-SS15-0.0-0.5	FTMM-57-SS15-3.0-3.5	FTMM-57-SS15-5.5-6.0	FTMM-57-SS16-0.0-0.5	FTMM-57-SS16-1.5-2.0	FTMM-57-SS16-6.0-6.5	FTMM-57-SS17-0.0-0.5	FTMM-57-SS17-3.0-3.5	FTMM-57-SS17-5.5-6.0
Sample Depth	0-0.5	3-3.5	6.5-7	0-0.5	3-3.5	5-5.5	0-0.5	3-3.5	5.5-6	0-0.5	1.5-2	6-6.5	0-0.5	3-3.5	5.5-6
Sample Date	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015
Volatile Organic Compounds (mg/kg)															
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg															
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**0.98**	< 0.0077	< 0.0082	**1.2**	**0.035**	< 0.0073	**0.066**	< 0.0078	**0.034**	**0.81**	**0.2**	< 0.0078	**4.3**	< 0.008	**0.0027 J**
Benzo(a)pyrene	**0.89**	< 0.0077	< 0.0082	**0.97**	**0.035**	< 0.0073	**0.077**	< 0.0078	**0.031**	**0.66**	**0.22**	< 0.0078	**4.8**	< 0.008	**0.0023 J**
Benzo(b)fluoranthene	**1.2**	< 0.0077	< 0.0082	**1.4**	**0.041**	< 0.0073	**0.092**	< 0.0078	**0.038**	**1.1**	**0.39**	< 0.0078	**6.1**	< 0.008	< 0.0075
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	**0.31**	< 0.0077	< 0.0082	**0.48**	**0.014**	< 0.0073	**0.019**	< 0.0078	**0.016**	**0.28**	< 0.071	< 0.0078	**2.2**	< 0.008	**0.0046 J**
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	**0.17**	< 0.0077	< 0.0082	**0.19**	**0.012**	< 0.0073	**0.021**	< 0.0078	< 0.0072	< 0.076	< 0.071	< 0.0078	**1.2**	< 0.008	< 0.0075
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	**0.52**	< 0.0077	< 0.0082	**0.51**	**0.023**	< 0.0073	**0.047**	< 0.0078	**0.023**	**0.44**	< 0.071	< 0.0078	**2.5**	< 0.008	< 0.0075
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)															
Total TIC, Semi-Volatile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)															
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)															
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids															
Percent Solids (percent)	**88.3**	**85.6**	**80.7**	**88**	**91.3**	**90.6**	**90.2**	**84.9**	**92.4**	**87.4**	**93.3**	**84.5**	**96.6**	**82.8**	**87.5**
Wet Chemistry - Solids															
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	PAR-57-SS-18		PAR-57-SS-19		PAR-57-SS-20			PAR-57-SS-21		PAR-57-SS-22		PAR-57-SS-23		PAR-57-SS-24	PAR-57-SS-25
Sample ID	FTMM-57-SS18-0.0-0.5	FTMM-57-SS18-5.0-5.5	FTMM-57-SS19-0.0-0.5	FTMM-57-SS19-5.5-6.0	FTMM-57-SS20-0.0-0.5	FTMM-57-SS20-3.0-3.5	FTMM-57-SS20-5.0-5.5	FTMM-57-SS21-0.0-0.5	FTMM-57-SS21-3.0-3.5	FTMM-57-SS22-0.0-0.5	FTMM-57-SS22-3.0-3.5	FTMM-57-SS23-0.0-0.5	FTMM-57-SS23-3.0-3.5	FTMM-57-SS24-0.0-0.5	FTMM-57-SS25-0.0-0.5
Sample Depth	0-0.5	5-5.5	0-0.5	5.5-6	0-0.5	3-3.5	5-5.5	0-0.5	3-3.5	0-0.5	3-3.5	0-0.5	3-3.5	0-0.5	0-0.5
Sample Date	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/1/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015	10/2/2015
Volatile Organic Compounds (mg/kg)															
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg															
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**3.7**	**0.037**	< 0.35	< 0.0089	**0.27**	**0.023**	**0.51**	**7.8**	**0.15**	**0.32**	**0.033**	**0.21**	**0.06**	**0.1**	**0.0076**
Benzo(a)pyrene	**2.3**	**0.035**	< 0.35	< 0.0089	**0.3**	**0.013**	**0.27**	**8.2**	**0.15**	**0.39**	**0.035**	**0.28**	**0.059**	**0.1**	**0.0076**
Benzo(b)fluoranthene	**3.8**	**0.049**	< 0.35	< 0.0089	**0.44**	**0.02**	**0.4**	**11**	**0.2**	**0.53**	**0.048**	**0.4**	**0.085**	**0.16**	**0.0087**
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	**1.1**	**0.013**	< 0.35	< 0.0089	**0.12**	**0.013**	**0.17**	**3.2**	**0.061**	**0.17**	**0.015**	**0.12**	**0.037**	**0.061**	**0.0018 J**
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	**0.4**	**0.0068 J**	< 0.35	< 0.0089	**0.079**	< 0.0077	< 0.078	**2.3**	**0.039**	**0.1**	**0.0086**	**0.07**	**0.014**	**0.022**	< 0.0071
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	**1.1**	**0.025**	< 0.35	< 0.0089	**0.2**	**0.011**	**0.21**	**6**	**0.098**	**0.38**	**0.025**	**0.24**	**0.037**	**0.072**	**0.0047 J**
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)															
Total TIC, Semi-Volatile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)															
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)															
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids															
Percent Solids (percent)	**88.3**	**87.7**	**93.8**	**73.7**	**84**	**85.5**	**83.7**	**96.3**	**87.6**	**90.1**	**92.8**	**88.5**	**87.5**	**79.8**	**92.6**
Wet Chemistry - Solids															
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	P57-A1			P57-A1-A	P57-A1-B	P57-A1-C	P57-A1-D	P57-A1-E	P57-A2			P57-A3			P57-A4			P57-A5			P57-A6		
Sample ID	P57-A1-A	P57-A1-B	P57-A1-C	P57-SS-A1-A-6.5-7.0	P57-SS-A1-B-6.5-7.0	P57-SS-A1-C-8.0-8.5	P57-SS-A1-D-6.0-6.5	P57-SS-A1-E-5.5-6.0	P57-A2-A	P57-A2-B	P57-A2-C	P57-A3-A	P57-A3-B	P57-A3-C	P57-A4-A	P57-A4-B	P57-A4-C	P57-A5-A	P57-A5-B	P57-A5-C	P57-A6-A	P57-A6-B	P57-A6-C
Sample Depth	0.5-1	1.5-2	7.5-8	6.5-7	6.5-7	8-8.5	6-6.5	5.5-6	0-0.5	1.5-2	5.5-6	0.5-1	1.5-2	4-4.5	0.5-1	1.5-2	6.5-7	0.5-1	1.5-2	7.5-8	0.5-1	1.5-2	7-7.5
Sample Date	12/11/2007	12/11/2007	12/11/2007	11/22/2010	11/22/2010	11/22/2010	11/22/2010	11/22/2010	12/8/2007	12/8/2007	12/8/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007
Volatile Organic Compounds (mg/kg)																							
Acetone	NA	< 0.26	**0.4**	NA	NA	NA	NA	NA	NA	< 0.24	< 0.32	NA	**0.42**	**0.3**	NA	**0.043 J**	**0.45**	NA	**0.34**	**0.42**	NA	**0.4**	**0.38**
Benzene	NA	< 0.26	< 0.33	NA	NA	NA	NA	NA	NA	**0.017 J**	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28	NA	< 0.27	< 0.26
Ethyl benzene	NA	< 0.26	< 0.33	NA	NA	NA	NA	NA	NA	**0.023 J**	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28	NA	< 0.27	< 0.26
Toluene	NA	< 0.26	< 0.33	NA	NA	NA	NA	NA	NA	**0.077 J**	< 0.32	NA	< 0.26	< 0.25	NA	**0.069 J**	< 0.29	NA	< 0.25	< 0.28	NA	< 0.27	< 0.26
Total Xylenes	NA	< 0.78	< 0.99	NA	NA	NA	NA	NA	NA	**0.35 J**	< 0.95	NA	< 0.78	< 0.75	NA	< 1	< 0.87	NA	< 0.76	< 0.84	NA	< 0.81	< 0.78
Trichlorofluoromethane	NA	< 0.26	< 0.33	NA	NA	NA	NA	NA	NA	< 0.24	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	**0.069 J**	< 0.28	NA	< 0.27	< 0.26
Vinyl acetate	NA	< 0.26	< 0.33	NA	NA	NA	NA	NA	NA	< 0.24	< 0.32	NA	< 0.26	< 0.25	NA	< 0.33	< 0.29	NA	< 0.25	< 0.28	NA	< 0.27	< 0.26
Semivolatile Organic Compounds (mg																							
1,2,4-Trichlorobenzene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	**1.4**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.075 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	**0.091 J**	NA	< 1.1
2-Nitroaniline	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	< 1.24	< 1.24	< 1.31	< 1.25	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	**1.2**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	**0.085 J**	NA	< 1.2	**0.07 J**	NA	< 1.1
Acenaphthylene	**0.76 J**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	**0.077 J**	NA	< 1.1	**0.061 J**	NA	< 1.2	**0.059 J**	NA	< 1.1
Aniline	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	**5.6**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.055 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.16 J**	NA	< 1.1	**0.18 J**	NA	< 1.2	**0.15 J**	NA	**0.03 J**
Azobenzene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	< 1.24	< 1.24	< 1.31	< 1.25	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**9.5 JD**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.22 J**	NA	< 1.3	**0.1 J**	NA	< 1.1	**0.31 J**	NA	< 1.1	**0.34 J**	NA	< 1.2	**0.35 J**	NA	**0.054 J**
Benzo(a)pyrene	**9.9**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.21 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.35 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1
Benzo(b)fluoranthene	**9.9 JD**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.33 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.47 J**	NA	< 1.1	**0.52 J**	NA	< 1.2	< 1.1	NA	**0.069 J**
Benzo(ghi)perylene	**3.4**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1
Benzo(k)fluoranthene	**7**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.11 J**	NA	< 1.3	< 1.2	NA	< 1.1	**0.16 J**	NA	< 1.1	**0.21 J**	NA	< 1.2	< 1.1	NA	**0.039 J**
Benzyl alcohol	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	< 1.1	NA	**0.08 J**	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.099 J**	NA	**0.052 J**	< 1.2	NA	**0.086 J**	**0.15 J**	NA	< 1.1	**3.2**	NA	**0.067 J**	< 1.1	NA	**0.044 J**
Butyl benzyl phthalate	< 1.1	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1
Chrysene	**10 JD**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.27 J**	NA	< 1.3	**0.13 J**	NA	< 1.1	**0.39 J**	NA	< 1.1	**0.43 J**	NA	< 1.2	**0.47 J**	NA	**0.077 J**
Dibenz(a,h)anthracene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	**1.8**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	**0.032 J**	NA	< 1.1	**0.061 J**	NA	< 1.2	< 1.1	NA	< 1.1
Diethyl phthalate	< 1.1	NA	< 0.059	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 0.053	< 0.16	NA	< 1.1	< 1.1	NA	< 1.2	< 0.08	NA	< 1.1
Dimethyl phthalate	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	**0.21 J**	NA	**0.99 J**	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 2.7	NA	< 1.8	**0.82 J**	NA	**1.5**	< 0.49	NA	< 1.4	**1.3**	NA	**0.3 J**	< 1.1	NA	< 0.38
Di-n-octylphthalate	< 1.1	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1
Fluoranthene	**25 D**	NA	**0.058 J**	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.42 J**	NA	< 1.3	**0.28 J**	NA	< 1.1	**0.68 J**	NA	< 1.1	**0.9 J**	NA	**0.077 J**	**0.85 J**	NA	**0.13 J**
Fluorene	**2.2**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	< 1.2	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	**0.073 J**	NA	< 1.1
Hexachlorobenzene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	**3.2**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.082 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1
Isophorone	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	**0.88 J**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.051 J**	NA	< 1.3	< 1.2	NA	< 1.1	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	**0.043 J**	NA	< 1.1
Nitrobenzene	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	< 0.62	< 0.62	< 0.65	< 0.63	NA U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	**19 D**	NA	< 1.3	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.2 J**	NA	< 1.3	**0.14 J**	NA	< 1.1	**0.51 J**	NA	**0.041 J**	**0.66 J**	NA	**0.057 J**	**0.67 J**	NA	**0.1 J**
Pyrene	**22 D**	NA	**0.05 J**	< 0.62	< 0.62	< 0.65	< 0.63	NA U	**0.41 J**	NA	< 1.3	**0.3 J**	NA	< 1.1	**0.82 J**	NA	**0.034 J**	**1.1 J**	NA	**0.074 J**	**1.3**	NA	**0.15 J**
TIC SVOCs (mg/kg)																							
Total TIC, Semi-Volatile	NA	NA	NA	**97.4 J**	**114 J**	**91 J**	**110 J**	**99 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																							
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																							
Aluminum	< 7800	NA	< 16500	NA	NA	NA	NA	NA	< 14500	NA	< 35200	< 21700	NA	< 6490	< 14400	NA	< 11500	< 11000	NA	< 11000	< 10600	NA	< 14300
Arsenic	**17.8**	NA	**9.11**	NA	NA	NA	NA	NA	**7.39**	NA	**11.4**	**12.4**	NA	**2.73**	**6.16**	NA	**8.12**	**6.05**	NA	**6.04**	**4.58**	NA	**13.2**
Barium	< 35.3	NA	< 12.2	NA	NA	NA	NA	NA	< 49.3	NA	< 148	< 50.1	NA	< 11.3	< 42.8	NA	< 17.2	< 49.1	NA	< 45.9	< 35.5	NA	< 38.6
Beryllium	**0.769**	NA	**0.526**	NA	NA	NA	NA	NA	**0.882**	NA	**1.54**	**1.35**	NA	**0.271**	**0.527**	NA	**1.61**	**0.52**	NA	**1.02**	**0.346**	NA	**1.23**
Cadmium	**0.325**	NA	**0.221**	NA	NA	NA	NA	NA	**0.384**	NA	**0.311**	**0.426**	NA	**0.112**	**0.468**	NA	**0.497**	**0.425**	NA	**0.203**	**0.435**	NA	**0.359**
Calcium	< 2180	NA	< 216	NA	NA	NA	NA	NA	< 3190	NA	< 468	< 18800	NA	< 466	< 29000	NA	< 778	< 45400	NA	< 1140	< 25000	NA	< 2040
Chromium	< 58.8	NA	< 106	NA	NA	NA	NA	NA	< 53.5	NA	< 217	< 110	NA	< 22.8	< 40.9	NA	< 122	< 31.3	NA	< 61.5	< 22.9	NA	< 108
Cobalt	**1.98**	NA	**0.526**	NA	NA	NA	NA	NA	**3.48**	NA	**0.832**	**1.79**	NA	< 0.338	**8.52**	NA	**1.3**	**4.8**	NA	< 0.347	**5.53**	NA	**1.7**
Copper	< 28.6	NA	< 9.4	NA	NA	NA	NA	NA	< 17.6	NA	< 26.4	< 12.8	NA	< 3.57	< 33.1	NA	< 7.01	< 25.3	NA	< 3.02	< 26.8	NA	< 11.1
Iron	< 27900	NA	< 22800	NA	NA	NA	NA	NA	< 24500	NA	< 35100	< 34600	NA	< 8110	< 21600	NA	< 44000	< 19700	NA	< 23100	< 16500	NA	< 33200
Lead	**5.9**	NA	**0.525**	NA	NA	NA	NA	NA	**22.8**	NA	**3.88**	**11.2**	NA	**3.01**	**21**	NA	< 0.351	**22.3**	NA	**3.05**	**15.7**	NA	**7.57**
Magnesium	< 3240	NA	< 4000	NA	NA	NA	NA	NA	< 3790	NA	< 5900	< 5000	NA	< 832	< 5240	NA	< 5250	< 4970	NA	< 2670	< 3790	NA	< 4330
Manganese	< 57.7	NA	< 42.2	NA	NA	NA	NA	NA	< 303	NA	< 54.8	< 85.9	NA	< 19.7	< 174	NA	< 27.9	< 154	NA	< 97.6	< 118	NA	< 73.1
Mercury	< 0.1	NA	< 0.119	NA	NA	NA	NA	NA	< 0.11	NA	< 0.122	< 0.116	NA	< 0.099	< 0.105	NA	< 0.109	< 0.113	NA	< 0.101	< 0.099	NA	< 0.108
Nickel	**7.56**	NA	**4.39**	NA	NA	NA	NA	NA	**10.4**	NA	**50.3**	**14.6**	NA	**2.76**	**17.6**	NA	**44.1**	**11.5**	NA	**5.57**	**20**	NA	**10.3**
Potassium	< 5200	NA	< 5190	NA	NA	NA	NA	NA	< 4290	NA	< 9540	< 7720	NA	< 1430	< 3420	NA	< 11800	< 2360	NA	< 4170	< 1920	NA	< 7580
Sodium	**42.5**	NA	< 41.667	NA	NA	NA	NA	NA	< 38.48	NA	< 43.926	< 42.214	NA	< 38.483	**904**	NA	< 37.586	**434**	NA	< 39.424	**539**	NA	< 41.362
Vanadium	**45.7**	NA	**60.5**	NA	NA	NA	NA	NA	**49.9**	NA	**86.1**	**77.6**	NA	**18.1**	**60.4**	NA	**70.2**	**43.3**	NA	**40.9**	**46.8**	NA	**63.9**
Zinc	**39.1**	NA	**46.9**	NA	NA	NA	NA	NA	**61.7**	NA	**72.6**	**70.2**	NA	**36.5**	**65**	NA	**165**	**74.4**	NA	**80.4**	**70.4**	NA	**58.2**
Wet Chemistry - Solids																							
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																							
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	P57-A7			P57-A8			P57-A9				P57-B3			P57-B4			P57-B5				P57-C3			
Sample ID	P57-A7-A	P57-A7-B	P57-A7-C	P57-A8-A	P57-A8-B	P57-A8-C	P57-A9-A	P57-A9-B	P57-A9-C	P57-A9-C DUP	P57-B3-A	P57-B3-B	P57-B3-C	P57-B4-A	P57-B4-B	P57-B4-C	P57-B5-A	P57-B5-B	P57-B5-C	P57-B5-C DUP	P57-C3-A	P57-C3-B	P57-C3-C	P57-C3-C DUP
Sample Depth	0-0.5	1.5-2	5.5-6	0.5-1	1.5-2	6-6.5	0-0.5	1.5-2	7.5-8	7.5-8	0.5-1	1.5-2	7-7.5	0.5-1	1.5-2	6.5-7	0.5-1	1.5-2	6.5-7	6.5-7	0.5-1	1.5-2	6.5-7	6.5-7
Sample Date	12/11/2007	12/11/2007	12/11/2007	12/10/2007	12/10/2007	12/10/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/8/2007	12/8/2007	12/8/2007	12/8/2007
Volatile Organic Compounds (mg/kg)																								
Acetone	NA	**0.61**	**0.34**	NA	**0.39**	**0.56**	NA	**0.51**	**0.49**	**0.73**	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	**0.28 J**	NA	< 0.27	< 0.26	< 0.26
Benzene	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26
Ethyl benzene	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	**0.011 J**	< 0.26	< 0.26
Toluene	NA	< 0.27	**0.024 J**	NA	< 0.26	< 0.27	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26
Total Xylenes	NA	< 0.82	**0.021 J**	NA	< 0.77	< 0.81	NA	< 0.79	< 0.75	< 0.87	NA	< 0.79	< 0.98	NA	< 0.79	< 0.84	NA	< 0.81	< 1.06	< 0.9	NA	< 0.81	< 0.78	< 0.78
Trichlorofluoromethane	NA	< 0.27	< 0.28	NA	< 0.26	< 0.27	NA	< 0.26	< 0.25	< 0.29	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26
Vinyl acetate	NA	< 0.27	< 0.28	NA	**0.21 J**	< 0.27	NA	< 0.26	< 0.25	**0.24 J**	NA	< 0.26	< 0.33	NA	< 0.26	< 0.28	NA	< 0.27	< 0.35	< 0.3	NA	< 0.27	< 0.26	< 0.26
Semivolatile Organic Compounds (mg																								
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.08 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.075 J**	NA	< 1.1	< 1.1
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.041 J**	NA	< 1.1	**0.066 J**	NA	< 1.2	< 1.2	**0.54 J**	NA	< 1.1	< 1.1
Acenaphthylene	< 1.1	NA	**0.069 J**	**0.17 J**	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.071 J**	NA	< 1.1	**0.039 J**	NA	< 1.2	< 1.2	**0.097 J**	NA	< 1.1	< 1.1
Aniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	**0.058 J**	NA	**0.039 J**	**0.52 J**	NA	< 1.1	< 1.2	NA	< 1.1	**0.11 J**	**0.049 J**	NA	< 1.2	**0.2 J**	NA	< 1.1	**0.2 J**	NA	< 1.2	< 1.2	**1.2**	NA	< 1.1	< 1.1
Azobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**0.24 J**	NA	**0.1 J**	**1.1 J**	NA	< 1.1	**0.089 J**	NA	< 1.1	**0.23 J**	**0.21 J**	NA	< 1.2	**0.6 J**	NA	< 1.1	**0.46 J**	NA	< 1.2	< 1.2	**2.9**	NA	**0.1 J**	< 1.1
Benzo(a)pyrene	**0.24 J**	NA	**0.088 J**	< 4.4	NA	< 1.1	**0.08 J**	NA	< 1.1	**0.15 J**	< 1.1	NA	< 1.2	**0.48 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**2**	NA	**0.081 J**	< 1.1
Benzo(b)fluoranthene	**0.43 J**	NA	**0.072 J**	< 4.4	NA	< 1.1	**0.13 J**	NA	< 1.1	**0.22 J**	< 1.1	NA	< 1.2	**0.79 J**	NA	< 1.1	**0.52 J**	NA	< 1.2	< 1.2	**3.1**	NA	**0.11 J**	< 1.1
Benzo(ghi)perylene	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	**0.1 J**	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.73 J**	NA	< 1.1	< 1.1
Benzo(k)fluoranthene	**0.1 J**	NA	**0.077 J**	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	**0.093 J**	< 1.1	NA	< 1.2	**0.36 J**	NA	< 1.1	**0.35 J**	NA	< 1.2	< 1.2	**1.9**	NA	**0.059 J**	< 1.1
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	**1.9**	NA	**0.73 J**	**1.2 J**	NA	**0.11 J**	**0.18 J**	NA	**0.1 J**	**0.062 J**	**0.15 J**	NA	< 1.2	**0.13 J**	NA	< 1.1	**0.3 J**	NA	< 1.2	**0.087 J**	**0.22 J**	NA	**0.092 J**	**0.09 J**
Butyl benzyl phthalate	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1	**0.13 J**	NA	< 1.2	< 1.2	< 1.1	NA	< 1.1	< 1.1
Chrysene	**0.32 J**	NA	**0.14 J**	**1.5 J**	NA	< 1.1	**0.12 J**	NA	< 1.1	**0.25 J**	**0.25 J**	NA	< 1.2	**0.69 J**	NA	< 1.1	**0.51 J**	NA	< 1.2	< 1.2	**3**	NA	**0.12 J**	< 1.1
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	< 1.1	NA	< 1.1	**0.17 J**	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.064 J**	NA	< 1.1	**0.057 J**	NA	< 1.2	< 1.2	**0.26 J**	NA	< 1.1	< 1.1
Diethyl phthalate	< 0.065	NA	< 0.054	< 0.25	NA	< 1.1	< 0.046	NA	< 1.1	< 0.048	< 0.043	NA	< 1.2	< 1.1	NA	< 1.1	< 1.1	NA	< 1.2	< 0.034	< 1.1	NA	< 1.1	< 1.1
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	**1.5**	NA	**0.81 J**	< 2.3	NA	< 3.8	**0.34 J**	NA	**1.1 J**	**1 J**	< 1.6	NA	< 0.63	< 1.7	NA	< 0.61	< 0.76	NA	< 0.91	< 2.7	< 2	NA	< 2.4	< 0.41
Di-n-octylphthalate	< 1.1	NA	< 1.1	< 4.4	NA	< 0.035	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	< 1.1	NA	< 1.1	< 0.38	NA	< 1.2	< 0.06	< 1.1	NA	< 1.1	< 1.1
Fluoranthene	**0.58 J**	NA	**0.14 J**	**2.4 J**	NA	**0.055 J**	**0.17 J**	NA	< 1.1	**0.68 J**	**0.32 J**	NA	< 1.2	**1.4**	NA	< 1.1	**0.99 J**	NA	< 1.2	< 1.2	**7.5**	NA	**0.12 J**	**0.041 J**
Fluorene	< 1.1	NA	< 1.1	**0.28 J**	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.038 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.38 J**	NA	< 1.1	< 1.1
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	< 1.1	NA	< 1.1	< 4.4	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.15 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.69 J**	NA	< 1.1	< 1.1
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	< 1.1	NA	< 1.1	**0.16 J**	NA	< 1.1	< 1.2	NA	< 1.1	< 1.2	< 1.1	NA	< 1.2	**0.065 J**	NA	< 1.1	< 1.1	NA	< 1.2	< 1.2	**0.12 J**	NA	< 1.1	< 1.1
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	**0.27 J**	NA	**0.05 J**	**2.1 J**	NA	**0.031 J**	**0.1 J**	NA	< 1.1	**0.51 J**	**0.18 J**	NA	< 1.2	**0.75 J**	NA	< 1.1	**1 J**	NA	< 1.2	< 1.2	**4.7**	NA	**0.033 J**	< 1.1
Pyrene	**0.55 J**	NA	**0.21 J**	**4 J**	NA	**0.051 J**	**0.2 J**	NA	< 1.1	**0.58 J**	**0.5 J**	NA	< 1.2	**1.6**	NA	< 1.1	**1.6**	NA	< 1.2	< 1.2	**9.4**	NA	**0.16 J**	**0.041 J**
TIC SVOCs (mg/kg)																								
Total TIC, Semi-Volatile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)																								
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)																								
Aluminum	< 10300	NA	< 6810	< 7970	NA	< 6370	< 12500	NA	< 5540	< 5180	< 8850	NA	< 18800	< 10600	NA	< 8020	< 9520	NA	< 19400	< 20300	< 10400	NA	< 11000	< 7000
Arsenic	**8.01**	NA	**4.58**	**2.84**	NA	**8.05**	**10.3**	NA	**2.42**	**1.7**	**7.58**	NA	**11**	**5.89**	NA	**6.21**	**5.03**	NA	**7.71**	**9.35**	**2.36**	NA	**4.98**	**3.65**
Barium	< 34.5	NA	< 14.6	< 19	NA	< 5.38	< 36.2	NA	< 19.9	< 17	< 20.6	NA	< 33.8	< 43.6	NA	< 39.3	< 32.9	NA	< 30.5	< 32	< 20.9	NA	< 20.6	< 13.4
Beryllium	**0.529**	NA	**0.524**	**0.259**	NA	**0.556**	**0.933**	NA	**0.462**	**0.475**	**1.25**	NA	**0.917**	**0.517**	NA	**0.516**	**0.54**	NA	**1.06**	**1.18**	**0.494**	NA	**0.637**	**0.508**
Cadmium	**0.329**	NA	**0.185**	**0.247**	NA	**0.0843**	**0.306**	NA	**0.135**	**0.126**	**0.193**	NA	**0.261**	**0.318**	NA	**0.414**	**0.289**	NA	**0.317**	**0.534**	**0.163**	NA	**0.194**	**0.0962**
Calcium	< 9430	NA	< 762	< 14300	NA	< 439	< 1720	NA	< 677	< 605	< 18300	NA	< 467	< 42600	NA	< 34300	< 34400	NA	< 607	< 598	< 292	NA	< 1660	< 1400
Chromium	< 33.3	NA	< 41	< 17.1	NA	< 72.2	< 58.9	NA	< 28	< 28.3	< 92.2	NA	< 63.6	< 39.9	NA	< 35.6	< 58.4	NA	< 127	< 135	< 46.4	NA	< 57.7	< 42.9
Cobalt	**1.32**	NA	**0.876**	**6.6**	NA	< 0.337	**1.42**	NA	< 0.332	< 0.333	**1.94**	NA	**2.47**	**2.82**	NA	**2.93**	**5.07**	NA	**1.64**	**1.58**	**0.756**	NA	**1.11**	**1.43**
Copper	< 13	NA	< 7.19	< 33.3	NA	< 2.9	< 16.2	NA	< 2.91	< 4.17	< 8	NA	< 12.2	< 14.4	NA	< 29.9	< 21	NA	< 5.56	< 6.99	< 4.84	NA	< 8.57	< 7.79
Iron	< 17800	NA	< 15600	< 14300	NA	< 14100	< 27200	NA	< 13300	< 13300	< 36000	NA	< 15300	< 15800	NA	< 17400	< 18500	NA	< 37400	< 47400	< 8230	NA	< 18400	< 16200
Lead	**29.5**	NA	**7**	**9.78**	NA	**1.65**	**28.9**	NA	**40.7**	**38**	**7.69**	NA	**7.04**	**20.3**	NA	**51.4**	**15**	NA	**3.03**	**2.82**	**4.81**	NA	**5.1**	**4.66**
Magnesium	< 2280	NA	< 1780	< 3720	NA	< 1180	< 2850	NA	< 1380	< 1460	< 4560	NA	< 2600	< 3970	NA	< 4980	< 4530	NA	< 5090	< 5330	< 1500	NA	< 1940	< 1330
Manganese	< 95.7	NA	< 55.9	< 140	NA	< 9.25	< 110	NA	< 36.2	< 26.9	< 58.4	NA	< 67.6	< 120	NA	< 118	< 102	NA	< 55.2	< 54.6	< 34.8	NA	< 52.7	< 96.2
Mercury	< 0.106	NA	< 0.101	< 0.104	NA	< 0.109	< 0.109	NA	< 0.106	< 0.114	< 0.11	NA	< 0.116	< 0.102	NA	< 0.102	< 0.107	NA	< 0.114	< 0.11	**0.16**	NA	< 0.1	< 0.101
Nickel	**6.45**	NA	**4.43**	**14.5**	NA	**2.27**	**6.97**	NA	**2.35**	**2.49**	**6.29**	NA	**11**	**8.92**	NA	**8.99**	**9.44**	NA	**8.71**	**8.98**	**5.59**	NA	**5.79**	**7.16**
Potassium	< 1970	NA	< 3110	< 1010	NA	< 2750	< 5150	NA	< 2500	< 2640	< 8710	NA	< 2780	< 2710	NA	< 2560	< 3170	NA	< 8330	< 8900	< 1940	NA	< 3070	< 1860
Sodium	< 36.479	NA	< 38.989	**429**	NA	< 38.358	< 38.584	NA	< 37.822	< 37.867	< 37.752	NA	< 43.828	< 36.969	NA	< 39.984	**48.6**	NA	< 42.72	< 39.581	< 40.694	NA	< 35.244	< 37.691
Vanadium	**37.5**	NA	**29.7**	**70.6**	NA	**40.6**	**47**	NA	**19.4**	**18.2**	**51.2**	NA	**62.7**	**40.8**	NA	**40**	**59.1**	NA	**85.3**	**91.4**	**30.9**	NA	**46.7**	**36.6**
Zinc	**76.4**	NA	**35.8**	**50.4**	NA	**14.4**	**57.8**	NA	**29.4**	**28.8**	**72.5**	NA	**57.9**	**50.5**	NA	**84.8**	**46.2**	NA	**62.6**	**67**	**25.2**	NA	**39.8**	**43.6**
Wet Chemistry - Solids																								
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids																								
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	P57-C4			P57-C5			PAR-57-SS-26				PAR-57-SS-27			PAR-57-SS-28
Sample ID	P57-C4-A	P57-C4-B	P57-C4-C	P57-C5-A	P57-C5-B	P57-C5-C	PAR-57-SB-126-3.5-4	PAR-57-SB-26-0.5-1	PAR-57-SB-26-3.5-4	PAR-57-SB-26-7.5-8	PAR-57-SB-27-0-0.5	PAR-57-SB-27-3.5-4	PAR-57-SB-27-7.5-8	PAR-57-SB-28-0.5-1
Sample Depth	0.5-1	1.5-2	6.5-7	0.5-1	1.5-2	7-7.5	3.5-4	0.5-1	3.5-4	7.5-8	0-0.5	3.5-4	7.5-8	0.5-1
Sample Date	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Volatile Organic Compounds (mg/kg)														
Acetone	NA	< 0.31	< 0.27	NA	**0.28 J**	< 0.32	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	< 0.92	< 0.81	NA	< 0.99	< 0.96	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	< 0.31	< 0.27	NA	< 0.3	< 0.32	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg														
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	< 1	NA	< 1.1	< 1.1	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	< 1	NA	< 1.1	**0.078 J**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	**0.19 J**	NA	< 1.1	**0.1 J**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	**0.13 J**	NA	< 1.1	**0.43 J**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**0.42 J**	NA	< 1.1	**1.2**	NA	< 1.1	**0.0035 J**	**0.12**	< 0.0079	**0.0041 J**	**0.12**	< 0.0079	< 0.0077	**0.4**
Benzo(a)pyrene	**0.47 J**	NA	< 1.1	**0.95 J**	NA	< 1.1	< 0.0084	**0.12**	< 0.0079	**0.0021 J**	**0.17**	< 0.0079	< 0.0077	**0.32**
Benzo(b)fluoranthene	**0.65 J**	NA	< 1.1	**1.5**	NA	< 1.1	< 0.0084	**0.15**	< 0.0079	**0.0031 J**	**0.2**	< 0.0079	< 0.0077	**0.28**
Benzo(ghi)perylene	< 1	NA	< 1.1	< 1.1	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	**0.29 J**	NA	< 1.1	**0.48 J**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	**0.2 J**	NA	< 1.1	**1.1**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	< 1	NA	< 1.1	< 1.1	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	**0.52 J**	NA	< 1.1	**1.3**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	< 0.0084	**0.024**	< 0.0079	< 0.0079	**0.027**	< 0.0079	< 0.0077	**0.057**
Dibenzofuran	< 1	NA	< 1.1	**0.058 J**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	< 1	NA	< 1.1	< 1.1	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	< 0.77	NA	< 0.57	< 0.64	NA	< 0.58	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	< 1	NA	< 1.1	< 1.1	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	**0.64 J**	NA	< 1.1	**2.6**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	< 1	NA	< 1.1	**0.11 J**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	< 1	NA	< 1.1	**0.33 J**	NA	< 1.1	< 0.0084	**0.099**	< 0.0079	< 0.0079	**0.12**	< 0.0079	< 0.0077	**0.16**
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	< 1	NA	< 1.1	< 1.1	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	**0.26 J**	NA	< 1.1	**1.4**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	**1.2**	NA	< 1.1	**3.6**	NA	< 1.1	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)														
Total TIC, Semi-Volatile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)														
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)														
Aluminum	< 13100	NA	< 11000	< 8990	NA	< 3580	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	**5.4**	NA	**11.4**	**4.64**	NA	**2.04**	NA	NA	NA	NA	NA	NA	NA	NA
Barium	< 40.7	NA	< 15.9	< 32.7	NA	< 6.15	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	**0.59**	NA	**1.33**	**0.615**	NA	**0.326**	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	**0.362**	NA	**0.196**	**0.319**	NA	**0.0535**	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	< 21100	NA	< 693	< 24100	NA	< 280	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	< 43.5	NA	< 96.4	< 54.5	NA	< 30.8	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	**8.68**	NA	**1.42**	**3.13**	NA	< 0.326	NA	NA	NA	NA	NA	NA	NA	NA
Copper	< 29.3	NA	< 5.09	< 20	NA	< 3.28	NA	NA	NA	NA	NA	NA	NA	NA
Iron	< 20100	NA	< 39500	< 19800	NA	< 8350	NA	NA	NA	NA	NA	NA	NA	NA
Lead	**30.1**	NA	**1.2**	**51.6**	NA	**1.4**	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	< 4740	NA	< 4300	< 3400	NA	< 871	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	< 127	NA	< 39.4	< 93.3	NA	< 15.3	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	< 0.098	NA	< 0.096	< 0.099	NA	< 0.099	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	**14.1**	NA	**5.97**	**9.05**	NA	**3.63**	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	< 2760	NA	< 9520	< 2540	NA	< 1960	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	**688**	NA	< 36.431	< 40.061	NA	< 37.124	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	**65.3**	NA	**60**	**65.3**	NA	**24.5**	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	**53.6**	NA	**61.5**	**58.2**	NA	**28**	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids														
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	**78.5**	**82.6**	**83.2**	**83.5**	**92.6**	**83.8**	**85.3**	**87.4**

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	PAR-57-SS-28		PAR-57-SS-29			PAR-57-SS-30			PAR-57-SS-31			PAR-57-SS-32		PAR-57-SS-33	
Sample ID	PAR-57-SB-28-3.5-4	PAR-57-SB-28-7.5-8	PAR-57-SB-29-0.5-1	PAR-57-SB-29-3.5-4	PAR-57-SB-29-7.5-8	PAR-57-SB-30-0.5-1	PAR-57-SB-30-3.5-4	PAR-57-SB-30-7.5-8	PAR-57-SB-31-0.5-1	PAR-57-SB-31-3.5-4	PAR-57-SB-31-7.5-8	PAR-57-SB-32-0.5-1	PAR-57-SB-32-3.5-4	PAR-57-SB-33-0.5-1	PAR-57-SB-33-3.5-4
Sample Depth	3.5-4	7.5-8	0.5-1	3.5-4	7.5-8	0.5-1	3.5-4	7.5-8	0.5-1	3.5-4	7.5-8	0.5-1	3.5-4	0.5-1	3.5-4
Sample Date	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Volatile Organic Compounds (mg/kg)															
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg/kg)															
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**0.0032 J**	< 0.0084	**1.6**	**0.0073 J**	**0.0025 J**	**0.3**	< 0.0079	**0.0027 J**	**0.035**	**0.052**	**0.0026 J**	**0.25**	**0.0035 J**	**0.009**	< 0.0083
Benzo(a)pyrene	< 0.0085	< 0.0084	**1.2**	**0.005 J**	< 0.0083	**0.32**	< 0.0079	**0.003 J**	**0.061**	**0.07**	< 0.0078	**0.27**	< 0.0077	**0.013**	< 0.0083
Benzo(b)fluoranthene	< 0.0085	< 0.0084	**1.1**	**0.0038 J**	< 0.0083	**0.43**	< 0.0079	< 0.0073	**0.053**	**0.062**	< 0.0078	**0.34**	< 0.0077	**0.014**	< 0.0083
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	< 0.0085	< 0.0084	**0.21**	< 0.0079	< 0.0083	**0.057**	< 0.0079	< 0.0073	**0.014**	**0.018**	< 0.0078	**0.035**	< 0.0077	**0.0026 J**	< 0.0083
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	< 0.0085	< 0.0084	**0.67**	**0.0023 J**	< 0.0083	**0.19**	< 0.0079	**0.0033 J**	**0.047**	**0.056**	< 0.0078	**0.21**	< 0.0077	**0.0098**	< 0.0083
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)															
Total TIC, Semi-Volatile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)															
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)															
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids															
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids															
Percent Solids (percent)	**77.9**	**78.1**	**94.2**	**84**	**80**	**96**	**83.1**	**90.8**	**86.4**	**93.3**	**84.6**	**82.2**	**86.1**	**88.3**	**79.2**

1) Summary Statistics were obtained from Result Sheet(s) and reflect values for the whole dataset.

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	PAR-57-SS-34		PAR-57-SS-35		PAR-57-SS-36	PAR-57-SS-37				PAR-57-SS-38		
Sample ID	PAR-57-SB-34-0.5-1	PAR-57-SB-34-3.5-4	PAR-57-SB-35-0.5-1	PAR-57-SB-35-3.5-4	PAR-57-SB-36-4.5-5	PAR-57-SB-137-2.5-3	PAR-57-SB-37-0.5-1	PAR-57-SB-37-2.5-3	PAR-57-SB-37-4.5-5	PAR-57-SB-38-0.5-1	PAR-57-SB-38-2.5-3	PAR-57-SB-38-4.5-5
Sample Depth	0.5-1	3.5-4	0.5-1	3.5-4	4.5-5	2.5-3	0.5-1	2.5-3	4.5-5	0.5-1	2.5-3	4.5-5
Sample Date	4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016
Volatile Organic Compounds (mg/kg)												
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg												
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	**0.0033 J**	< 0.0077	< 0.0076	< 0.0079	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	< 0.0082	< 0.0077	< 0.0076	< 0.0079	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	< 0.0082	< 0.0077	< 0.0076	< 0.0079	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	< 0.0082	< 0.0077	< 0.0076	< 0.0079	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	< 0.0082	< 0.0077	< 0.0076	< 0.0079	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)												
Total TIC, Semi-Volatile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)												
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	NA	NA	NA	NA	< 0.041	< 0.037	< 0.036	< 0.037	< 0.039	< 0.037	< 0.039	< 0.041
Aroclor-1260	NA	NA	NA	NA	< 0.041	< 0.037	**0.057**	< 0.037	< 0.039	**0.048**	< 0.039	< 0.041
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)												
Aluminium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids												
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids												
Percent Solids (percent)	**80.6**	**85.8**	**86.2**	**83.2**	**80.8**	**89**	**91**	**89.9**	**84.5**	**88.8**	**85.1**	**80.2**

1) Summary Statistics were obtained fro

Attachment D
SOIL SAMPLING RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	PAR-57-SS-39			PAR-57-SS-40			
Sample ID	PAR-57-SB-39-0.5-1	PAR-57-SB-39-2.5-3	PAR-57-SB-39-4.5-5	PAR-57-SB-140-2.5-3	PAR-57-SB-40-0.5-1	PAR-57-SB-40-2.5-3	PAR-57-SB-40-4.5-5
Sample Depth	0.5-1	2.5-3	4.5-5	2.5-3	0.5-1	2.5-3	4.5-5
Sample Date	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016
Volatile Organic Compounds (mg/kg)							
Acetone	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (mg							
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA
TIC SVOCs (mg/kg)							
Total TIC, Semi-Volatile	NA	NA	NA	NA	NA	NA	NA
PCBs (mg/kg)							
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	< 0.037	< 0.038	< 0.04	< 0.038	< 0.041	< 0.055	< 0.041
Aroclor-1260	< 0.037	< 0.038	< 0.04	< 0.038	**0.068**	< 0.055	< 0.041
Aroclor-1268	NA	NA	NA	NA	NA	NA	NA
Inorganics (mg/kg)							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids							
Percent Solids (percent)	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry - Solids							
Percent Solids (percent)	**89.2**	**87.1**	**82.9**	**86.5**	**80.9**	**89.4**	**80**

1) Summary Statistics were obtained fro

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Bold chemical dectection

3) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

R = Rejected, data validation rejected the results.

U = non-detect, i.e. not detected at or above this value.

U-DL = Elevated sample detection limit due to difficult sample matrix.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

E (or ER) = Estimated result.

D = Results from dilution of sample.

J-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

Attachment D
GROUND WATER SAMPLING
RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	57-TMP-A-5		57-TMP-A-7		57-TMP-A-9		800MW01				800MW02							
Sample ID	PAR57-GW-57-TMP-A-5	PAR57-GW-57-TMP-A-5	PAR57-GW-57-TMP-A-7	PAR57-GW-57-TMP-A-7	PAR57-GW-57-TMP-A-9	PAR57-GW-57-TMP-A-9	800MW01-10.06	800MW01-10.06 DISSOLVED	800MW101-10.06	800MW101-10.06 DISSOLVED	PAR57-GW-800MW02	PAR57-GW-800MW02-Dup	800MW02-11.9	800MW02-11.9 DISSOLVED	800MW02-16.9	800MW02-16.9 DISSOLVED	800MW02-6.9	800MW02-6.9 DISSOLVED
Sample Date	4/2/2010	4/2/2010	3/11/2010	3/11/2010	3/10/2010	3/10/2010	5/23/2016	5/23/2016	5/23/2016	5/23/2016	2/4/2011	2/4/2011	5/23/2016	5/23/2016	5/23/2016	5/23/2016	5/23/2016	5/23/2016
Sample Round																		
Filtered	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved	Total	Dissolved	Total	Total	Total	Dissolved	Total	Dissolved	Total	Dissolved
Volatile Organic Compounds (µg/l)																		
1,1,1,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
2-Chloroethylvinylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Acrolein	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
Acrylonitrile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Chlorodibromomethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Diisoproply Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Meta/Para Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	NA	NA
Methyl bromide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Methyl butyl ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Methyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Methyl isobutyl ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Methyl Tertbutyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Ortho Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Tert Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/l)																		
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 20	< 20	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.15**	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.136**	**0.14**	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA	NA
Inorganics (µg/l)																		
Aluminum	NA	NA	NA	NA	NA	NA	**390**	< 100	**410**	< 100	**290**	**300**	**210**	**120**	**230**	**110**	**200**	**120**
Antimony	NA	NA	NA	NA	NA	NA	< 22	< 20	< 22	< 20	< 6	< 6	< 22	< 20	< 22	< 20	< 22	< 20
Arsenic	NA	NA	NA	NA	NA	NA	< 3	**2.9 J**	< 3	**3.6 J**	**4.1**	**4.1**	**1.2 J**	< 8	**2.7 J**	**2.9 J**	< 3	< 8
Barium	NA	NA	NA	NA	NA	NA	**5.2 J**	**3.4 J**	**5.6 J**	**6.8 J**	< 200	< 200	**33**	**34**	**31**	**32**	**28**	**31**
Beryllium	< 0.5	**2.85**	< 0.5	**2.81**	< 0.5	**0.459**	< 1	< 4	< 1	< 4	< 1	< 1	< 4	< 4	< 4	< 4	< 1	< 4
Cadmium	NA	NA	NA	NA	**3.97**	**5.43**	< 2.2	< 20	< 2.2	< 20	< 3	< 3	< 2.2	< 20	< 2.2	< 20	< 2.2	< 20
Calcium	NA	NA	NA	NA	NA	NA	**20,700**	**23,100**	**20,800**	**23,100**	**13,300**	**13,800**	**3,600**	**3,700**	**3,500**	**3,600**	**3,300**	**3,400**
Chromium	NA	NA	NA	NA	NA	**54.7**	< 5.6	< 5	< 5.6	< 5	< 10	< 10	< 5.6	< 5	< 5.6	< 5	< 5.6	< 5
Cobalt	NA	NA	NA	NA	**51.2**	**53.8**	< 5.6	< 5	< 5.6	< 5	< 50	< 50	**2.7 J**	**2.4 J**	**2.8 J**	**2.3 J**	**2.7 J**	**2.3 J**
Copper	NA	NA	NA	NA	NA	NA	**8.3 J**	**5 J**	**8.8 J**	**5.7 J**	< 10	< 10	< 11	< 10	< 11	< 10	< 11	< 10
Iron	NA	NA	NA	NA	NA	NA	**860**	**22 J**	**880**	**25 J**	**8,220**	**8,710**	**1,900**	**40 J**	**3,800**	**89**	**870**	**25 J**
Lead	< 5	**138**	< 5	**43.2**	**2.81**	**6.74**	< 6.7	< 6	< 6.7	< 6	**3.5**	**3.7**	**2.6 J**	< 6	< 6.7	**2.4 J**	< 6.7	**2.8 J**
Magnesium	NA	NA	NA	NA	NA	NA	**4,400**	**4,900**	**4,400**	**4,900**	**5,190**	**5,570**	**2,500**	**2,700**	**2,400**	**2,600**	**2,400**	**2,500**
Manganese	NA	NA	NA	NA	NA	NA	**28**	**15**	**27**	**15**	**172**	**180**	**56**	**59**	**54**	**58**	**53**	**56**
Mercury	NA	NA	NA	NA	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	NA	NA	NA	NA	NA	NA	< 22	< 20	< 22	< 20	**16**	**16.9**	**10 J**	**10 J**	**9.9 J**	**9.6 J**	**9.3 J**	**9.4 J**
Potassium	NA	NA	NA	NA	NA	NA	**1,700**	**2,000**	**1,700**	**2,000**	< 10000	< 10000	**2,500**	**2,900**	**2,500**	**2,800**	**2,200**	**2,500**
Selenium	NA	NA	NA	NA	NA	NA	< 22	< 20	< 22	< 20	< 10	< 10	< 22	< 20	< 22	< 20	< 22	< 20
Silver	NA	NA	NA	NA	NA	NA	< 4.4	< 4	< 4.4	< 4	< 10	< 10	< 4.4	< 4	< 4.4	< 4	< 4.4	< 4
Sodium	NA	NA	NA	NA	NA	NA	**2,700**	**3,000**	**2,700**	**3,000**	**35,500**	**35,500**	**17,500**	**18,700**	**17,300**	**18,400**	**17,200**	**18,100**
Thallium	NA	NA	NA	NA	NA	NA	< 1	< 20	< 1	< 20	< 2	< 2	< 1	< 20	< 1	< 20	< 1	< 20
Vanadium	NA	NA	NA	NA	NA	NA	**3.2 J**	**1.8 J**	**3.2 J**	**1.6 J**	< 50	< 50	< 5.6	< 5	< 5.6	< 5	< 5.6	< 5
Zinc	NA	NA	NA	NA	NA	NA	**10 J**	< 20	**11 J**	**6.7 J**	**125**	**130**	**21 J**	**26**	**22**	**23**	**21 J**	**23**

Attachment D
GROUND WATER SAMPLING
RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	812MW14			866MW02		86MW02		P57-A-1	P57-A-3		P57-A-5	P57-A-7	P57-A-9	PAR-57MW01							
Sample ID	812-MW114-10.27	812MW14-10.27	812MW14-10.27 DISSOLVED	866MW02-14.35	866MW02-14.35 DISSOLVED	86MW02-9.35	86MW02-9.35 DISSOLVED	P57-A-1	P57-A-3	P57-A-3 DUP	P57-A-5	P57-A-7	P57-A-9	PAR57-GW-MW01-15.1	PAR57-GW-MW01-15.1 DISSOLVED	PAR57-GW-MW101-15.1	PAR57-GW-MW101-15.1 DISSOLVED	PAR57-GW-MW01-12.5	PAR57-GW-MW01-12.5 DISSOLVED	PAR-57-GW-MW01-17.5	PAR-57-GW-MW01-17.5 DISSOLVED
Sample Date	5/24/2016	5/24/2016	5/24/2016	5/24/2016	5/24/2016	5/24/2016	5/24/2016	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	12/11/2007	11/23/2015	11/23/2015	11/23/2015	11/23/2015	5/23/2016	5/23/2016	5/24/2016	5/24/2016
Sample Round																					
Filtered	Total	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Total	Total	Total	Total	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Volatile Organic Compounds (µg/l)																					
1,1,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloroethylvinylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	< 0.85	< 0.85	< 0.85	< 0.85	< 31.13	< 0.85	NA	NA	NA	NA	NA	NA	NA	NA
Acrolein	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	< 0.44	< 0.44	< 0.44	< 0.44	**0.28 J**	**0.1 J**	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorodibromomethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diisoproply Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Meta/Para Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl bromide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl butyl ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.4 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	NA	NA	NA	NA	NA	NA	NA	< 0.14	< 0.14	< 0.14	< 0.14	**4.14**	< 0.14	NA	NA	NA	NA	NA	NA	NA	NA
Methyl isobutyl ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Tertbutyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ortho Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tert Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	< 1.82	**10.49**	< 1.82	< 1.82	< 1.82	< 1.82	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	**0.23 J**	< 0.27	< 0.27	**1.02**	**0.77**	**0.21 J**	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg																					
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	< 1.28	**1.94**	< 1.29	< 1.28	< 1.28	< 1.28	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (µg/l)																					
Aluminum	**9,500**	**9,600**	< 100	**480**	< 100	**360**	< 100	< 592	< 16100	< 266	< 13400	< 11000	< 43400	**989**	< 100	**1,010**	< 100	**260**	< 100	**250**	< 100
Antimony	< 22	< 22	< 20	< 22	< 20	< 22	< 20	< 0.7	< 0.7	< 0.7	< 0.7	**1.13**	< 0.7	< 60	< 60	< 60	< 60	< 60	< 22	< 20	< 20
Arsenic	**5.5**	**6.7**	< 8	**1.8 J**	< 8	**1.3 J**	**2.6 J**	< 2.7	**5.24**	< 2.7	**3.94**	**4.01**	**6.73**	**6.7 J**	**8.3 J**	**8.7 J**	**6.7 J**	**11**	**23**	**9.6**	**17**
Barium	**55**	**56**	**3.3 J**	**62**	**62**	**60**	**67**	**66.2**	**189**	**165**	**225**	**224**	**26.8**	**49.8**	**46.9**	**55.7**	**50.6**	**55**	**57**	**49**	**52**
Beryllium	**0.8 J**	**1.3**	< 4	< 1	< 4	< 1	< 4	**0.454**	**0.249**	< 0.1	**2.12**	**1.98**	**10.9**	< 3	< 3	< 3	< 3	< 1	< 4	< 1	< 4
Cadmium	**0.9 J**	**1 J**	< 20	**7.8**	< 20	**3.9**	< 20	**0.274**	**1.46**	**1.15**	**0.284**	**0.917**	**14.3**	< 5	< 5	< 5	< 5	< 5	< 2.2	< 20	< 2.2	< 20
Calcium	**13,000**	**12,400**	**11,700**	**117,000**	**127,000**	**82,700**	**93,200**	< 3300	< 290000	< 284000	< 33200	< 63400	< 73300	**169,000**	**191,000**	**228,000**	**192,000**	**144,000**	**153,000**	**138,000**	**152,000**
Chromium	**41**	**43**	< 5	**2.4 J**	< 5	< 5.6	< 5	< 0.692	< 45.5	< 0.64	< 69.8	< 105	< 3.57	**8.8 J**	**0.315 J**	**9 J**	**0.445 J**	< 5.6	< 5	< 5.6	< 5
Cobalt	**4.4 J**	**5.2 J**	< 5	**11**	**9.5**	**21**	**22**	**3.79**	**1.75**	**0.755**	**9.62**	**10.5**	**147**	< 50	< 50	< 50	< 50	< 5.6	< 5	< 5.6	< 5
Copper	**9.7 J**	**9.7 J**	< 10	**31**	< 10	**56**	< 10	**1.72**	**27.7**	**6.58**	**10.7**	**137**	**43.4**	< 20	< 20	< 20	< 20	< 11	< 10	< 11	< 10
Iron	**18,700**	**19,000**	**59 J**	**3,200**	**2,600**	**2,800**	**2,800**	< 323	**17,100**	< 323	**138,000**	**25,200**	**17,700**	**31,300 J**	**35,200 J**	**35,800 J**	**32,900 J**	**74,000**	**75,300**	**55,200**	**60,200**
Lead	**14**	**13**	< 6	**11**	**4.9 J**	**12**	< 6	< 0.7	**3.31**	< 0.7	< 0.7	**829**	**3.07**	< 5	< 5	**2.6 J**	< 5	< 6.7	< 6	< 6.7	< 6
Magnesium	**2,600**	**2,600**	**1,400**	**9,400**	**10,300**	**8,000**	**9,100**	**5,370**	**14,000**	**12,900**	**22,000**	**6,600**	**37,500**	**12,200 J**	**14,200 J**	**14,300 J**	**13,800 J**	**27,400**	**28,800**	**24,700**	**26,500**
Manganese	**400**	**420**	< 5	**520**	**580**	**820**	**940**	< 46.4	< 62.7	< 43.5	< 502	< 765	< 2710	**644 J**	**746 J**	**771 J**	**740 J**	**630**	**670**	**560**	**630**
Mercury	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA	**0.057 J**	**0.049 J**	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	< 22	< 22	< 20	< 22	< 20	**9.3 J**	**9 J**	< 7.38	< 7.18	< 0.3	< 16.6	< 24	< 372	**2.9 J**	**1.4 J**	**2.6 J**	**1.6 J**	< 22	< 20	< 22	< 20
Potassium	**2,400**	**2,500**	**1,000**	**11,800**	**12,800**	**10,100**	**11,200**	< 2850	< 72600	< 68500	< 6720	< 2500	< 5480	**7,450**	**7,970**	**8,930**	**8,380**	**5,700**	**6,400**	**6,400**	**7,100**
Selenium	< 22	< 22	< 20	< 22	< 20	< 22	< 20	< 4.89	< 2.7	< 2.7	< 2.7	< 2.7	< 2.7	< 10	< 10	< 10	< 10	< 22	**15 J**	< 22	**6.9 J**
Silver	< 4.4	< 4.4	< 4	< 4.4	< 4	< 4.4	< 4	NA	NA	NA	NA	NA	NA	**2.8 J**	**3.1 J**	**2.5 J**	**2.6 J**	< 4.4	< 4	< 4.4	< 4
Sodium	**26,800**	**25,600**	**28,200**	**33,400**	**36,100**	**43,900**	**49,500**	**20,900**	**3,070,000 E**	**3,110,000 E**	**156,000**	**6,790**	**26,000**	**30,400**	**30,700**	**28,100**	**31,300**	**45,900**	**47,900**	**43,100**	**45,200**
Thallium	< 1	< 1	< 20	< 1	< 20	< 1	< 20	NA	NA	NA	NA	NA	NA	< 10	< 10	< 10	< 10	< 1	< 20	< 1	< 20
Vanadium	**42**	**44**	< 5	< 5.6	< 5	**3.6 J**	**3.2 J**	< 0.5	**95.3**	**17.6**	**56.9**	**68.8**	**3.07**	**3.2 J**	< 50	**3 J**	< 50	**4.2 J**	**2.8 J**	**3.2 J**	**2.9 J**
Zinc	**34**	**37**	< 20	**200**	< 20	**190**	**7.5 J**	**23.6**	**62.7**	**20**	**171**	**145**	**1,580**	**10.2 J**	< 20	**9.6 J**	**7.2 J**	< 22	< 20	< 22	< 20

Attachment D
GROUND WATER SAMPLING
RESULTS
SITE PARCEL 57
FORT MONMOUTH, NEW JERSEY

Loc ID	PAR-57MW02							
Sample ID	PAR57-GW-MW02-15.25	PAR57-GW-MW02-15.25 DISSOLVED	PAR57-GW-MW02-20.25	PAR57-GW-MW02-20.25 DISSOLVED	PAR-57-GW-MW02-15.8	PAR-57-GW-MW02-15.8 DISSOLVED	PAR-57-GW-MW02-20.8	PAR-57-GW-MW02-20.8 DISSSOLVED
Sample Date	11/24/2015	11/24/2015	11/24/2015	11/24/2015	5/24/2016	5/24/2016	5/24/2016	5/24/2016
Sample Round								
Filtered	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Volatile Organic Compounds (µg/l)								
1,1,1,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloroethylvinylether	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA
Acrolein	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA
Chlorodibromomethane	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA
Cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA	NA	NA	NA	NA	NA
Diisoproply Ether	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	NA	NA	NA	NA	NA	NA	NA	NA
Meta/Para Xylene	NA	NA	NA	NA	NA	NA	NA	NA
Methyl bromide	NA	NA	NA	NA	NA	NA	NA	NA
Methyl butyl ketone	NA	NA	NA	NA	NA	NA	NA	NA
Methyl chloride	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	NA	NA	NA	NA	NA	NA	NA	NA
Methyl isobutyl ketone	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Tertbutyl Ether	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA
Ortho Xylene	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA
Tert Butyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg								
1,1'-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(ghi)perylene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (µg/l)								
Aluminium	**12,800**	**9,070**	**11,400**	**9,230**	**24,600**	**3,100**	**3,800**	**4,600**
Antimony	< 60	< 60	< 60	< 60	< 110	< 20	< 22	< 20
Arsenic	**10.3**	**8.5 J**	**8.9 J**	**7.8 J**	**5.7**	**4.8 J**	**6.1**	**6.6 J**
Barium	**31.6**	**27**	**27**	**25**	**120**	**36**	**44**	**32**
Beryllium	**7**	**6.2**	**6.8**	**6.4**	**3.6**	**3.3 J**	**4.4**	**4.3**
Cadmium	**5.8**	**5.3**	**5.2**	**5.1**	**15**	**3.5 J**	**2.7**	**4.8 J**
Calcium	**66,900**	**232,000**	**63,400**	**65,600**	**219,000**	**66,100**	**109,000**	**65,100**
Chromium	**8.2 J**	**1.9 J**	**5.3 J**	**1.9 J**	< 28	< 5	< 5.6	< 5
Cobalt	**113**	**111**	**103**	**104**	**280**	**82**	**37**	**95**
Copper	**17 J**	**5.6 J**	**13.5 J**	**5.4 J**	**31 J**	**4.6 J**	**4.9 J**	**7.9 J**
Iron	**36,600 J**	**30,900 J**	**34,000 J**	**31,200 J**	**141,000**	**42,800**	**48,100**	**35,900**
Lead	< 5	< 5	< 5	< 5	< 34	**2.1 J**	< 6.7	**2 J**
Magnesium	**25,600 J**	**25,000 J**	**24,500 J**	**23,700 J**	**77,700**	**23,800**	**24,000**	**24,100**
Manganese	**2,690 J**	**2,560 J**	**2,460 J**	**2,420 J**	**8,500**	**2,600**	**1,300**	**2,500**
Mercury	< 0.2	**0.048 J**	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	**224**	**222**	**223**	**219**	**610**	**180**	**79**	**200**
Potassium	**6,580**	**6,080**	**6,070**	**5,760**	**19,500**	**6,100**	**6,300**	**6,300**
Selenium	< 10	< 10	< 10	< 10	< 110	< 20	< 22	< 20
Silver	**3.1 J**	**2.8 J**	**2.5 J**	**2.6 J**	< 22	< 4	< 4.4	< 4
Sodium	**71,300**	**67,900**	**71,400**	**73,100**	**280,000**	**86,000**	**57,300**	**79,400**
Thallium	< 10	< 10	< 10	< 10	< 1	< 20	< 1	< 20
Vanadium	**5.6 J**	< 50	**3 J**	< 50	**30**	**7.4**	**6.2**	**6.8**
Zinc	**851**	**858**	**788**	**792**	**1,900**	**560**	**270**	**720**

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Bold chemical dectection

3) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

R = Rejected, data validation rejected the results.

U = non-detect, i.e. not detected at or above this value.

U-DL = Elevated sample detection limit due to difficult sample matrix.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

E (or ER) = Estimated result.

D = Results from dilution of sample.

J-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

June 08, 2016 Service Request No:R1604094

Mr. Cory Mahony
Parsons Engineering Science
100 High St. 4th Floor
Boston, MA 02110

Laboratory Results for: FTMM Baseline

Dear Mr.Mahony,

Enclosed are the results of the sample(s) submitted to our laboratory April 26, 2016
For your reference, these analyses have been assigned our service request number **R1604094.**

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s) for analysis of these samples, and represented by Laboratory Control Sample control limits. Any events, such as QC failures, which may add to the uncertainty are explained in the report narrative.

Please contact me if you have any questions. My extension is 7478. You may also contact me via email at Vanessa.Badman@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Vanessa Badman
Customer Service
Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

Client: Parsons Engineering Science **Service Request:**R1604094

Project: FTMM Baseline/748810-03000

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1604094-001	PAR-57-SB-32-0.5-1	4/22/2016	1250
R1604094-002	PAR-57-SB-32-3.5-4	4/22/2016	1255
R1604094-003	PAR-57-SB-32-7.5-8	4/22/2016	1300
R1604094-004	PAR-57-SB-33-0.5-1	4/22/2016	1100
R1604094-005	PAR-57-SB-33-3.5-4	4/22/2016	1105
R1604094-006	PAR-57-SB-33-7.5-8	4/22/2016	1110
R1604094-007	PAR-57-SB-34-0.5-1	4/22/2016	1025
R1604094-008	PAR-57-SB-34-3.5-4	4/22/2016	1030
R1604094-009	PAR-57-SB-34-7.5-8	4/22/2016	1035
R1604094-010	PAR-57-SB-35-0.5-1	4/22/2016	1330
R1604094-011	PAR-57-SB-35-3.5-4	4/22/2016	1335
R1604094-012	PAR-57-SB-35-7.5-8	4/22/2016	1340
R1604094-013	PAR57-EB-042216	4/22/2016	1430

This is a preliminary Tier II report in which your Tier III or Tier IV will soon follow. The report has been reviewed for completeness only. The Case Narrative and Raw Data review will be completed upon the assembling of the final data package and therefore could contain some differences between the preliminary report and final data package.
Preliminary Tier II reports containing Metals data could have a slight difference in the final Tier III or Tier IV results due to rounding rules used in the reporting software.
If you have any questions regarding this, please contact your Customer Service Representative.

Client: Parsons Engineering Science **Service Request:** R1604094
Project: FTMM Baseline/748810-03000

Non-Certified Analytes

Certifying Agency: New York Department of Health

Method	Matrix	Analyte
ALS SOP	Soil	Total Solids

REPORT QUALIFIERS AND DEFINITIONS

U	Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.
J	Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).
B	Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.
E	Inorganics- Concentration is estimated due to the serial dilution was outside control limits.
E	Organics- Concentration has exceeded the calibration range for that specific analysis.
D	Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.
*	Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.
H	Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.
#	Spike was diluted out.
+	Correlation coefficient for MSA is <0.995.
N	Inorganics- Matrix spike recovery was outside laboratory limits.
N	Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.
S	Concentration has been determined using Method of Standard Additions (MSA).
W	Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.
P	Concentration >40% (25% for CLP) difference between the two GC columns.
C	Confirmed by GC/MS
Q	DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).
X	See Case Narrative for discussion.
MRL LOQ	Method Reporting Limit. Also known as: Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.
MDL	Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).
LOD	Limit of Detection. A value at or above the MDL which has been verified to be detectable.
ND	Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	New Hampshire ID # 294100 A/B
Delaware Accredited	Nebraska Accredited	
DoD ELAP #65817	New Jersey ID # NY004	Pennsylvania ID# 68-786
Florida ID # E87674	New York ID # 10145	Rhode Island ID # 158
Illinois ID #200047	North Carolina #676	Virginia #460167

[1] Analyses were performed according to our laboratoryôs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 12:50
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-32-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604094-001	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**250**	8.0	4.0	2.3	1	05/18/16 09:33	5/5/16	
Benzo(a)pyrene	**270**	8.0	4.0	2.1	1	05/18/16 09:33	5/5/16	
Benzo(b)fluoranthene	**340**	8.0	4.0	2.6	1	05/18/16 09:33	5/5/16	
Dibenz(a,h)anthracene	**35**	8.0	4.0	2.6	1	05/18/16 09:33	5/5/16	
Indeno(1,2,3-cd)pyrene	**210**	8.0	4.0	2.1	1	05/18/16 09:33	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	77	44 - 115	05/18/16 09:33	
Nitrobenzene-d5	69	37 - 122	05/18/16 09:33	
p-Terphenyl-d14	84	54 - 127	05/18/16 09:33	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 12:55
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-32-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604094-002	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result		LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**3.5**	**J**	7.7	3.8	2.2	1	05/18/16 10:01	5/5/16	
Benzo(a)pyrene	ND	U	7.7	3.8	2.0	1	05/18/16 10:01	5/5/16	
Benzo(b)fluoranthene	ND	U	7.7	3.8	2.5	1	05/18/16 10:01	5/5/16	
Dibenz(a,h)anthracene	ND	U	7.7	3.8	2.5	1	05/18/16 10:01	5/5/16	
Indeno(1,2,3-cd)pyrene	ND	U	7.7	3.8	2.0	1	05/18/16 10:01	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	76	44 - 115	05/18/16 10:01	
Nitrobenzene-d5	70	37 - 122	05/18/16 10:01	
p-Terphenyl-d14	83	54 - 127	05/18/16 10:01	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-33-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604094-004	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**9.0**	7.5	3.7	2.2	1	05/18/16 10:28	5/5/16	
Benzo(a)pyrene	**13**	7.5	3.7	1.9	1	05/18/16 10:28	5/5/16	
Benzo(b)fluoranthene	**14**	7.5	3.7	2.4	1	05/18/16 10:28	5/5/16	
Dibenz(a,h)anthracene	**2.6**	7.5	3.7	2.4	1	05/18/16 10:28	5/5/16	J
Indeno(1,2,3-cd)pyrene	**9.8**	7.5	3.7	1.9	1	05/18/16 10:28	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	71	44 - 115	05/18/16 10:28	
Nitrobenzene-d5	70	37 - 122	05/18/16 10:28	
p-Terphenyl-d14	73	54 - 127	05/18/16 10:28	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-33-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604094-005	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	8.3	4.2	2.4	1	05/18/16 10:56	5/5/16	
Benzo(a)pyrene	ND U	8.3	4.2	2.1	1	05/18/16 10:56	5/5/16	
Benzo(b)fluoranthene	ND U	8.3	4.2	2.7	1	05/18/16 10:56	5/5/16	
Dibenz(a,h)anthracene	ND U	8.3	4.2	2.7	1	05/18/16 10:56	5/5/16	
Indeno(1,2,3-cd)pyrene	ND U	8.3	4.2	2.1	1	05/18/16 10:56	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	74	44 - 115	05/18/16 10:56	
Nitrobenzene-d5	70	37 - 122	05/18/16 10:56	
p-Terphenyl-d14	85	54 - 127	05/18/16 10:56	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 10:25
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-34-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604094-007	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**3.3 J**	8.2	4.1	2.4	1	05/18/16 11:24	5/5/16	
Benzo(a)pyrene	ND U	8.2	4.1	2.1	1	05/18/16 11:24	5/5/16	
Benzo(b)fluoranthene	ND U	8.2	4.1	2.7	1	05/18/16 11:24	5/5/16	
Dibenz(a,h)anthracene	ND U	8.2	4.1	2.7	1	05/18/16 11:24	5/5/16	
Indeno(1,2,3-cd)pyrene	ND U	8.2	4.1	2.1	1	05/18/16 11:24	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	69	44 - 115	05/18/16 11:24	
Nitrobenzene-d5	66	37 - 122	05/18/16 11:24	
p-Terphenyl-d14	79	54 - 127	05/18/16 11:24	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 10:30
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-34-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604094-008	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	7.7	3.8	2.2	1	05/18/16 11:52	5/5/16	
Benzo(a)pyrene	ND U	7.7	3.8	2.0	1	05/18/16 11:52	5/5/16	
Benzo(b)fluoranthene	ND U	7.7	3.8	2.5	1	05/18/16 11:52	5/5/16	
Dibenz(a,h)anthracene	ND U	7.7	3.8	2.5	1	05/18/16 11:52	5/5/16	
Indeno(1,2,3-cd)pyrene	ND U	7.7	3.8	2.0	1	05/18/16 11:52	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	72	44 - 115	05/18/16 11:52	
Nitrobenzene-d5	72	37 - 122	05/18/16 11:52	
p-Terphenyl-d14	84	54 - 127	05/18/16 11:52	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 13:30
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-35-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604094-010	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	7.6	3.8	2.2	1	05/18/16 12:20	5/5/16	
Benzo(a)pyrene	ND U	7.6	3.8	2.0	1	05/18/16 12:20	5/5/16	
Benzo(b)fluoranthene	ND U	7.6	3.8	2.5	1	05/18/16 12:20	5/5/16	
Dibenz(a,h)anthracene	ND U	7.6	3.8	2.5	1	05/18/16 12:20	5/5/16	
Indeno(1,2,3-cd)pyrene	ND U	7.6	3.8	2.0	1	05/18/16 12:20	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	79	44 - 115	05/18/16 12:20	
Nitrobenzene-d5	75	37 - 122	05/18/16 12:20	
p-Terphenyl-d14	87	54 - 127	05/18/16 12:20	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 13:35
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-35-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604094-011	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	7.9	4.0	2.3	1	05/18/16 12:47	5/5/16	
Benzo(a)pyrene	ND U	7.9	4.0	2.0	1	05/18/16 12:47	5/5/16	
Benzo(b)fluoranthene	ND U	7.9	4.0	2.6	1	05/18/16 12:47	5/5/16	
Dibenz(a,h)anthracene	ND U	7.9	4.0	2.6	1	05/18/16 12:47	5/5/16	
Indeno(1,2,3-cd)pyrene	ND U	7.9	4.0	2.0	1	05/18/16 12:47	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	74	44 - 115	05/18/16 12:47	
Nitrobenzene-d5	70	37 - 122	05/18/16 12:47	
p-Terphenyl-d14	88	54 - 127	05/18/16 12:47	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 14:30
Sample Matrix:	Water	**Date Received:**	04/26/16 09:40
Sample Name:	PAR57-EB-042216	**Units:**	ug/L
Lab Code:	R1604094-013	**Basis:**	NA

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	0.19	0.10	0.050	1	05/02/16 14:18	4/28/16	
Benzo(a)pyrene	ND U	0.19	0.10	0.050	1	05/02/16 14:18	4/28/16	
Benzo(b)fluoranthene	ND U	0.19	0.10	0.050	1	05/02/16 14:18	4/28/16	
Dibenz(a,h)anthracene	ND U	0.19	0.10	0.050	1	05/02/16 14:18	4/28/16	
Indeno(1,2,3-cd)pyrene	ND U	0.19	0.10	0.050	1	05/02/16 14:18	4/28/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	68	44 - 119	05/02/16 14:18	
Nitrobenzene-d5	71	44 - 120	05/02/16 14:18	
p-Terphenyl-d14	87	50 - 134	05/02/16 14:18	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	RQ1604647-01	**Basis:**	NA

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3510C

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	0.20	0.10	0.050	1	05/02/16 12:03	4/28/16	
Benzo(a)pyrene	ND U	0.20	0.10	0.050	1	05/02/16 12:03	4/28/16	
Benzo(b)fluoranthene	ND U	0.20	0.10	0.050	1	05/02/16 12:03	4/28/16	
Dibenz(a,h)anthracene	ND U	0.20	0.10	0.050	1	05/02/16 12:03	4/28/16	
Indeno(1,2,3-cd)pyrene	ND U	0.20	0.10	0.050	1	05/02/16 12:03	4/28/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	64	44 - 119	05/02/16 12:03	
Nitrobenzene-d5	66	44 - 120	05/02/16 12:03	
p-Terphenyl-d14	83	50 - 134	05/02/16 12:03	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1604980-01	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	6.6	3.3	1.9	1	05/18/16 08:10	5/5/16	
Benzo(a)pyrene	ND U	6.6	3.3	1.7	1	05/18/16 08:10	5/5/16	
Benzo(b)fluoranthene	ND U	6.6	3.3	2.1	1	05/18/16 08:10	5/5/16	
Dibenz(a,h)anthracene	ND U	6.6	3.3	2.2	1	05/18/16 08:10	5/5/16	
Indeno(1,2,3-cd)pyrene	ND U	6.6	3.3	1.7	1	05/18/16 08:10	5/5/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	80	44 - 115	05/18/16 08:10	
Nitrobenzene-d5	70	37 - 122	05/18/16 08:10	
p-Terphenyl-d14	90	54 - 127	05/18/16 08:10	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 12:50
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-32-0.5-1	**Basis:**	As Received
Lab Code:	R1604094-001		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**82.2**	Percent	-	-	-	1	05/21/16 08:25	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 12:55
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-32-3.5-4	**Basis:**	As Received
Lab Code:	R1604094-002		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**86.1**	Percent	-	-	-	1	05/21/16 08:25	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-33-0.5-1	**Basis:**	As Received
Lab Code:	R1604094-004		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**88.3**	Percent	-	-	-	1	05/21/16 08:25	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-33-3.5-4	**Basis:**	As Received
Lab Code:	R1604094-005		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**79.2**	Percent	-	-	-	1	05/21/16 08:25	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 10:25
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-34-0.5-1	**Basis:**	As Received
Lab Code:	R1604094-007		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**80.6**	Percent	-	-	-	1	05/21/16 08:25	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 10:30
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-34-3.5-4	**Basis:**	As Received
Lab Code:	R1604094-008		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**85.8**	Percent	-	-	-	1	05/21/16 08:25	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 13:30
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-35-0.5-1	**Basis:**	As Received
Lab Code:	R1604094-010		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**86.2**	Percent	-	-	-	1	05/21/16 08:25	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 13:35
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-35-3.5-4	**Basis:**	As Received
Lab Code:	R1604094-011		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**83.2**	Percent	-	-	-	1	05/21/16 08:25	

Client: Parsons Engineering Science
Project: FTMM Baseline/748810-03000
Sample Matrix: Water

Service Request: R1604094
Date Analyzed: 05/02/16

Duplicate Lab Control Sample Summary
Low Level Semivolatile Organic Compounds by GC/MS

Units:ug/L
Basis:NA

		Lab Control Sample			Duplicate Lab Control Sample					
		RQ1604647-02			RQ1604647-03					
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benz(a)anthracene	8270D	4.46	6.00	74	4.27	6.00	71	58-125	4	20
Benzo(a)pyrene	8270D	4.58	6.00	76	4.46	6.00	74	54-128	3	20
Benzo(b)fluoranthene	8270D	4.39	6.00	73	4.26	6.00	71	53-131	3	20
Dibenz(a,h)anthracene	8270D	4.77	6.00	80	4.60	6.00	77	51-134	4	20
Indeno(1,2,3-cd)pyrene	8270D	4.70	6.00	78	4.85	6.00	81	52-134	3	20

Client: Parsons Engineering Science
Project: FTMM Baseline/748810-03000
Sample Matrix: Soil

Service Request: R1604094
Date Analyzed: 05/18/16

Duplicate Lab Control Sample Summary
Low Level Semivolatile Organic Compounds by GC/MS

Units:ug/Kg
Basis: Dry

		Lab Control Sample			Duplicate Lab Control Sample					
		RQ1604980-02			RQ1604980-03					
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benz(a)anthracene	8270D	117	133	88	113	133	85	49-126	4	20
Benzo(a)pyrene	8270D	140	133	105	133	133	100	45-129	5	20
Benzo(b)fluoranthene	8270D	135	133	101	133	133	100	45-132	2	20
Dibenz(a,h)anthracene	8270D	139	133	104	134	133	100	45-134	4	20
Indeno(1,2,3-cd)pyrene	8270D	143	133	107	137	133	103	45-133	4	20

QA/QC Report

Client:	Parsons Engineering Science	**Service Request:**	R1604094
Project	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16
Sample Matrix:	Soil	**Date Received:**	04/26/16
		Date Analyzed:	05/21/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	PAR-57-SB-32-3.5-4	**Units:**	Percent
Lab Code:	R1604094-002	**Basis:**	As Received

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample R1604094-002DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	-	86.1	86.5	86.3	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK:

COC #: PS7042220160O2 1 of 2
ALS Quote #:

Client Name: Parsons Government Services
Address: 100 High St. 4th Floor
Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570
Project Name/#: FTMM Soils - 57-748810-07100
Bill To: Parsons Government Services

TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Cory.Mahony Approved?
Email? [X] -Y cris.grill@parsons.com
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	NJDEP EPH Fractionated	PCBs (8082A)	VOC (8260C)+TICs	TAL Metals (6010C)	PAH (8270D) *	SVOC (8270D): 2-Methylnaphthalene, Naphthalene Only				
			Container Type		CG	CG	TCK	CG	CG	CG				
			Container Size		4oz	4oz	40mL	4oz	4oz	4oz				
			Preservative		None	None	MeOH/DI	None	None	None				
			ANALYSES/METHOD REQUESTED											
			Enter Number of Containers Per Sample or Field Results Below.											
1 PAR-57-SB-32-0.5-1	4/22/16	1250	G	SO					1					
2 PAR-57-SB-32-3.5-4		1255							1					
3 PAR-57-SB-32-7.5-8		1300							1					
4 PAR-57-SB-33-0.5-1		1100							1					
5 PAR-57-SB-33-3.5-4		1105							1					
6 PAR-57-SB-33-7.5-8		1110							1					
7 PAR-57-SB-34-0.5-1		1025							1					
8 PAR-57-SB-34-3.5-4		1030							1					
9 PAR-57-SB-34-7.5-8		1035							1					
10 PAR-57-SB-35-0.5-1		1330							1					

Project Comments: * Hold Extract

LOGGED BY(signature): DATE: 4/22/16 TIME:
REVIEWED BY(signature): DATE: TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2	4/25/16	0940
3			4		
5			6		
7			8		
9			10		

Receipt Information (completed by Receiving Lab)
Cooler Temp: Therm ID:
No. of Coolers:

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: _Pickup _Labor _Composite Sampling _Rental Equipment _Other:

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- ERPMIS-HAZSITE

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 USA

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Parsons Engineering Science
FTMM Baseline

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: PS704222016002 2of2
ALS Quote #:

Client Name: Parsons Government Services
Address: 100 High St. 4th Floor, Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570
Project Name/#: FTMM Soils -57- 748810-07100
Bill To: Parsons Government Services
TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Cory Mahony Approved?
Email? [X] -Y cris.grill@parsons.com
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	NJDEP EPH Fractionated	PCBs (8082A)	VOC (8260C)+TICs	TAL Metals (6010C)	PAH (8270D) *	SVOC (8270D): 2-Methylnaphthalene, Naphthalene Only	PAH (EB)
Container Type					CG	CG	TCK	CG	CG	CG	
Container Size					4oz	4oz	40mL	4oz	4oz	4oz	
Preservative					None	None	MeOH/DI	None	None	None	
1 PAR-57-SB-35-3.5-4	4/22/16	1335	G	SO					1		
2 PAR-57-SB-35-7.5-8	"	1340	"	"					1		
3 PAR57-EB-04222016	"	1430	"	W							2
4											
5											
6											
7											
8											
9											
10											

ANALYSES/METHOD REQUESTED
Enter Number of Containers Per Sample or Field Results Below.

Receipt Information (completed by Receiving Lab)
Cooler Temp: ____ Therm ID: ____
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:
Sample/COC Comments

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other:

Project Comments: * Hold + Extract

LOGGED BY(signature): [signature] DATE: 4/22/16 TIME:
REVIEWED BY(signature): T. Chorsi DATE: 4-25-16 TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2 [signature]	4/24/16	0740
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- ERPMIS-HAZSITE

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=W

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 USA

R1604094 5
Parsons Engineering Science
FTMM Baseline

R1604094 Appendix D 5
Parsons Engineering Science
FTMM Baseline

Cooler Receipt and Preservation Check Form

Project/Client Parsons Folder Number .

Cooler received on 4/24/14 by: GE/GE

COURIER: ALS UPS ~~FEDEX~~ VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y)	N
2	**Custody papers** properly completed (ink, signed)?	(Y)	N
3	Did all bottles arrive in good **condition** (unbroken)?	(Y)	N
4	Circle: (Wet Ice) **Dry Ice Gel packs** present?	(Y)	N

5a	**Perchlorate** samples have required headspace?	Y	N	(NA)
5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y	N	(NA)
6	Where did the bottles originate?	(ALS/ROC)	~~CLIENT~~	
7	Soil VOA received as: Bulk Encore 5035set			(NA)

8. Temperature Readings Date: 4/24/14 Time: 1015 ID: (IR#3) IR#5 From: (Temp Blank) Sample Bottle

Observed Temp (°C)	3.2	1.9					
Correction Factor (°C)	+0.0	—					
Corrected Temp (°C)	3.2	1.9					
Within 0-6°C?	(Y) N	(Y) N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: Ice melted Poorly Packed Same Day Rule

&Client Approval to Run Samples: Standing Approval Client aware at drop-off Client notified by:

All samples held in storage location: R-002 by GE/GE on 4/24/14 at 1025
5035 samples placed in storage location: by on at

PC Secondary Review:

Cooler Breakdown: Date: 4/24/14 Time: 1411 by: GE

1. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
2. Did all bottle labels and tags agree with custody papers? (YES) NO
3. Were correct containers used for the tests indicated? (YES) NO
4. Air Samples: Cassettes / Tubes Intact Canisters Pressurized Tedlar® Bags Inflated (N/A)

Explain any discrepancies:

pH	Reagent	Yes	No	Lot Received	Exp	Sample ID	Vol. Added	Lot Added	Final pH
≥12	NaOH								
≤2	HNO_3								
≤2	H_2SO_4								
<4	$NaHSO_4$								
Residual Chlorine (-)	For CN Phenol and 522			If +, contact PM to add $Na_2S_2O_3$ (CN), ascorbic (phenol).					
	$Na_2S_2O_3$	-	-						
	ZnAcetate	-	-						
	HCl	**	**						

**Not to be tested before analysis – pH tested and recorded by VOAs on a separate worksheet

Yes=All samples OK

No=Samples were preserved at The lab as listed

PM OK to Adjust: _____

Bottle lot numbers: 010116-IBWS, 061515-1BT, Client

Other Comments:

COC's not signed

PC Secondary Review:

*significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

June 08, 2016 Service Request No:R1604095

Mr. Cory Mahony
Parsons Engineering Science
100 High St. 4th Floor
Boston, MA 02110

Laboratory Results for: FTMM Baseline

Dear Mr.Mahony,

Enclosed are the results of the sample(s) submitted to our laboratory April 26, 2016
For your reference, these analyses have been assigned our service request number **R1604095.**

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s) for analysis of these samples, and represented by Laboratory Control Sample control limits. Any events, such as QC failures, which may add to the uncertainty are explained in the report narrative.

Please contact me if you have any questions. My extension is 7478. You may also contact me via email at Vanessa.Badman@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Vanessa Badman
Customer Service
Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

Client: Parsons Engineering Science **Service Request:**R1604095

Project: FTMM Baseline/748810-03000

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1604095-001	PAR-57-SB-26-0.5-1	4/22/2016	0840
R1604095-002	PAR-57-SB-26-3.5-4	4/22/2016	0845
R1604095-003	PAR-57-SB-126-3.5-4	4/22/2016	1200
R1604095-004	PAR-57-SB-26-7.5-8	4/22/2016	0850
R1604095-005	PAR-57-SB-27-0-0.5	4/22/2016	0905
R1604095-006	PAR-57-SB-27-3.5-4	4/22/2016	0910
R1604095-007	PAR-57-SB-27-7.5-8	4/22/2016	0915
R1604095-008	PAR-57-SB-28-0.5-1	4/22/2016	0930
R1604095-009	PAR-57-SB-28-3.5-4	4/22/2016	0935
R1604095-010	PAR-57-SB-28-7.5-8	4/22/2016	0940
R1604095-011	PAR-57-SB-29-0.5-1	4/22/2016	0955
R1604095-012	PAR-57-SB-29-3.5-4	4/22/2016	1000
R1604095-013	PAR-57-SB-29-7.5-8	4/22/2016	1005
R1604095-014	PAR-57-SB-30-0.5-1	4/22/2016	1135
R1604095-015	PAR-57-SB-30-3.5-4	4/22/2016	1140
R1604095-016	PAR-57-SB-30-7.5-8	4/22/2016	1145
R1604095-017	PAR-57-SB-31-0.5-1	4/22/2016	1400
R1604095-018	PAR-57-SB-31-3.5-4	4/22/2016	1405
R1604095-019	PAR-57-SB-31-7.5-8	4/22/2016	1410

This is a preliminary Tier II report in which your Tier III or Tier IV will soon follow. The report has been reviewed for completeness only. The Case Narrative and Raw Data review will be completed upon the assembling of the final data package and therefore could contain some differences between the preliminary report and final data package.
Preliminary Tier II reports containing Metals data could have a slight difference in the final Tier III or Tier IV results due to rounding rules used in the reporting software.
If you have any questions regarding this, please contact your Customer Service Representative.

Client: Parsons Engineering Science **Service Request:** R1604095
Project: FTMM Baseline/748810-03000

Non-Certified Analytes

Certifying Agency: New York Department of Health

Method	Matrix	Analyte
ALS SOP	Soil	Total Solids

REPORT QUALIFIERS AND DEFINITIONS

U	Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.
J	Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).
B	Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.
E	Inorganics- Concentration is estimated due to the serial dilution was outside control limits.
E	Organics- Concentration has exceeded the calibration range for that specific analysis.
D	Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.
*	Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.
H	Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.
#	Spike was diluted out.
+	Correlation coefficient for MSA is <0.995.
N	Inorganics- Matrix spike recovery was outside laboratory limits.
N	Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.
S	Concentration has been determined using Method of Standard Additions (MSA).
W	Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.
P	Concentration >40% (25% for CLP) difference between the two GC columns.
C	Confirmed by GC/MS
Q	DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).
X	See Case Narrative for discussion.
MRL LOQ	Method Reporting Limit. Also known as: Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.
MDL	Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).
LOD	Limit of Detection. A value at or above the MDL which has been verified to be detectable.
ND	Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	New Hampshire ID # 294100 A/B
Delaware Accredited	Nebraska Accredited	
DoD ELAP #65817	New Jersey ID # NY004	Pennsylvania ID# 68-786
Florida ID # E87674	New York ID # 10145	Rhode Island ID # 158
Illinois ID #200047	North Carolina #676	Virginia #460167

[1] Analyses were performed according to our laboratoryôs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 08:40
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-26-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604095-001	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**120**	8.0	4.0	2.3	1	05/02/16 16:05	4/29/16	
Benzo(a)pyrene	**120**	8.0	4.0	2.0	1	05/02/16 16:05	4/29/16	
Benzo(b)fluoranthene	**150**	8.0	4.0	2.6	1	05/02/16 16:05	4/29/16	
Dibenz(a,h)anthracene	**24**	8.0	4.0	2.6	1	05/02/16 16:05	4/29/16	
Indeno(1,2,3-cd)pyrene	**99**	8.0	4.0	2.0	1	05/02/16 16:05	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	68	29 - 135	05/02/16 16:05	
Nitrobenzene-d5	65	35 - 113	05/02/16 16:05	
p-Terphenyl-d14	65	42 - 165	05/02/16 16:05	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 08:45
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-26-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604095-002	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	7.9	4.0	2.3	1	05/02/16 16:32	4/29/16	
Benzo(a)pyrene	ND U	7.9	4.0	2.0	1	05/02/16 16:32	4/29/16	
Benzo(b)fluoranthene	ND U	7.9	4.0	2.6	1	05/02/16 16:32	4/29/16	
Dibenz(a,h)anthracene	ND U	7.9	4.0	2.6	1	05/02/16 16:32	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	7.9	4.0	2.0	1	05/02/16 16:32	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	64	29 - 135	05/02/16 16:32	
Nitrobenzene-d5	67	35 - 113	05/02/16 16:32	
p-Terphenyl-d14	73	42 - 165	05/02/16 16:32	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 12:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-126-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604095-003	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**3.5 J**	8.4	4.2	2.5	1	05/02/16 16:59	4/29/16	
Benzo(a)pyrene	ND U	8.4	4.2	2.2	1	05/02/16 16:59	4/29/16	
Benzo(b)fluoranthene	ND U	8.4	4.2	2.7	1	05/02/16 16:59	4/29/16	
Dibenz(a,h)anthracene	ND U	8.4	4.2	2.7	1	05/02/16 16:59	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	8.4	4.2	2.2	1	05/02/16 16:59	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	63	29 - 135	05/02/16 16:59	
Nitrobenzene-d5	64	35 - 113	05/02/16 16:59	
p-Terphenyl-d14	74	42 - 165	05/02/16 16:59	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 08:50
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-26-7.5-8	**Units:**	ug/Kg
Lab Code:	R1604095-004	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**4.1 J**	7.9	3.9	2.3	1	05/02/16 17:26	4/29/16	
Benzo(a)pyrene	**2.1 J**	7.9	3.9	2.0	1	05/02/16 17:26	4/29/16	
Benzo(b)fluoranthene	**3.1 J**	7.9	3.9	2.6	1	05/02/16 17:26	4/29/16	
Dibenz(a,h)anthracene	ND U	7.9	3.9	2.6	1	05/02/16 17:26	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	7.9	3.9	2.0	1	05/02/16 17:26	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	59	29 - 135	05/02/16 17:26	
Nitrobenzene-d5	65	35 - 113	05/02/16 17:26	
p-Terphenyl-d14	69	42 - 165	05/02/16 17:26	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-27-0-0.5	**Units:**	ug/Kg
Lab Code:	R1604095-005	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**120**	7.1	3.6	2.1	1	05/02/16 17:53	4/29/16	
Benzo(a)pyrene	**170**	7.1	3.6	1.8	1	05/02/16 17:53	4/29/16	
Benzo(b)fluoranthene	**200**	7.1	3.6	2.3	1	05/02/16 17:53	4/29/16	
Dibenz(a,h)anthracene	**27**	7.1	3.6	2.3	1	05/02/16 17:53	4/29/16	
Indeno(1,2,3-cd)pyrene	**120**	7.1	3.6	1.8	1	05/02/16 17:53	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	63	29 - 135	05/02/16 17:53	
Nitrobenzene-d5	65	35 - 113	05/02/16 17:53	
p-Terphenyl-d14	62	42 - 165	05/02/16 17:53	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:10
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-27-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604095-006	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	7.9	3.9	2.3	1	05/02/16 18:20	4/29/16	
Benzo(a)pyrene	ND U	7.9	3.9	2.0	1	05/02/16 18:20	4/29/16	
Benzo(b)fluoranthene	ND U	7.9	3.9	2.6	1	05/02/16 18:20	4/29/16	
Dibenz(a,h)anthracene	ND U	7.9	3.9	2.6	1	05/02/16 18:20	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	7.9	3.9	2.0	1	05/02/16 18:20	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	64	29 - 135	05/02/16 18:20	
Nitrobenzene-d5	65	35 - 113	05/02/16 18:20	
p-Terphenyl-d14	74	42 - 165	05/02/16 18:20	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:15
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-27-7.5-8	**Units:**	ug/Kg
Lab Code:	R1604095-007	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	7.7	3.9	2.3	1	05/02/16 19:40	4/29/16	
Benzo(a)pyrene	ND U	7.7	3.9	2.0	1	05/02/16 19:40	4/29/16	
Benzo(b)fluoranthene	ND U	7.7	3.9	2.5	1	05/02/16 19:40	4/29/16	
Dibenz(a,h)anthracene	ND U	7.7	3.9	2.5	1	05/02/16 19:40	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	7.7	3.9	2.0	1	05/02/16 19:40	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	62	29 - 135	05/02/16 19:40	
Nitrobenzene-d5	64	35 - 113	05/02/16 19:40	
p-Terphenyl-d14	78	42 - 165	05/02/16 19:40	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:30
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-28-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604095-008	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**400**	7.5	3.8	2.2	1	05/02/16 20:07	4/29/16	
Benzo(a)pyrene	**320**	7.5	3.8	1.9	1	05/02/16 20:07	4/29/16	
Benzo(b)fluoranthene	**280**	7.5	3.8	2.5	1	05/02/16 20:07	4/29/16	
Dibenz(a,h)anthracene	**57**	7.5	3.8	2.5	1	05/02/16 20:07	4/29/16	
Indeno(1,2,3-cd)pyrene	**160**	7.5	3.8	1.9	1	05/02/16 20:07	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	67	29 - 135	05/02/16 20:07	
Nitrobenzene-d5	66	35 - 113	05/02/16 20:07	
p-Terphenyl-d14	73	42 - 165	05/02/16 20:07	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:35
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-28-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604095-009	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result		LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**3.2**	**J**	8.5	4.2	2.5	1	05/02/16 20:34	4/29/16	
Benzo(a)pyrene	ND	U	8.5	4.2	2.2	1	05/02/16 20:34	4/29/16	
Benzo(b)fluoranthene	ND	U	8.5	4.2	2.7	1	05/02/16 20:34	4/29/16	
Dibenz(a,h)anthracene	ND	U	8.5	4.2	2.8	1	05/02/16 20:34	4/29/16	
Indeno(1,2,3-cd)pyrene	ND	U	8.5	4.2	2.2	1	05/02/16 20:34	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	54	29 - 135	05/02/16 20:34	
Nitrobenzene-d5	58	35 - 113	05/02/16 20:34	
p-Terphenyl-d14	61	42 - 165	05/02/16 20:34	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:40
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-28-7.5-8	**Units:**	ug/Kg
Lab Code:	R1604095-010	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	8.4	4.2	2.5	1	05/02/16 21:01	4/29/16	
Benzo(a)pyrene	ND U	8.4	4.2	2.2	1	05/02/16 21:01	4/29/16	
Benzo(b)fluoranthene	ND U	8.4	4.2	2.7	1	05/02/16 21:01	4/29/16	
Dibenz(a,h)anthracene	ND U	8.4	4.2	2.7	1	05/02/16 21:01	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	8.4	4.2	2.2	1	05/02/16 21:01	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	65	29 - 135	05/02/16 21:01	
Nitrobenzene-d5	65	35 - 113	05/02/16 21:01	
p-Terphenyl-d14	75	42 - 165	05/02/16 21:01	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:55
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-29-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604095-011	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**1600**	35	18	10	5	05/03/16 09:11	4/29/16	
Benzo(a)pyrene	**1200**	35	18	8.8	5	05/03/16 09:11	4/29/16	
Benzo(b)fluoranthene	**1100**	35	18	12	5	05/03/16 09:11	4/29/16	
Dibenz(a,h)anthracene	**210**	35	18	12	5	05/03/16 09:11	4/29/16	
Indeno(1,2,3-cd)pyrene	**670**	35	18	8.8	5	05/03/16 09:11	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	45	29 - 135	05/03/16 09:11	
Nitrobenzene-d5	46	35 - 113	05/03/16 09:11	
p-Terphenyl-d14	94	42 - 165	05/03/16 09:11	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 10:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-29-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604095-012	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**7.3 J**	7.9	3.9	2.3	1	05/02/16 21:54	4/29/16	
Benzo(a)pyrene	**5.0 J**	7.9	3.9	2.0	1	05/02/16 21:54	4/29/16	
Benzo(b)fluoranthene	**3.8 J**	7.9	3.9	2.5	1	05/02/16 21:54	4/29/16	
Dibenz(a,h)anthracene	ND U	7.9	3.9	2.6	1	05/02/16 21:54	4/29/16	
Indeno(1,2,3-cd)pyrene	**2.3 J**	7.9	3.9	2.0	1	05/02/16 21:54	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	66	29 - 135	05/02/16 21:54	
Nitrobenzene-d5	61	35 - 113	05/02/16 21:54	
p-Terphenyl-d14	75	42 - 165	05/02/16 21:54	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 10:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-29-7.5-8	**Units:**	ug/Kg
Lab Code:	R1604095-013	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**2.5 J**	8.3	4.1	2.4	1	05/02/16 22:21	4/29/16	
Benzo(a)pyrene	ND U	8.3	4.1	2.1	1	05/02/16 22:21	4/29/16	
Benzo(b)fluoranthene	ND U	8.3	4.1	2.7	1	05/02/16 22:21	4/29/16	
Dibenz(a,h)anthracene	ND U	8.3	4.1	2.7	1	05/02/16 22:21	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	8.3	4.1	2.1	1	05/02/16 22:21	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	69	29 - 135	05/02/16 22:21	
Nitrobenzene-d5	67	35 - 113	05/02/16 22:21	
p-Terphenyl-d14	80	42 - 165	05/02/16 22:21	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:35
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-30-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604095-014	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**300**	21	10	5.9	3	05/03/16 13:14	4/29/16	
Benzo(a)pyrene	**320**	21	10	5.2	3	05/03/16 13:14	4/29/16	
Benzo(b)fluoranthene	**430**	21	10	6.6	3	05/03/16 13:14	4/29/16	
Dibenz(a,h)anthracene	**57**	21	10	6.6	3	05/03/16 13:14	4/29/16	
Indeno(1,2,3-cd)pyrene	**190**	21	10	5.2	3	05/03/16 13:14	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	53	29 - 135	05/03/16 13:14	
Nitrobenzene-d5	63	35 - 113	05/03/16 13:14	
p-Terphenyl-d14	51	42 - 165	05/03/16 13:14	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:40
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-30-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604095-015	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	7.9	4.0	2.3	1	05/03/16 10:04	4/29/16	
Benzo(a)pyrene	ND U	7.9	4.0	2.0	1	05/03/16 10:04	4/29/16	
Benzo(b)fluoranthene	ND U	7.9	4.0	2.6	1	05/03/16 10:04	4/29/16	
Dibenz(a,h)anthracene	ND U	7.9	4.0	2.6	1	05/03/16 10:04	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	7.9	4.0	2.0	1	05/03/16 10:04	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	61	29 - 135	05/03/16 10:04	
Nitrobenzene-d5	62	35 - 113	05/03/16 10:04	
p-Terphenyl-d14	82	42 - 165	05/03/16 10:04	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:45
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-30-7.5-8	**Units:**	ug/Kg
Lab Code:	R1604095-016	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**2.7 J**	7.3	3.6	2.1	1	05/03/16 10:31	4/29/16	
Benzo(a)pyrene	**3.0 J**	7.3	3.6	1.9	1	05/03/16 10:31	4/29/16	
Benzo(b)fluoranthene	ND U	7.3	3.6	2.4	1	05/03/16 10:31	4/29/16	
Dibenz(a,h)anthracene	ND U	7.3	3.6	2.4	1	05/03/16 10:31	4/29/16	
Indeno(1,2,3-cd)pyrene	**3.3 J**	7.3	3.6	1.9	1	05/03/16 10:31	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	67	29 - 135	05/03/16 10:31	
Nitrobenzene-d5	70	35 - 113	05/03/16 10:31	
p-Terphenyl-d14	75	42 - 165	05/03/16 10:31	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 14:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-31-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604095-017	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**35**	7.6	3.8	2.2	1	05/03/16 12:20	4/29/16	
Benzo(a)pyrene	**61**	7.6	3.8	2.0	1	05/03/16 12:20	4/29/16	
Benzo(b)fluoranthene	**53**	7.6	3.8	2.5	1	05/03/16 12:20	4/29/16	
Dibenz(a,h)anthracene	**14**	7.6	3.8	2.5	1	05/03/16 12:20	4/29/16	
Indeno(1,2,3-cd)pyrene	**47**	7.6	3.8	2.0	1	05/03/16 12:20	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	57	29 - 135	05/03/16 12:20	
Nitrobenzene-d5	61	35 - 113	05/03/16 12:20	
p-Terphenyl-d14	70	42 - 165	05/03/16 12:20	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 14:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-31-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604095-018	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**52**	7.1	3.5	2.1	1	05/03/16 12:47	4/29/16	
Benzo(a)pyrene	**70**	7.1	3.5	1.8	1	05/03/16 12:47	4/29/16	
Benzo(b)fluoranthene	**62**	7.1	3.5	2.3	1	05/03/16 12:47	4/29/16	
Dibenz(a,h)anthracene	**18**	7.1	3.5	2.3	1	05/03/16 12:47	4/29/16	
Indeno(1,2,3-cd)pyrene	**56**	7.1	3.5	1.8	1	05/03/16 12:47	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	62	29 - 135	05/03/16 12:47	
Nitrobenzene-d5	70	35 - 113	05/03/16 12:47	
p-Terphenyl-d14	114	42 - 165	05/03/16 12:47	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 14:10
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-31-7.5-8	**Units:**	ug/Kg
Lab Code:	R1604095-019	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	**2.6 J**	7.8	3.9	2.3	1	05/03/16 11:53	4/29/16	
Benzo(a)pyrene	ND U	7.8	3.9	2.0	1	05/03/16 11:53	4/29/16	
Benzo(b)fluoranthene	ND U	7.8	3.9	2.5	1	05/03/16 11:53	4/29/16	
Dibenz(a,h)anthracene	ND U	7.8	3.9	2.5	1	05/03/16 11:53	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	7.8	3.9	2.0	1	05/03/16 11:53	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	67	29 - 135	05/03/16 11:53	
Nitrobenzene-d5	68	35 - 113	05/03/16 11:53	
p-Terphenyl-d14	77	42 - 165	05/03/16 11:53	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1604728-01	**Basis:**	Dry

Low Level Semivolatile Organic Compounds by GC/MS

Analysis Method: 8270D
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Benz(a)anthracene	ND U	6.6	3.3	1.9	1	05/02/16 14:45	4/29/16	
Benzo(a)pyrene	ND U	6.6	3.3	1.7	1	05/02/16 14:45	4/29/16	
Benzo(b)fluoranthene	ND U	6.6	3.3	2.1	1	05/02/16 14:45	4/29/16	
Dibenz(a,h)anthracene	ND U	6.6	3.3	2.2	1	05/02/16 14:45	4/29/16	
Indeno(1,2,3-cd)pyrene	ND U	6.6	3.3	1.7	1	05/02/16 14:45	4/29/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
2-Fluorobiphenyl	67	29 - 135	05/02/16 14:45	
Nitrobenzene-d5	66	35 - 113	05/02/16 14:45	
p-Terphenyl-d14	79	42 - 165	05/02/16 14:45	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 08:40
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-26-0.5-1	**Basis:**	As Received
Lab Code:	R1604095-001		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**82.6**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 08:45
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-26-3.5-4	**Basis:**	As Received
Lab Code:	R1604095-002		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**83.2**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 12:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-126-3.5-4	**Basis:**	As Received
Lab Code:	R1604095-003		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**78.5**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 08:50
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-26-7.5-8	**Basis:**	As Received
Lab Code:	R1604095-004		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**83.5**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-27-0-0.5	**Basis:**	As Received
Lab Code:	R1604095-005		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**92.6**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:10
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-27-3.5-4	**Basis:**	As Received
Lab Code:	R1604095-006		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**83.8**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:15
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-27-7.5-8	**Basis:**	As Received
Lab Code:	R1604095-007		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**85.3**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:30
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-28-0.5-1	**Basis:**	As Received
Lab Code:	R1604095-008		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**87.4**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:35
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-28-3.5-4	**Basis:**	As Received
Lab Code:	R1604095-009		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**77.9**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:40
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-28-7.5-8	**Basis:**	As Received
Lab Code:	R1604095-010		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**78.1**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 09:55
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-29-0.5-1	**Basis:**	As Received
Lab Code:	R1604095-011		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**94.2**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 10:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-29-3.5-4	**Basis:**	As Received
Lab Code:	R1604095-012		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**84.0**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 10:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-29-7.5-8	**Basis:**	As Received
Lab Code:	R1604095-013		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**80.0**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:35
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-30-0.5-1	**Basis:**	As Received
Lab Code:	R1604095-014		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**96.0**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:40
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-30-3.5-4	**Basis:**	As Received
Lab Code:	R1604095-015		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**83.1**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 11:45
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-30-7.5-8	**Basis:**	As Received
Lab Code:	R1604095-016		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**90.8**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 14:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-31-0.5-1	**Basis:**	As Received
Lab Code:	R1604095-017		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**86.4**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 14:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-31-3.5-4	**Basis:**	As Received
Lab Code:	R1604095-018		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**93.3**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16 14:10
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-31-7.5-8	**Basis:**	As Received
Lab Code:	R1604095-019		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**84.6**	Percent	-	-	-	1	05/04/16 16:15	

Client: Parsons Engineering Science
Project: FTMM Baseline/748810-03000
Sample Matrix: Soil

Service Request: R1604095
Date Analyzed: 05/02/16

Duplicate Lab Control Sample Summary
Low Level Semivolatile Organic Compounds by GC/MS

Units:ug/Kg
Basis: Dry

		Lab Control Sample			Duplicate Lab Control Sample					
		RQ1604728-02			RQ1604728-03					
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benz(a)anthracene	8270D	92.6	133	69	94.6	133	71	50-110	2	30
Benzo(a)pyrene	8270D	98.9	133	74	104	133	78	50-110	5	30
Benzo(b)fluoranthene	8270D	93.4	133	70	97.6	133	73	45-115	4	30
Dibenz(a,h)anthracene	8270D	106	133	79	105	133	79	40-125	<1	30
Indeno(1,2,3-cd)pyrene	8270D	103	133	77	98.7	133	74	40-120	4	30

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16
Sample Matrix:	Soil	**Date Received:**	04/26/16
		Date Analyzed:	05/2/16
		Date Extracted:	04/29/16

Duplicate Matrix Spike Summary
Low Level Semivolatile Organic Compounds by GC/MS

Sample Name:	PAR-57-SB-27-3.5-4	**Units:**	ug/Kg
Lab Code:	R1604095-006	**Basis:**	Dry
Analysis Method:	8270D		
Prep Method:	EPA 3541		

		Matrix Spike RQ1604728-04			Duplicate Matrix Spike RQ1604728-05					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Benz(a)anthracene	ND U	107	159	68	110	159	69	50-110	2	30
Benzo(a)pyrene	ND U	113	159	71	115	159	72	50-110	2	30
Benzo(b)fluoranthene	ND U	103	159	65	106	159	67	45-115	3	30
Dibenz(a,h)anthracene	ND U	138	159	87	138	159	87	40-125	<1	30
Indeno(1,2,3-cd)pyrene	ND U	141	159	89	133	159	84	40-120	5	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16
Sample Matrix:	Soil	**Date Received:**	04/26/16
		Date Analyzed:	05/04/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	PAR-57-SB-27-3.5-4	**Units:**	Percent
Lab Code:	R1604095-006	**Basis:**	As Received

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample R1604095-006DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	-	83.8	83.3	83.5	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:	Parsons Engineering Science	**Service Request:**	R1604095
Project	FTMM Baseline/748810-03000	**Date Collected:**	04/22/16
Sample Matrix:	Soil	**Date Received:**	04/26/16
		Date Analyzed:	05/04/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	PAR-57-SB-31-7.5-8	**Units:**	Percent
Lab Code:	R1604095-019	**Basis:**	As Received

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample R1604095-019DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	-	84.6	84.3	84.5	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: P5704222016001 1 of 2
ALS Quote #:

Client Name: Parsons Government Services
Address: 100 High St. 4th Floor
Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570
Project Name/#: FTMM Soils - 57-748510-07100
Bill To: Parsons Government Services

TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Cory Mahony Approved?
Email? [X] -Y eris.grill@parsons.com
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	NJDEP EPH Fractionated	PCBs (8082A)	VOC (8260C)+TICs	TAL Metals (6010C)	PAH (8270D)	SVOC (8270D): 2-Methylnaphthalene, Naphthalene Only
			Container Type		CG	CG	TCK	CG	CG	CG
			Container Size		4oz	4oz	40mL	4oz	4oz	4oz
			Preservative		None	None	MeOH/DI	None	None	None
			ANALYSES/METHOD REQUESTED							
			Enter Number of Containers Per Sample or Field Results Below.							
1 PAR-57-SB-26-0.5-1	4/22/16	0840	G	SO					1	
2 PAR-57-SB-26-3.5-4		0845							1	
3 PAR-57-SB-126-3.5-4		1200							1	
4 PAR-57-SB-26-7.5-8		0850							1	
5 PAR-57-SB-27-0-0.5		0905							1	
6 PAR-57-SB-27-3.5-4		0910							1	
7 PAR-57-SB-27-3.5-4 MS/MSD		0910							1	
8 PAR-57-SB-27-7.5-8		0915							1	
9 PAR-57-SB-28-0.5-1		0930							1	
10 PAR-57-SB-28-3.5-4		0935							1	

Receipt Information (completed by Receiving Lab)
Cooler Temp: ____ Therm ID: ____
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other:

Project Comments:

LOGGED BY(signature): DATE 4/22/16 TIME
REVIEWED BY(signature): DATE 4-25-16 TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2 Diego Lo	4/22/16	09:10
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- EQUIS-HAZSITE

* G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 USA

R1604095 5
Parsons Engineering Science
FTMM Baseline

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: P5704222016001 2of2
ALS Quote #:

Client Name: Parsons Government Services
Address: 100 High St. 4th Floor, Boston, MA 02110
Contact: Christina Grill / Cory Mchary
Phone#: 617-449-1570
Project Name/#: FTMM Soils -57-748810-07101
Bill To: Parsons Government Services
TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Cory.Mchary Approved?
Email? [X] -Y cmcgrill@parsons.com
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	NJDEP EPH Fractionated	PCBs (8082A)	VOC (8260C)+TICs	TAL Metals (6010C)	PAH (8270D)	SVOC (8270D): 2-Methylnaphthalene, Naphthalene Only
			Container Type		CG	CG	TCK	CG	CG	CG
			Container Size		4oz	4oz	40mL	4oz	4oz	4oz
			Preservative		None	None	MeOH/DI	None	None	None
			ANALYSES/METHOD REQUESTED							
			Enter Number of Containers Per Sample or Field Results Below.							
1 PAR-57-SB-28-7.5-8	4/22/16	0940	G	SO					1	
2 PAR-57-SB-29-0.5-1		0955							1	
3 PAR-57-SB-29-3.5-4		1000							1	
4 PAR-57-SB-29-7.5-8		1005							1	
5 PAR-57-SB-30-0.5-1		1135							1	
6 PAR-57-SB-30-3.5-4		1140							1	
7 PAR-57-SB-30-7.5-8		1145							1	
8 PAR-57-SB-31-0.5-1		1400							1	
9 PAR-57-SB-31-3.5-4		1405							1	
10 PAR-57-SB-31-7.5-8		1410							1	

Receipt Information (completed by Receiving Lab)
Cooler Temp: ____ Therm ID: ____
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:
Sample/COC Comments

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other:

Project Comments:

LOGGED BY(signature): DATE: 4/22/16 TIME:
REVIEWED BY(signature): DATE: 4-25-16 TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- ERPMIS-HAZSITE

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 USA

R1604095
Parsons Engineering Science
FTMM Baseline
5

Cooler Receipt and Preservation Check Form

R1604095 Appendix 5
Parsons Engineering Science
FTMM Baseline

Project/Client Parsons Folder Number .

Cooler received on 4/26/16 by: (AD)/GE

COURIER: ALS UPS ~~FEDEX~~ VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y) N
2	**Custody papers** properly completed (ink, signed)?	(Y) N
3	Did all bottles arrive in good **condition** (unbroken)?	(Y) N
4	Circle: (Wet Ice) **Dry Ice Gel packs** present?	(Y) N

5a	**Perchlorate** samples have required headspace?	Y N (NA)
5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y N (NA)
6	Where did the bottles originate?	(ALS/ROC) ~~CLIENT~~
7	Soil VOA received as: Bulk Encore 5035set	(NA)

8. Temperature Readings Date: 4/26/16 Time: 1015 ID: (IR#3) IR#5 From: Temp Blank (Sample Bottle)

Observed Temp (°C)	3.1	1.9					
Correction Factor (°C)	+0.0	—					
Corrected Temp (°C)	3.2	1.9					
Within 0-6°C?	(Y) N	(Y) N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: Ice melted Poorly Packed Same Day Rule

&Client Approval to Run Samples: Standing Approval Client aware at drop-off Client notified by:

All samples held in storage location: B-002 by GE/AD on 4/26/16 at 1025
5035 samples placed in storage location: by on at

PC Secondary Review:

Cooler Breakdown: Date: 4/26/16 Time: 1419 by: (AD)

1. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
2. Did all bottle labels and tags agree with custody papers? (YES) NO
3. Were correct containers used for the tests indicated? (YES) NO
4. Air Samples: Cassettes / Tubes Intact Canisters Pressurized Tedlar® Bags Inflated (N/A)

Explain any discrepancies:

pH	Reagent	Yes	No	Lot Received	Exp	Sample ID	Vol. Added	Lot Added	Final pH
≥12	NaOH								
≤2	HNO_3								
≤2	H_2SO_4								
<4	$NaHSO_4$								
Residual Chlorine (-)	For CN Phenol and 522			If +, contact PM to add $Na_2S_2O_3$ (CN), ascorbic (phenol).					
	$Na_2S_2O_3$	-	-						
	ZnAcetate	-	-						
	HCl	**	**						

**Not to be tested before analysis – pH tested and recorded by VOAs on a separate worksheet

Yes=All samples OK

No=Samples were preserved at The lab as listed

PM OK to Adjust:

Bottle lot numbers: 0104/16-1BNS
Other Comments:

COC's not signed

PC Secondary Review:

*significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

June 08, 2016 Service Request No:R1604096

Mr. Cory Mahony
Parsons Engineering Science
100 High St. 4th Floor
Boston, MA 02110

Laboratory Results for: FTMM Baseline

Dear Mr.Mahony,

Enclosed are the results of the sample(s) submitted to our laboratory April 26, 2016
For your reference, these analyses have been assigned our service request number **R1604096.**

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAP standards except as noted in the case narrative report. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s) for analysis of these samples, and represented by Laboratory Control Sample control limits. Any events, such as QC failures, which may add to the uncertainty are explained in the report narrative.

Please contact me if you have any questions. My extension is 7478. You may also contact me via email at Vanessa.Badman@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Vanessa Badman
Customer Service
Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

Client: Parsons Engineering Science **Service Request:**R1604096

Project: FTMM Baseline/748810-03000

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R1604096-001	PAR-57-SB-37-0.5-1	4/21/2016	0915
R1604096-002	PAR-57-SB-37-2.5-3	4/21/2016	0917
R1604096-003	PAR-57-SB-137-2.5-3	4/21/2016	1200
R1604096-004	PAR-57-SB-37-4.5-5	4/21/2016	0920
R1604096-005	PAR-57-SB-36-4.5-5	4/21/2016	1000
R1604096-006	PAR-57-SB-39-0.5-1	4/21/2016	1040
R1604096-007	PAR-57-SB-39-2.5-3	4/21/2016	1043
R1604096-008	PAR-57-SB-39-4.5-5	4/21/2016	1045
R1604096-009	PAR-57-SB-38-0.5-1	4/21/2016	1300
R1604096-010	PAR-57-SB-38-2.5-3	4/21/2016	1303
R1604096-011	PAR-57-SB-38-4.5-5	4/21/2016	1305
R1604096-012	PAR-57-SB-40-0.5-1	4/21/2016	1330
R1604096-013	PAR-57-SB-40-2.5-3	4/21/2016	1333
R1604096-014	PAR-57-SB-140-2.5-3	4/21/2016	1205
R1604096-015	PAR-57-SB-40-4.5-5	4/21/2016	1335
R1604096-016	PAR57-EB-04212016	4/21/2016	1500

This is a preliminary Tier II report in which your Tier III or Tier IV will soon follow. The report has been reviewed for completeness only. The Case Narrative and Raw Data review will be completed upon the assembling of the final data package and therefore could contain some differences between the preliminary report and final data package.
Preliminary Tier II reports containing Metals data could have a slight difference in the final Tier III or Tier IV results due to rounding rules used in the reporting software.
If you have any questions regarding this, please contact your Customer Service Representative.

Client: Parsons Engineering Science **Service Request:** R1604096
Project: FTMM Baseline/748810-03000

Non-Certified Analytes

Certifying Agency: New York Department of Health

Method	Matrix	Analyte
ALS SOP	Soil	Total Solids

REPORT QUALIFIERS AND DEFINITIONS

U	Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.
J	Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).
B	Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.
E	Inorganics- Concentration is estimated due to the serial dilution was outside control limits.
E	Organics- Concentration has exceeded the calibration range for that specific analysis.
D	Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.
*	Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.
H	Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.
#	Spike was diluted out.
+	Correlation coefficient for MSA is <0.995.
N	Inorganics- Matrix spike recovery was outside laboratory limits.
N	Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.
S	Concentration has been determined using Method of Standard Additions (MSA).
W	Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.
P	Concentration >40% (25% for CLP) difference between the two GC columns.
C	Confirmed by GC/MS
Q	DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).
X	See Case Narrative for discussion.
MRL LOQ	Method Reporting Limit. Also known as: Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.
MDL	Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).
LOD	Limit of Detection. A value at or above the MDL which has been verified to be detectable.
ND	Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

ACCREDITED IN ACCORDANCE WITH nelac

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	New Hampshire ID # 294100 A/B
Delaware Accredited	Nebraska Accredited	
DoD ELAP #65817	New Jersey ID # NY004	Pennsylvania ID# 68-786
Florida ID # E87674	New York ID # 10145	Rhode Island ID # 158
Illinois ID #200047	North Carolina #676	Virginia #460167

[1] Analyses were performed according to our laboratoryôs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to http://www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads/North-America-Downloads

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 09:15
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-37-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604096-001	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	36	21	21	1	05/21/16 10:11	5/12/16	
Aroclor 1260	**57**	36	19	19	1	05/21/16 10:11	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	68	60 - 125	05/21/16 10:11	
Tetrachloro-m-xylene	60	27 - 134	05/21/16 10:11	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 09:17
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-37-2.5-3	**Units:**	ug/Kg
Lab Code:	R1604096-002	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	37	22	22	1	05/21/16 10:37	5/12/16	
Aroclor 1260	ND U	37	19	19	1	05/21/16 10:37	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	91	60 - 125	05/21/16 10:37	
Tetrachloro-m-xylene	82	27 - 134	05/21/16 10:37	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 12:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-137-2.5-3	**Units:**	ug/Kg
Lab Code:	R1604096-003	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	37	22	22	1	05/21/16 11:02	5/12/16	
Aroclor 1260	ND U	37	20	20	1	05/21/16 11:02	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	71	60 - 125	05/21/16 11:02	
Tetrachloro-m-xylene	65	27 - 134	05/21/16 11:02	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 09:20
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-37-4.5-5	**Units:**	ug/Kg
Lab Code:	R1604096-004	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	39	23	23	1	05/21/16 11:52	5/12/16	
Aroclor 1260	ND U	39	21	21	1	05/21/16 11:52	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	70	60 - 125	05/21/16 11:52	
Tetrachloro-m-xylene	63	27 - 134	05/21/16 11:52	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 10:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-36-4.5-5	**Units:**	ug/Kg
Lab Code:	R1604096-005	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	41	24	24	1	05/21/16 12:17	5/12/16	
Aroclor 1260	ND U	41	22	22	1	05/21/16 12:17	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	94	60 - 125	05/21/16 12:17	
Tetrachloro-m-xylene	59	27 - 134	05/21/16 12:17	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 10:40
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-39-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604096-006	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	37	22	22	1	05/21/16 11:27	5/12/16	
Aroclor 1260	ND U	37	20	20	1	05/21/16 11:27	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	67	60 - 125	05/21/16 11:27	
Tetrachloro-m-xylene	65	27 - 134	05/21/16 11:27	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 10:43
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-39-2.5-3	**Units:**	ug/Kg
Lab Code:	R1604096-007	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	38	22	22	1	05/21/16 12:42	5/12/16	
Aroclor 1260	ND U	38	20	20	1	05/21/16 12:42	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	92	60 - 125	05/21/16 12:42	
Tetrachloro-m-xylene	68	27 - 134	05/21/16 12:42	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 10:45
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-39-4.5-5	**Units:**	ug/Kg
Lab Code:	R1604096-008	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	40	23	23	1	05/21/16 16:53	5/12/16	
Aroclor 1260	ND U	40	21	21	1	05/21/16 16:53	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	96	60 - 125	05/21/16 16:53	
Tetrachloro-m-xylene	49	27 - 134	05/21/16 16:53	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-38-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604096-009	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	37	22	22	1	05/21/16 14:48	5/12/16	
Aroclor 1260	**48**	37	20	20	1	05/21/16 14:48	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	82	60 - 125	05/21/16 14:48	
Tetrachloro-m-xylene	74	27 - 134	05/21/16 14:48	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:03
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-38-2.5-3	**Units:**	ug/Kg
Lab Code:	R1604096-010	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	39	23	23	1	05/21/16 17:18	5/12/16	
Aroclor 1260	ND U	39	20	20	1	05/21/16 17:18	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	87	60 - 125	05/21/16 17:18	
Tetrachloro-m-xylene	62	27 - 134	05/21/16 17:18	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-38-4.5-5	**Units:**	ug/Kg
Lab Code:	R1604096-011	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	41	24	24	1	05/21/16 17:43	5/12/16	
Aroclor 1260	ND U	41	22	22	1	05/21/16 17:43	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	91	60 - 125	05/21/16 17:43	
Tetrachloro-m-xylene	56	27 - 134	05/21/16 17:43	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:30
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-40-0.5-1	**Units:**	ug/Kg
Lab Code:	R1604096-012	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	41	24	24	1	05/21/16 15:13	5/12/16	
Aroclor 1260	**68**	41	22	22	1	05/21/16 15:13	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	85	60 - 125	05/21/16 15:13	
Tetrachloro-m-xylene	76	27 - 134	05/21/16 15:13	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:33
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-40-2.5-3	**Units:**	ug/Kg
Lab Code:	R1604096-013	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	55	32	32	1	05/21/16 16:03	5/12/16	
Aroclor 1260	ND U	55	29	29	1	05/21/16 16:03	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	92	60 - 125	05/21/16 16:03	
Tetrachloro-m-xylene	82	27 - 134	05/21/16 16:03	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 12:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-140-2.5-3	**Units:**	ug/Kg
Lab Code:	R1604096-014	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	38	22	22	1	05/21/16 16:28	5/12/16	
Aroclor 1260	ND U	38	20	20	1	05/21/16 16:28	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	86	60 - 125	05/21/16 16:28	
Tetrachloro-m-xylene	75	27 - 134	05/21/16 16:28	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:35
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-40-4.5-5	**Units:**	ug/Kg
Lab Code:	R1604096-015	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	41	24	24	1	05/21/16 15:38	5/12/16	
Aroclor 1260	ND U	41	22	22	1	05/21/16 15:38	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	90	60 - 125	05/21/16 15:38	
Tetrachloro-m-xylene	77	27 - 134	05/21/16 15:38	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 15:00
Sample Matrix:	Water	**Date Received:**	04/26/16 09:40
Sample Name:	PAR57-EB-04212016	**Units:**	ug/L
Lab Code:	R1604096-016	**Basis:**	NA

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3510C

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	0.94	0.50	0.26	1	05/04/16 14:39	4/27/16	
Aroclor 1260	ND U	0.94	0.50	0.36	1	05/04/16 14:39	4/27/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	45	10 - 149	05/04/16 14:39	
Tetrachloro-m-xylene	75	15 - 131	05/04/16 14:39	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/L
Lab Code:	RQ1604539-01	**Basis:**	NA

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3510C

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	1.0	0.50	0.26	1	05/04/16 12:58	4/27/16	
Aroclor 1260	ND U	1.0	0.50	0.36	1	05/04/16 12:58	4/27/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	71	10 - 149	05/04/16 12:58	
Tetrachloro-m-xylene	73	15 - 131	05/04/16 12:58	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	RQ1605316-08	**Basis:**	Dry

Polychlorinated Biphenyls (PCBs) by GC

Analysis Method: 8082A
Prep Method: EPA 3541

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Aroclor 1254	ND U	33	19	19	1	05/21/16 13:07	5/12/16	
Aroclor 1260	ND U	33	17	17	1	05/21/16 13:07	5/12/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Decachlorobiphenyl	78	60 - 125	05/21/16 13:07	
Tetrachloro-m-xylene	73	27 - 134	05/21/16 13:07	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 09:15
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-37-0.5-1	**Basis:**	As Received
Lab Code:	R1604096-001		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**91.0**	Percent	-	-	-	1	05/04/16 16:15	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 09:17
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-37-2.5-3	**Basis:**	As Received
Lab Code:	R1604096-002		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**89.9**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 12:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-137-2.5-3	**Basis:**	As Received
Lab Code:	R1604096-003		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**89.0**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 09:20
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-37-4.5-5	**Basis:**	As Received
Lab Code:	R1604096-004		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**84.5**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 10:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-36-4.5-5	**Basis:**	As Received
Lab Code:	R1604096-005		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**80.8**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 10:40
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-39-0.5-1	**Basis:**	As Received
Lab Code:	R1604096-006		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**89.2**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 10:43
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-39-2.5-3	**Basis:**	As Received
Lab Code:	R1604096-007		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**87.1**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 10:45
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-39-4.5-5	**Basis:**	As Received
Lab Code:	R1604096-008		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**82.9**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:00
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-38-0.5-1	**Basis:**	As Received
Lab Code:	R1604096-009		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**88.8**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:03
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-38-2.5-3	**Basis:**	As Received
Lab Code:	R1604096-010		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**85.1**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-38-4.5-5	**Basis:**	As Received
Lab Code:	R1604096-011		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**80.2**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:30
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-40-0.5-1	**Basis:**	As Received
Lab Code:	R1604096-012		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**80.9**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:33
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-40-2.5-3	**Basis:**	As Received
Lab Code:	R1604096-013		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**89.4**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 12:05
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-140-2.5-3	**Basis:**	As Received
Lab Code:	R1604096-014		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**86.5**	Percent	-	-	-	1	05/05/16 19:55	

Analytical Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16 13:35
Sample Matrix:	Soil	**Date Received:**	04/26/16 09:40
Sample Name:	PAR-57-SB-40-4.5-5	**Basis:**	As Received
Lab Code:	R1604096-015		

General Chemistry Parameters

Analyte Name	Analysis Method	Result	Units	LOQ	LOD	MDL	Dil.	Date Analyzed	Q
Total Solids	ALS SOP	**80.0**	Percent	-	-	-	1	05/05/16 19:55	

QA/QC Report

Client: Parsons Engineering Science
Project: FTMM Baseline/748810-03000
Sample Matrix: Water

Service Request: R1604096
Date Analyzed: 05/04/16

Duplicate Lab Control Sample Summary
Polychlorinated Biphenyls (PCBs) by GC

Units:ug/L
Basis:NA

			Lab Control Sample RQ1604539-02			Duplicate Lab Control Sample RQ1604539-03				
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Aroclor 1260	8082A	3.75	5.00	75	4.00	5.00	80	45-134	6	30

QA/QC Report

Client: Parsons Engineering Science
Project: FTMM Baseline/748810-03000
Sample Matrix: Soil

Service Request: R1604096
Date Analyzed: 05/21/16

Duplicate Lab Control Sample Summary
Polychlorinated Biphenyls (PCBs) by GC

Units:ug/Kg
Basis: Dry

			Lab Control Sample RQ1605316-09		**Duplicate Lab Control Sample** RQ1605316-10					
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Aroclor 1260	8082A	157	167	94	113	167	68	60-130	32*	30

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16
Sample Matrix:	Soil	**Date Received:**	04/26/16
		Date Analyzed:	05/21/16
		Date Extracted:	05/12/16

Duplicate Matrix Spike Summary
Polychlorinated Biphenyls (PCBs) by GC

Sample Name:	PAR-57-SB-38-4.5-5	**Units:**	ug/Kg
Lab Code:	R1604096-011	**Basis:**	Dry
Analysis Method:	8082A		
Prep Method:	EPA 3541		

		Matrix Spike RQ1605316-04			Duplicate Matrix Spike RQ1605316-05					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Aroclor 1260	ND U	170	208	82	174	208	84	60-130	2	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project:	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16
Sample Matrix:	Soil	**Date Received:**	04/26/16
		Date Analyzed:	05/21/16
		Date Extracted:	05/12/16

Duplicate Matrix Spike Summary
Polychlorinated Biphenyls (PCBs) by GC

Sample Name:	PAR-57-SB-40-4.5-5	**Units:**	ug/Kg
Lab Code:	R1604096-015	**Basis:**	Dry
Analysis Method:	8082A		
Prep Method:	EPA 3541		

		Matrix Spike RQ1605316-06			Duplicate Matrix Spike RQ1605316-07					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Aroclor 1260	ND U	151	209	72	198	208	95	60-130	27	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16
Sample Matrix:	Soil	**Date Received:**	04/26/16
		Date Analyzed:	05/05/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	PAR-57-SB-38-4.5-5	**Units:**	Percent
Lab Code:	R1604096-011	**Basis:**	As Received

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample R1604096-011DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	-	80.2	82.7	81.4	3	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client:	Parsons Engineering Science	**Service Request:**	R1604096
Project	FTMM Baseline/748810-03000	**Date Collected:**	04/21/16
Sample Matrix:	Soil	**Date Received:**	04/26/16
		Date Analyzed:	05/05/16

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	PAR-57-SB-40-4.5-5	**Units:**	Percent
Lab Code:	R1604096-015	**Basis:**	As Received

Analyte Name	Analysis Method	LOQ	LOD	MDL	Sample Result	Duplicate Sample R1604096-015DUP Result	Average	RPD	RPD Limit
Total Solids	ALS SOP	-	-	-	80.0	81.6	80.8	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: P5704212016002 1 of 2
ALS Quote #:

Client Name: Parsons Government Services
Address: 100 High St. 4th Floor
Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570 57-748610-07160
Project Name/#: FTMM Soils
Bill To: Parsons Government Services
TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Cory Mahony Approved?
Email? [X] -Y ~~cric.grill~~@parsons.com
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	NJDEP EPH Fractionated	PCBs (8082A) (Aroclor 1254) Cory Mahony	VOC (8260C)+TICs	TAL Metals (6010C)	PAH (8270D)	SVOC (8270D): 2-Methylnaphthalene, Naphthalene Only				
Container Type						CG	CG	TCK	CG	CG	CG			
Container Size						4oz	4oz	40mL	4oz	4oz	4oz			
Preservative						None	None	MeOH/DI	None	None	None			
ANALYSES/METHOD REQUESTED														
Enter Number of Containers Per Sample or Field Results Below.														
1 PAR-57-SB-37-0.5-1	4/21/16	0915	G	SO		1								
2 PAR-57-SB-37-2.5-3		0917				1								
3 PAR-57-SB-137-2.5-3		1200				1								
4 PAR-57-SB-37-4.5-5		0920				1								
5 PAR-57-SB-36-4.5-5		1000				1								
6 PAR-57-SB-39-0.5-1		1040				1								
7 PAR-57-SB-39-2.5-3		1043				1								
8 PAR-57-SB-39-4.5-5		1045				1								
9 PAR-57-SB-38-0.5-1		1300				1								
10 PAR-57-SB-38-2.5-3		1303				1								

Receipt Information (completed by Receiving Lab)
Cooler Temp: ____ Therm ID: ____
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other:

Project Comments:

LOGGED BY(signature): [signature] DATE: 4/21/16 TIME:
REVIEWED BY(signature): [signature] DATE: 4-25-16 TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2 [signature]	4/22/16	0940
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC
Reportable to PADEP? Yes [ ] PWSID # ____
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- ____

R1604096 5
Parsons Engineering Science
FTMM Baseline

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wa

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 USA

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: PS704212016001 2of2
ALS Quote #:

Client Name: Parsons Government Services
Address: 100 High St. 4th Floor
Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570
Project Name/#: FTMM Soils - 57-748810-07100
Bill To: Parsons Government Services
TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Cory.Mahony Approved?
Email? [X] -Y ~~cris.grill~~@parsons.com
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	NJDEP EPH Fractionated	PCBs (8082A) Aroclor 1254 1260 only	VOC (8260C)+TICs	TAL Metals (6010C)	PAH (8270D)	SVOC (8270D): 2-Methylnaphthalene, Naphthalene Only
		Container Type	CG	CG	TCK	CG	CG	CG		
		Container Size	4oz	4oz	40mL	4oz	4oz	4oz		
		Preservative	None	None	MeOH/DI	None	None	None		
			ANALYSES/METHOD REQUESTED							
			Enter Number of Containers Per Sample or Field Results Below.							
1 PAR-57-SB-38-4.5-5	4/21/16	1305	G	SO		1				
2 PAR-57-SB-38-4.5-5 MS/MSD		1305				1				
3 PAR-57-SB-40-0.5-1		1330				1				
4 PAR-57-SB-40-2.5-3		1333				1				
5 PAR-57-SB-140-2.5-3		1205				1				
6 PAR-57-SB-40-4.5-5		1335				1				
7 PAR-57-SB-40-4.5-5-MS/MSD		1335				1				
8 PAR57-EB-04212016		1500	6	W		2				
9										
10										

Receipt Information (completed by Receiving Lab)
Cooler Temp: ____ Therm ID: ____
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other:

Project Comments:

LOGGED BY(signature): DATE: 4/21/16 TIME:
REVIEWED BY(signature): DATE: 4-25-16 TIME:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2		
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type-

R1604096
Parsons Engineering Science
FTMM Baseline
5

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 US

Cooler Receipt and Preservation Check Form

R1604096 Appendix 5
Parsons Engineering Science
FTMM Baseline

Project/Client Parsons Folder Number

Cooler received on 4/26/16 by: AE/GE

COURIER: ALS UPS (FEDEX) VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y)	N
2	**Custody papers** properly completed (ink, signed)?	(Y)	N
3	Did all bottles arrive in good **condition** (unbroken)?	(Y)	N
4	Circle: (Wet Ice) **Dry Ice Gel packs** present?	(Y)	N

5a	**Perchlorate** samples have required headspace?	Y	N	(NA)
5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y	N	(NA)
6	Where did the bottles originate?	(ALS/ROC)	-	(CLIENT)
7	Soil VOA received as: Bulk Encore 5035set			(NA)

8. Temperature Readings Date: 4/26/16 Time: 1015 ID: (IR#3) (IR#5) From: Temp Blank (Sample Bottle)

Observed Temp (°C)	3.1	1.9					
Correction Factor (°C)	+0.0	—					
Corrected Temp (°C)	3.2	1.9					
Within 0-6°C?	(Y) N	(Y) N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-002 by GE/AE on 4/26/16 at 1025
5035 samples placed in storage location: _____ by _____ on _____ at _____

PC Secondary Review: _____

Cooler Breakdown: Date: 4/26/16 Time: 1425 by: (AE)

1. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
2. Did all bottle labels and tags agree with custody papers? (YES) NO
3. Were correct containers used for the tests indicated? (YES) NO
4. Air Samples: Cassettes / Tubes Intact Canisters Pressurized Tedlar® Bags Inflated (N/A)

Explain any discrepancies:

pH	Reagent	Yes	No	Lot Received	Exp	Sample ID	Vol. Added	Lot Added	Final pH
≥12	NaOH								
≤2	HNO_3								
≤2	H_2SO_4								
<4	$NaHSO_4$								
Residual Chlorine (-)	For CN Phenol and 522			If +, contact PM to add $Na_2S_2O_3$ (CN), ascorbic (phenol).					
	$Na_2S_2O_3$	-	-						
	ZnAcetate	-	-						
	HCl	**	**						

**Not to be tested before analysis – pH tested and recorded by VOAs on a separate worksheet

Yes=All samples OK

No=Samples were preserved at The lab as listed

PM OK to Adjust: _____

Bottle lot numbers: 093115-13, 060515-18

Other Comments:

COC's not signed

PC Secondary Review: _____

*significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

July 29, 2016

Ms. Carla Rodman
Parsons
301 Plainfield Rd
Suite 350
Syracuse, NY 13212

Certificate of Analysis

Revised Report - 7/29/2016 7:03:15 PM - See workorder comment section for explanation

Project Name:	**Ft. Monmouth GW Sampling**	Workorder:	**2146059**
Purchase Order:		Workorder ID:	**PQF009|FTMM GW Parcel 57-7100**

Dear Ms. Rodman:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, May 24, 2016.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Debra J. Musser (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Christina Grill , Ms. Maryanne Kosciewicz , Mr. Cory Mahony , Ms. Meghan Emmert

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2146059001	800MW01-10.06	Water	5/23/2016 13:50	5/24/2016 08:56	Collected by Client
2146059002	800MW01-10.06 Dissolved	Water	5/23/2016 13:50	5/24/2016 08:56	Collected by Client
2146059003	800MW101-10.06	Water	5/23/2016 12:00	5/24/2016 08:56	Collected by Client
2146059004	800MW101-10.06 Dissolved	Water	5/23/2016 12:00	5/24/2016 08:56	Collected by Client
2146059005	PAR-57-EB-05232016	Water	5/23/2016 16:00	5/24/2016 08:56	Collected by Client
2146059006	800MW02-6.9	Water	5/23/2016 14:30	5/24/2016 08:56	Collected by Client
2146059007	800MW02-6.9 Dissolved	Water	5/23/2016 14:30	5/24/2016 08:56	Collected by Client
2146059008	800MW02-11.9	Water	5/23/2016 15:05	5/24/2016 08:56	Collected by Client
2146059009	800MW02-11.9 Dissolved	Water	5/23/2016 15:05	5/24/2016 08:56	Collected by Client
2146059010	800MW02-16.9	Water	5/23/2016 15:40	5/24/2016 08:56	Collected by Client
2146059011	800MW02-16.9 Dissolved	Water	5/23/2016 15:40	5/24/2016 08:56	Collected by Client
2146059012	PAR-57-GW-MW01-12.5	Water	5/23/2016 15:40	5/24/2016 08:56	Collected by Client
2146059013	PAR-57-GW-MW01-12.5 Dissolved	Water	5/23/2016 15:40	5/24/2016 08:56	Collected by Client

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SAMPLE SUMMARY

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Workorder Comments

This report was updatead to include Vanadium on sample 007. DJM

This report was modified to report the Total Arsenic, Beryllium and Thallium data by ICPMS. DJM

The 6020 analysis was conducted from sample digestates prepared for the SW846 6010 analysis.

Batch quality control such as a method blank and laboratory control sample were not available to run by SW846 Method 6020. All calibration and instrument level quality control were analyzed with the samples and within method control limits.

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059001** Date Collected: 5/23/2016 13:50 Matrix: Water
Sample ID: **800MW01-10.06** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.39	1	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Arsenic, Total	0.0020U	U	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 12:41	MO	G
Barium, Total	0.0052J	J	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 12:41	MO	G
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Calcium, Total	20.7		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Cobalt, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Copper, Total	0.0083J	J	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Iron, Total	0.86	2	mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Magnesium, Total	4.4	3	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Manganese, Total	0.028		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:15	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Potassium, Total	1.7		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Sodium, Total	2.7		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 12:41	MO	G
Vanadium, Total	0.0032J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1
Zinc, Total	0.010J	J	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 15:41	SRT	B1

Debra J Musser

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059002** Date Collected: 5/23/2016 13:50 Matrix: Water
Sample ID: **800MW01-10.06 Dissolved** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.066U	U	mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Arsenic, Dissolved	0.0029J	J	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Barium, Dissolved	0.0034J	J	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Calcium, Dissolved	23.1		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Cobalt, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Copper, Dissolved	0.0050J	J	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Iron, Dissolved	0.022J	J	mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Lead, Dissolved	0.0040U	U	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Magnesium, Dissolved	4.9		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Manganese, Dissolved	0.015		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 10:49	MNP	B1
Nickel, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Potassium, Dissolved	2.0		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Sodium, Dissolved	3.0		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Vanadium, Dissolved	0.0018J	J	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B
Zinc, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:18	TSS	B

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059003** Date Collected: 5/23/2016 12:00 Matrix: Water
Sample ID: **800MW101-10.06** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.41		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Arsenic, Total	0.0020U	U	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 12:08	MO	E
Barium, Total	0.0056J	J	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 12:08	MO	E
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Calcium, Total	20.8		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Cobalt, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Copper, Total	0.0088J	J	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Iron, Total	0.88		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Magnesium, Total	4.4		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Manganese, Total	0.027		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:16	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Potassium, Total	1.7		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Sodium, Total	2.7		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 12:08	MO	E
Vanadium, Total	0.0032J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1
Zinc, Total	0.011J	J	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 16:58	SRT	B1

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059004** Date Collected: 5/23/2016 12:00 Matrix: Water
Sample ID: **800MW101-10.06 Dissolved** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.066U	U	mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Arsenic, Dissolved	0.0036J	J	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Barium, Dissolved	0.0068J	J	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Calcium, Dissolved	23.1		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Cobalt, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Copper, Dissolved	0.0057J	J	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Iron, Dissolved	0.025J	J	mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Lead, Dissolved	0.0040U	U	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Magnesium, Dissolved	4.9		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Manganese, Dissolved	0.015		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 10:50	MNP	B1
Nickel, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Potassium, Dissolved	2.0		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Sodium, Dissolved	3.0		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Vanadium, Dissolved	0.0016J	J	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B
Zinc, Dissolved	0.0067J	J	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:36	TSS	B

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059005** Date Collected: 5/23/2016 16:00 Matrix: Water
Sample ID: **PAR-57-EB-05232016** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.073U	U	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Arsenic, Total	0.0020U	U	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 12:52	MO	E
Barium, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 12:52	MO	E
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Calcium, Total	0.073U	U	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Cobalt, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Copper, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Iron, Total	0.045U	U	mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Magnesium, Total	0.073U	U	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Manganese, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:17	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Potassium, Total	0.37U	U	mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Sodium, Total	0.37U	U	mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 12:52	MO	E
Vanadium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1
Zinc, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:02	SRT	B1

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059006** Date Collected: 5/23/2016 14:30 Matrix: Water
Sample ID: **800MW02-6.9** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.20		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Arsenic, Total	0.0020U	U	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 12:56	MO	E
Barium, Total	0.028		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 12:56	MO	E
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Calcium, Total	3.3		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Cobalt, Total	0.0027J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Copper, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Iron, Total	0.87		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Magnesium, Total	2.4		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Manganese, Total	0.053		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:21	MNP	B2
Nickel, Total	0.0093J	J	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Potassium, Total	2.2		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Sodium, Total	17.2		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 12:56	MO	E
Vanadium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1
Zinc, Total	0.021J	J	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:05	SRT	B1

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059007** Date Collected: 5/23/2016 14:30 Matrix: Water
Sample ID: **800MW02-6.9 Dissolved** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.12		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Arsenic, Dissolved	0.0053U	U	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Barium, Dissolved	0.031		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Calcium, Dissolved	3.4		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Cobalt, Dissolved	0.0023J	J	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Copper, Dissolved	0.0066U	U	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Iron, Dissolved	0.025J	J	mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Lead, Dissolved	0.0028J	J	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Magnesium, Dissolved	2.5		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Manganese, Dissolved	0.056		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 10:51	MNP	B1
Nickel, Dissolved	0.0094J	J	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Potassium, Dissolved	2.5		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Sodium, Dissolved	18.1		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B
Vanadium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	
Zinc, Dissolved	0.023		mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:39	TSS	B

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059008** Date Collected: 5/23/2016 15:05 Matrix: Water
Sample ID: **800MW02-11.9** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.21		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Arsenic, Total	0.0012J	J	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 13:00	MO	E
Barium, Total	0.033		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:00	MO	E
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Calcium, Total	3.6		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Cobalt, Total	0.0027J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Copper, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Iron, Total	1.9		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Lead, Total	0.0026J	J	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Magnesium, Total	2.5		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Manganese, Total	0.056		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:22	MNP	B2
Nickel, Total	0.010J	J	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Potassium, Total	2.5		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Sodium, Total	17.5		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:00	MO	E
Vanadium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1
Zinc, Total	0.021J	J	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:09	SRT	B1

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059009** Date Collected: 5/23/2016 15:05 Matrix: Water
Sample ID: **800MW02-11.9 Dissolved** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.12		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Arsenic, Dissolved	0.0053U	U	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Barium, Dissolved	0.034		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Calcium, Dissolved	3.7		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Cobalt, Dissolved	0.0024J	J	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Copper, Dissolved	0.0066U	U	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Iron, Dissolved	0.040J	J	mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Lead, Dissolved	0.0040U	U	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Magnesium, Dissolved	2.7		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Manganese, Dissolved	0.059		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 10:56	MNP	B1
Nickel, Dissolved	0.010J	J	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Potassium, Dissolved	2.9		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Sodium, Dissolved	18.7		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Vanadium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B
Zinc, Dissolved	0.026		mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:43	TSS	B

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059010** Date Collected: 5/23/2016 15:40 Matrix: Water
Sample ID: **800MW02-16.9** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.23		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Arsenic, Total	0.0027J	J	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 13:04	MO	E
Barium, Total	0.031		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:04	MO	E
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Calcium, Total	3.5		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Cobalt, Total	0.0028J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Copper, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Iron, Total	3.8		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Magnesium, Total	2.4		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Manganese, Total	0.054		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:25	MNP	B2
Nickel, Total	0.0099J	J	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Potassium, Total	2.5		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Sodium, Total	17.3		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:04	MO	E
Vanadium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1
Zinc, Total	0.022		mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:13	SRT	B1

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059011** Date Collected: 5/23/2016 15:40 Matrix: Water
Sample ID: **800MW02-16.9 Dissolved** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.11		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Arsenic, Dissolved	0.0029J	J	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Barium, Dissolved	0.032		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Calcium, Dissolved	3.6		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Cobalt, Dissolved	0.0023J	J	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Copper, Dissolved	0.0066U	U	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Iron, Dissolved	0.089		mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Lead, Dissolved	0.0024J	J	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Magnesium, Dissolved	2.6		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Manganese, Dissolved	0.058		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 10:58	MNP	B1
Nickel, Dissolved	0.0096J	J	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Potassium, Dissolved	2.8		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Sodium, Dissolved	18.4		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Vanadium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B
Zinc, Dissolved	0.023		mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:47	TSS	B

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059012** Date Collected: 5/23/2016 15:40 Matrix: Water
Sample ID: **PAR-57-GW-MW01-12.5** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.26		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Arsenic, Total	0.011		mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 13:08	MO	E
Barium, Total	0.055		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:08	MO	E
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Calcium, Total	144		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Cobalt, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Copper, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Iron, Total	74.0		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Magnesium, Total	27.4		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Manganese, Total	0.63		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:26	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Potassium, Total	5.7		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Sodium, Total	45.9		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:08	MO	E
Vanadium, Total	0.0042J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1
Zinc, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:16	SRT	B1

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ANALYTICAL RESULTS

Workorder: 2146059 PQF009|FTMM GW Parcel 57-7100

Lab ID: **2146059013** Date Collected: 5/23/2016 15:40 Matrix: Water
Sample ID: **PAR-57-GW-MW01-12.5 Dissolved** Date Received: 5/24/2016 08:56

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.066U	U	mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Arsenic, Dissolved	0.023		mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Barium, Dissolved	0.057		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Calcium, Dissolved	153		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Cobalt, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Copper, Dissolved	0.0066U	U	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Iron, Dissolved	75.3		mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Lead, Dissolved	0.0040U	U	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Magnesium, Dissolved	28.8		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Manganese, Dissolved	0.67		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 10:59	MNP	B1
Nickel, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Potassium, Dissolved	6.4		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Selenium, Dissolved	0.015J	J	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Sodium, Dissolved	47.9		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Vanadium, Dissolved	0.0028J	J	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B
Zinc, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:51	TSS	B

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2146059001	1	800MW01-10.06	SW846 6010C	Aluminum, Total
The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits. The sample was post-digestion spiked, and this matrix spike was within acceptable recovery limits.				
2146059001	2	800MW01-10.06	SW846 6010C	Iron, Total
The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits. The sample was post-digestion spiked, and this matrix spike was within acceptable recovery limits.				
2146059001	3	800MW01-10.06	SW846 6010C	Magnesium, Total
The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits. The sample was post-digestion spiked, and this matrix spike was within acceptable recovery limits.				

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.



1 of 2

Client Name: Parsons Federal
Address: 100 High St. 4th Floor
Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570
Project Name/#: FTMM GW PARCEL 57-07106
Bill To: Parsons Federal

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.
Date Required: Approved?
Email? [X] -Y cory.mahony@parsons.com
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Container Type	P	P	P	P	AN	CG			
					Container Size	500mL	500mL	500mL	500mL	1L	40mL			
					Preservative	HNO3	HNO3	HNO3	HNO3	None	HCl			
					ANALYSES/METHOD REQUESTED									
						TAL Metals (6010C)	Metals (6010C) (Lead only)	Metals (6010C) (As, Pb, Sb, Cu, Zn only)	Metals (6010C) (Beryllium only)	SVOCs (8270D) + TICs	VOCs (8260C)+TICs			
					Enter Number of Containers Per Sample or Field Results Below.									
1 800MW01-10.06	5/23/16	1350	G	GW		1								
2 800MW01-10.06-Dissolved		1350				1								
3 800MW01-10.06-MS		1350				1								
4 800MW01-10.06-MS-Dissolved		1350				1								
5 800MW01-10.06-MSD		1350				1								
6 800MW01-10.06-MSD-Dissolved		1350				1								
7 800MW101-10.06		1200				1								
8 800MW101-10.06-Dissolved		1200				1								
9 PAR-57-EB-05232016		1600				1								
10														

Receipt Information (completed by Receiving Lab)
Cooler Temp: 1 Therm ID: TH360
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #: 783186347909
Sample/COC Comments

AG 5/24/16

ALS Field Services: _Pickup _Labor
_Composite Sampling _Rental Equipment
_Other:

Project Comments:

LOGGED BY(signature): [signature] DATE 5/23/16 TIME
REVIEWED BY(signature): [signature] DATE 5/23/16 TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [signature]			2 [signature]	5/24/16	0855
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE
Special Processing: USACE [ ] Navy [ ]
State Samples Collected in: [ ] NY [X] NJ [ ] PA [ ] NC
Reportable to PADEP? Yes [ ]
PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- ERPIMS/Hazsite

* G=Grab; C=Composite ** Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 USA

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 214605 (PS70533016 000) 2 of 2
ALS Quote #:

Client Name: Parsons Federal
Address: 100 High St. 4th Floor, Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570
Project Name/#: FTMM GW - PARCEL 57-07100
Bill To: Parsons Federal

TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Approved?
Email? [X] -Y cory.mahony@parsons.com
Fax? [ ] -Y No.:

Container Type	P	P	P	P	AN	CG				
Container Size	500mL	500mL	500mL	500mL	1L	40mL				
Preservative	HNO3	HNO3	HNO3	HNO3	None	HCl				

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TAL Metals (6010C)	Metals (6010C) (Lead only)	Metals (6010C) (As, Pb, Sb, Cu, Zn only)	Metals (6010C) (Beryllium only)	SVOCs (8270D) + TICs	VOCs (8260C)+TICs				
			Enter Number of Containers Per Sample or Field Results Below.											
1 800MW03-6.9	5/23/16	1430	G	GW	1									
2 800MW03-6.9-Dissolved	5/23/16	1430	|	|	1									
3 800MW03-11.9	5/23/16	1505	|	|	1									
4 800MW03-11.9-Dissolved	5/23/16	1505	|	|	1									
5 800MW03-16.9	5/23/16	1540	|	|	1									
6 800MW03-16.9-Dissolved	5/23/16	1540	|	|	1									
7 PAR-57-GW-MW01-12.5	5/23/16	1540	|	|	1									
8 PAR-57-GW-MW01-12.5-Dissolved	5/23/16	1540	|	|	1									
9 RCHD														
10 ~~PAR-57-EB~~	~~5/23/16~~	~~1600~~												

Project Comments: ~~05232016~~ AG 5/24/16

LOGGED BY(signature): DATE 5/23/16 TIME
REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2		
3			4		
5			6		
7			8		
9			10		

Receipt Information (completed by Receiving Lab)
Cooler Temp: 1 Therm ID: IR360
No. of Coolers:

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #: 7931 8534 5405
Sample/COC Comments

ALS Field Services: _Pickup _Labor _Composite Sampling _Rental Equipment _Other:

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- ERPIMS/Hazsite

*G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

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July 29, 2016

Ms. Carla Rodman
Parsons
301 Plainfield Rd
Suite 350
Syracuse, NY 13212

Certificate of Analysis

Revised Report - 7/29/2016 7:05:56 PM - See workorder comment section for explanation

Project Name:	**Ft. Monmouth GW Sampling**	Workorder:	**2146757**
Purchase Order:		Workorder ID:	**PQF010|Ft. Monmouth GW Smpling**

Dear Ms. Rodman:

Enclosed are the analytical results for samples received by the laboratory on Thursday, May 26, 2016.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Debra J. Musser (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

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ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Christina Grill , Ms. Maryanne Kosciewicz , Mr. Cory Mahony , Ms. Meghan Emmert

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

ALS Environmental

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SAMPLE SUMMARY

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2146757001	PAR-57-GW-MW01-17.5	Water	5/24/2016 10:20	5/26/2016 09:14	Collected by Client
2146757002	PAR-57-GW-MW01-17.5 DISSOLVED	Water	5/24/2016 10:20	5/26/2016 09:14	Collected by Client
2146757003	PAR-57-GW-MW02-20.8	Water	5/24/2016 12:25	5/26/2016 09:14	Collected by Client
2146757004	PAR-57-GW-MW02-20.8 DISSSOLVED	Water	5/24/2016 12:25	5/26/2016 09:14	Collected by Client
2146757005	PAR-57-GW-MW02-15.8	Water	5/24/2016 11:45	5/26/2016 09:14	Collected by Client
2146757006	PAR-57-GW-MW02-15.8 DISSOLVED	Water	5/24/2016 11:45	5/26/2016 09:14	Collected by Client
2146757007	812MW14-10.27	Water	5/24/2016 13:45	5/26/2016 09:14	Collected by Client
2146757008	812MW14-10.27 DISSOLVED	Water	5/24/2016 13:45	5/26/2016 09:14	Collected by Client
2146757009	866MW02-14.35	Water	5/24/2016 11:15	5/26/2016 09:14	Collected by Client
2146757010	866MW02-14.35 DISSOLVED	Water	5/24/2016 11:15	5/26/2016 09:14	Collected by Client
2146757011	PAR-57-EB-05242016	Water	5/24/2016 17:30	5/26/2016 09:14	Collected by Client
2146757012	86MW02-9.35	Water	5/24/2016 10:40	5/26/2016 09:14	Collected by Client
2146757013	86MW02-9.35 DISSOLVED	Water	5/24/2016 10:40	5/26/2016 09:14	Collected by Client
2146757014	812-MW114-10.27	Water	5/24/2016 12:00	5/26/2016 09:14	Collected by Client

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SAMPLE SUMMARY

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Workorder Comments

This report was modified to report the Total Arsenic, Beryllium and Thallium data by ICPMS. DJM

The 6020 analysis was conducted from sample digestates prepared for the SW846 6010 analysis.

Batch quality control such as a method blank and laboratory control sample were not available to run by SW846 Method 6020. All calibration and instrument level quality control were analyzed with the samples and within method control limits.

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ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757001** Date Collected: 5/24/2016 10:20 Matrix: Water
Sample ID: **PAR-57-GW-MW01-17.5** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.25		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Arsenic, Total	0.0096		mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 13:12	MO	E
Barium, Total	0.049		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:12	MO	E
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Calcium, Total	138		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Cobalt, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Copper, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Iron, Total	55.2		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Magnesium, Total	24.7		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Manganese, Total	0.56		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:27	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Potassium, Total	6.4		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Sodium, Total	43.1		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:12	MO	E
Vanadium, Total	0.0032J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1
Zinc, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:20	SRT	B1

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757002** Date Collected: 5/24/2016 10:20 Matrix: Water

Sample ID: **PAR-57-GW-MW01-17.5 DISSOLVED** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.066U	U	mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Arsenic, Dissolved	0.017		mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Barium, Dissolved	0.052		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Calcium, Dissolved	152		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Cobalt, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Copper, Dissolved	0.0066U	U	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Iron, Dissolved	60.2		mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Lead, Dissolved	0.0040U	U	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Magnesium, Dissolved	26.5		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Manganese, Dissolved	0.63		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 11:00	MNP	B1
Nickel, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Potassium, Dissolved	7.1		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Selenium, Dissolved	0.0069J	J	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Sodium, Dissolved	45.2		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Vanadium, Dissolved	0.0029J	J	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B
Zinc, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:54	TSS	B

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

ALS Environmental
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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757003** Date Collected: 5/24/2016 12:25 Matrix: Water
Sample ID: **PAR-57-GW-MW02-20.8** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	3.8		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Arsenic, Total	0.0061		mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 13:16	MO	E
Barium, Total	0.044		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Beryllium, Total	0.0044		mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:16	MO	E
Cadmium, Total	0.0027		mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Calcium, Total	109		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Cobalt, Total	0.037		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Copper, Total	0.0049J	J	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Iron, Total	48.1		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Magnesium, Total	24.0		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Manganese, Total	1.3		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:28	MNP	B2
Nickel, Total	0.079		mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Potassium, Total	6.3		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Sodium, Total	57.3		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:16	MO	E
Vanadium, Total	0.0062		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1
Zinc, Total	0.27		mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:47	SRT	B1

Debra J Musser

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ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757004** Date Collected: 5/24/2016 12:25 Matrix: Water

Sample ID: **PAR-57-GW-MW02-20.8 DISSSOLVED** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	4.6		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Arsenic, Dissolved	0.0066J	J	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Barium, Dissolved	0.032		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Beryllium, Dissolved	0.0043		mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Cadmium, Dissolved	0.0048J	J	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Calcium, Dissolved	65.1		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Cobalt, Dissolved	0.095		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Copper, Dissolved	0.0079J	J	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Iron, Dissolved	35.9		mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Lead, Dissolved	0.0020J	J	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Magnesium, Dissolved	24.1		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Manganese, Dissolved	2.5		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 11:01	MNP	B1
Nickel, Dissolved	0.20		mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Potassium, Dissolved	6.3		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Sodium, Dissolved	79.4		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Vanadium, Dissolved	0.0068		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B
Zinc, Dissolved	0.72		mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 00:58	TSS	B

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ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757005** Date Collected: 5/24/2016 11:45 Matrix: Water
Sample ID: **PAR-57-GW-MW02-15.8** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	24.6		mg/L	0.55	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Antimony, Total	0.070U	U	mg/L	0.11	0.070	0.050	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Arsenic, Total	0.0057		mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 13:43	MO	E
Barium, Total	0.12		mg/L	0.055	0.037	0.018	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Beryllium, Total	0.0036		mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:43	MO	E
Cadmium, Total	0.015		mg/L	0.011	0.0070	0.0037	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Calcium, Total	219		mg/L	0.55	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Chromium, Total	0.020U	U	mg/L	0.028	0.020	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Cobalt, Total	0.28		mg/L	0.028	0.020	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Copper, Total	0.031J	J	mg/L	0.055	0.037	0.018	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Iron, Total	141		mg/L	0.34	0.23	0.11	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Lead, Total	0.023U	U	mg/L	0.034	0.023	0.011	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Magnesium, Total	77.7		mg/L	0.55	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Manganese, Total	8.5		mg/L	0.028	0.020	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:29	MNP	B2
Nickel, Total	0.61		mg/L	0.11	0.070	0.037	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Potassium, Total	19.5		mg/L	2.8	1.9	0.90	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Selenium, Total	0.070U	U	mg/L	0.11	0.070	0.037	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Silver, Total	0.015U	U	mg/L	0.022	0.015	0.0070	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Sodium, Total	280		mg/L	2.8	1.9	0.90	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:43	MO	E
Vanadium, Total	0.030		mg/L	0.028	0.020	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1
Zinc, Total	1.9		mg/L	0.11	0.070	0.037	SW846 6010C	5/30/16	JPS	5/31/16 17:51	SRT	B1

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ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757006** Date Collected: 5/24/2016 11:45 Matrix: Water

Sample ID: **PAR-57-GW-MW02-15.8 DISSOLVED** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	3.1		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Arsenic, Dissolved	0.0048J	J	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Barium, Dissolved	0.036		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Beryllium, Dissolved	0.0033J	J	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Cadmium, Dissolved	0.0035J	J	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Calcium, Dissolved	66.1		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Cobalt, Dissolved	0.082		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Copper, Dissolved	0.0046J	J	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Iron, Dissolved	42.8		mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Lead, Dissolved	0.0021J	J	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Magnesium, Dissolved	23.8		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Manganese, Dissolved	2.6		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 11:04	MNP	B1
Nickel, Dissolved	0.18		mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Potassium, Dissolved	6.1		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Sodium, Dissolved	86.0		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Vanadium, Dissolved	0.0074		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B
Zinc, Dissolved	0.56		mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:02	TSS	B

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ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757007** Date Collected: 5/24/2016 13:45 Matrix: Water
Sample ID: **812MW14-10.27** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	9.6		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Arsenic, Total	0.0067		mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 13:47	MO	G
Barium, Total	0.056		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Beryllium, Total	0.0013		mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:47	MO	G
Cadmium, Total	0.0010J	J	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Calcium, Total	12.4		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Chromium, Total	0.043	1	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Cobalt, Total	0.0052J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Copper, Total	0.0097J	J	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Iron, Total	19.0		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Lead, Total	0.013		mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Magnesium, Total	2.6	2	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Manganese, Total	0.42	3	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:31	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Potassium, Total	2.5		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Sodium, Total	25.6		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:47	MO	G
Vanadium, Total	0.044	4	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1
Zinc, Total	0.037		mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 17:58	SRT	B1

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757008** Date Collected: 5/24/2016 13:45 Matrix: Water
Sample ID: **812MW14-10.27 DISSOLVED** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.066U	U	mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Arsenic, Dissolved	0.0053U	U	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Barium, Dissolved	0.0033J	J	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Calcium, Dissolved	11.7		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Cobalt, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Copper, Dissolved	0.0066U	U	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Iron, Dissolved	0.059J	J	mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Lead, Dissolved	0.0040U	U	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Magnesium, Dissolved	1.4		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Manganese, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 11:05	MNP	B1
Nickel, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Potassium, Dissolved	1.0		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Sodium, Dissolved	28.2		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Vanadium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B
Zinc, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:05	TSS	B

Debra J Musser

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757009** Date Collected: 5/24/2016 11:15 Matrix: Water
Sample ID: **866MW02-14.35** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.48		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Arsenic, Total	0.0018J	J	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 13:59	MO	E
Barium, Total	0.062		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:59	MO	E
Cadmium, Total	0.0078		mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Calcium, Total	117		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Chromium, Total	0.0024J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Cobalt, Total	0.011		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Copper, Total	0.031		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Iron, Total	3.2		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Lead, Total	0.011		mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Magnesium, Total	9.4		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Manganese, Total	0.52		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:34	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Potassium, Total	11.8		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Sodium, Total	33.4		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 13:59	MO	E
Vanadium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1
Zinc, Total	0.20		mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:09	SRT	B1

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ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757010** Date Collected: 5/24/2016 11:15 Matrix: Water
Sample ID: **866MW02-14.35 DISSOLVED** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.066U	U	mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Arsenic, Dissolved	0.0053U	U	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Barium, Dissolved	0.062		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Calcium, Dissolved	127		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Cobalt, Dissolved	0.0095		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Copper, Dissolved	0.0066U	U	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Iron, Dissolved	2.6		mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Lead, Dissolved	0.0049J	J	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Magnesium, Dissolved	10.3		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Manganese, Dissolved	0.58		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 11:08	MNP	B1
Nickel, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Potassium, Dissolved	12.8		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Sodium, Dissolved	36.1		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Vanadium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B
Zinc, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:09	TSS	B

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ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757011** Date Collected: 5/24/2016 17:30 Matrix: Water
Sample ID: **PAR-57-EB-05242016** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.073U	U	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Arsenic, Total	0.0020U	U	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 14:03	MO	E
Barium, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 14:03	MO	E
Cadmium, Total	0.0014U	U	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Calcium, Total	0.038J	J	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Cobalt, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Copper, Total	0.0073U	U	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Iron, Total	0.045U	U	mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Lead, Total	0.0045U	U	mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Magnesium, Total	0.073U	U	mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Manganese, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:35	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Potassium, Total	0.37U	U	mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Sodium, Total	0.37U	U	mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 14:03	MO	E
Vanadium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1
Zinc, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:13	SRT	B1

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757012** Date Collected: 5/24/2016 10:40 Matrix: Water
Sample ID: **86MW02-9.35** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	0.36		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Arsenic, Total	0.0013J	J	mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 14:07	MO	E
Barium, Total	0.060		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 14:07	MO	E
Cadmium, Total	0.0039		mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Calcium, Total	82.7		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Chromium, Total	0.0040U	U	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Cobalt, Total	0.021		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Copper, Total	0.056		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Iron, Total	2.8		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Lead, Total	0.012		mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Magnesium, Total	8.0		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Manganese, Total	0.82		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:38	MNP	B2
Nickel, Total	0.0093J	J	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Potassium, Total	10.1		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Sodium, Total	43.9		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 14:07	MO	E
Vanadium, Total	0.0036J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1
Zinc, Total	0.19		mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:16	SRT	B1

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757013** Date Collected: 5/24/2016 10:40 Matrix: Water

Sample ID: **86MW02-9.35 DISSOLVED** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Dissolved	0.066U	U	mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Antimony, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Arsenic, Dissolved	0.0026J	J	mg/L	0.0080	0.0053	0.0026	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Barium, Dissolved	0.067		mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Beryllium, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Cadmium, Dissolved	0.0013U	U	mg/L	0.020	0.0013	0.00066	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Calcium, Dissolved	93.2		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Chromium, Dissolved	0.0033U	U	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Cobalt, Dissolved	0.022		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Copper, Dissolved	0.0066U	U	mg/L	0.010	0.0066	0.0033	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Iron, Dissolved	2.8		mg/L	0.060	0.040	0.020	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Lead, Dissolved	0.0040U	U	mg/L	0.0060	0.0040	0.0020	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Magnesium, Dissolved	9.1		mg/L	0.10	0.066	0.033	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Manganese, Dissolved	0.94		mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Mercury, Dissolved	0.00025U	U	mg/L	0.00050	0.00025	0.000030	SW846 7470A	6/2/16	MNP	6/2/16 11:11	MNP	B1
Nickel, Dissolved	0.0090J	J	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Potassium, Dissolved	11.2		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Selenium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Silver, Dissolved	0.0026U	U	mg/L	0.0040	0.0026	0.0013	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Sodium, Dissolved	49.5		mg/L	0.50	0.33	0.16	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Thallium, Dissolved	0.013U	U	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Vanadium, Dissolved	0.0032J	J	mg/L	0.0050	0.0033	0.0016	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B
Zinc, Dissolved	0.0075J	J	mg/L	0.020	0.013	0.0066	SW846 6010C	5/31/16	SRT	6/1/16 01:20	TSS	B

Debra J Musser

Ms. Debra J. Musser
Project Coordinator

ALS Environmental
34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2146757 PQF010|Ft. Monmouth GW Smpling

Lab ID: **2146757014** Date Collected: 5/24/2016 12:00 Matrix: Water
Sample ID: **812-MW114-10.27** Date Received: 5/26/2016 09:14

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Aluminum, Total	9.5		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Antimony, Total	0.014U	U	mg/L	0.022	0.014	0.010	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Arsenic, Total	0.0055		mg/L	0.0030	0.0020	0.0010	SW846 6020A	5/30/16	MO	7/18/16 14:11	MO	E
Barium, Total	0.055		mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Beryllium, Total	0.00082J	J	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 14:11	MO	E
Cadmium, Total	0.00089J	J	mg/L	0.0022	0.0014	0.00073	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Calcium, Total	13.0		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Chromium, Total	0.041		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Cobalt, Total	0.0044J	J	mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Copper, Total	0.0097J	J	mg/L	0.011	0.0073	0.0036	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Iron, Total	18.7		mg/L	0.067	0.045	0.022	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Lead, Total	0.014		mg/L	0.0067	0.0045	0.0022	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Magnesium, Total	2.6		mg/L	0.11	0.073	0.036	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Manganese, Total	0.40		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Mercury, Total	0.00033U	U	mg/L	0.00050	0.00033	0.00016	SW846 7470A	6/2/16	MNP	6/2/16 11:39	MNP	B2
Nickel, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Potassium, Total	2.4		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Selenium, Total	0.014U	U	mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Silver, Total	0.0029U	U	mg/L	0.0044	0.0029	0.0014	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Sodium, Total	26.8		mg/L	0.56	0.37	0.18	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	5/30/16	MO	7/18/16 14:11	MO	E
Vanadium, Total	0.042		mg/L	0.0056	0.0040	0.0020	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1
Zinc, Total	0.034		mg/L	0.022	0.014	0.0073	SW846 6010C	5/30/16	JPS	5/31/16 18:20	SRT	B1

Debra J Musser
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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2146757007	1	812MW14-10.27	SW846 6010C	Chromium, Total
The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits. The sample was post-digestion spiked, and this matrix spike was within acceptable recovery limits.				
2146757007	2	812MW14-10.27	SW846 6010C	Magnesium, Total
The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits. The sample was post-digestion spiked, and this matrix spike was within acceptable recovery limits.				
2146757007	3	812MW14-10.27	SW846 6010C	Manganese, Total
The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits. The sample was post-digestion spiked, and this matrix spike was within acceptable recovery limits.				
2146757007	4	812MW14-10.27	SW846 6010C	Vanadium, Total
The recovery of the Matrix Spike (MS) associated to this analyte was outside of the established control limits. The sample was post-digestion spiked, and this matrix spike was within acceptable recovery limits.				

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

DJM

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

2146757

1 of 2

Client Name: Parsons Federal
Address: 100 High St. 4th Floor, Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570
Project Name/#: FTMM GW Parcel 57-07100
Bill To: Parsons Federal

TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Approved?
Email? [X] -Y cory.mahony@parsons.com
Fax? [ ] -Y No.:

Container Type	P	P	P	P	AN	CG				
Container Size	500mL	500mL	500mL	500mL	1L	40mL				
Preservative	HNO3	HNO3	HNO3	HNO3	None	HCl				

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TAL Metals (6010C)	Metals (6010C) (Lead only)	Metals (6010C) (As, Pb, Sb, Cu, Zn only)	Metals (6010C) (Beryllium only)	SVOCs (8270D) + TICs	VOCs (8260C)+TICs			Enter Number of Containers Per Sample or Field Results Below.
1 PAR-57-GW-MW01-17.5	5/24/16	1020	G	GW	1								
2 PAR-57-GW-MW01-17.5-Dissolved		1020			1								
3 PAR-57-GW-MW02-20.8		1225			1								
4 PAR-57-GW-MW02-20.8-Dissolved		1225			1								
5 PAR-57-GW-MW02-15.8		1145			1								
6 PAR-57-GW-MW02-15.8-Dissolved		1145			1								
7 812MW14-10.27-MS/MSD		1345			3X								
8 812MW14-10.27-Dissolved		1345			1								
9 866MW02-14.35	5/25/16	1115			1								
10 866MW02-14.35-Dissolved		1115			1								

Cooler Temp: 1 Therm ID: IR860 (Initial by Receiving Lab)
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?	X		AM
COC/Labels Complete/Accurate?	X		
Cont. in Good Cond.?	X		
Correct Containers?	X		
Correct Sample Volumes?	X		
Correct Preservation?	X		
Headspace/Volatiles?			

Courier/Tracking #: 7832 0857 4519

Sample/COC Comments

ALS Field Services: _Pickup _Labor _Composite Sampling _Rental Equipment _Other:

Project Comments: 5/26/16 1PU

LOGGED BY(signature): [signature] DATE: 5/24/16
REVIEWED BY(signature): [signature] DATE: 5/24/16

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2	5/26/16	0914
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- ERPIMS/Hazsite

*G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 USA

246757

ALS Environmental
1565 Jefferson Road
Building 300, Suite 360
Rochester, NY 14623
(585)288-5380

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: P57 05242016 COC — 2 of 2
ALS Quote #:

Client Name: Parsons Federal
Address: 100 High St. 4th Floor, Boston, MA 02110
Contact: Christina Grill / Cory Mahony
Phone#: 617-449-1570
Project Name/#: FTMM GW parcel 57-07100
Bill To: Parsons Federal

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Approved?
Email? [X] -Y cory.mahony@parsons.com
Fax? [ ] -Y No.:

Container Type	P	P	P	P	AN	CG
Container Size	500mL	500mL	500mL	500mL	1L	40mL
Preservative	HNO3	HNO3	HNO3	HNO3	None	HCl

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TAL Metals (6010C)	Metals (6010C) (Lead only)	Metals (6010C) (As, Pb, Sb, Cu, Zn only)	Metals (6010C) (Beryllium only)	SVOCs (8270D) + TICs	VOCs (8260C)+TICs
1 PAR-57-EB-05242016	5/24/16	1730	G	GW	1					
2 866MW02-9.35	5/24/16	1040			1					
3 866MW02-9.35-Dissolved	5/24/16	1040			1					
~~4 BIBMW14-10.37-MS~~	~~5/24/16~~	~~1345~~			~~1~~					
~~5 BIBMW14-10.37-MSD~~	~~5/24/16~~	~~1345~~			~~1~~					
6 BIBMW14-10.37	5/24/16	1900			1					
7										
8										
9	5/26/16 1811									
10										

Enter Number of Containers Per Sample or Field Results Below.

Receipt Information (completed by Receiving Lab)
Cooler Temp: 1 Therm ID: IR360
No. of Coolers: ____

	Y	N	Initial
Custody Seals Present?			AJ
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #: FB2045748[illegible]
Sample/COC Comments

ALS Field Services: _Pickup _Labor _Composite Sampling _Rental Equipment _Other:

Project Comments:

LOGGED BY(signature): [signature] DATE 5/24/16 TIME
REVIEWED BY(signature): [signature] DATE 5/24/16 TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1			2 [signature]	5/26/16	0914
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [X] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [X] NJ [ ] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- ERPIMS/Hazsite

*G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 1565 Jefferson Road, Building 300, Suite 360 Rochester, NY 14623 USA

APPENDIX E

Data Validation Reports

(included electronically on the CD of this report)

DATA VALIDATION SUMMARY REPORT

for samples collected from

FORT MONMOUTH

OCEANPORT, NEW JERSEY

Data Validation by: Sandra de las Fuentes

Date: December 8, 2015

Parsons - Austin

INTRODUCTION

The following data validation summary report covers soil samples and the associated field quality control (QC) samples collected from Fort Monmouth in Oceanport, New Jersey on September 18 through October 2, 2015. Samples were logged in under the following Sample Delivery Groups (SDGs):

R1507881, R1507882,
R1508446, R1508456,
R1508459

The samples in these SDGs were analyzed for organochlorine PCBs and polynuclear aromatic hydrocarbons (PAHs). It should be noted that not all soils were analyzed; some were only activated when results of other soils indicated the need. Refer to the Sample ID table below for details and associated field QC samples.

All samples were collected by Parsons and shipped to ALS Environmental in Rochester, New York. All the coolers with the samples listed in the table below were received within the 2-6°C range recommended by the Department of Defense Quality System Manual (DoD QSM) version 4.2, with one exception. The cooler with samples in SDG R1507882 was received at 11°C as indicated in the comments section of the Sample ID table below.

All samples were prepared and analyzed following the procedures outlined in the Department of Defense (DoD) Quality Systems Manual (QSM) version 4.2, and the procedures outlined in the Standard Subcontract and the project-specific Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP).

SAMPLE IDs AND REQUESTED PARAMETERS

SAMPLE ID	LAB ID	MATRIX	COLLECTED	ANALYSIS	HOLD	COMMENTS
FTMM-57-SS-01-1.0-1.5	R1507881-001	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-01-2.0-2.5	R1507881-002	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-02-2.3-2.8	R1507881-003	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-02-3.3-3.8	R1507881-004	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-03-1.0-1.5	R1507881-005	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-03-2.1-2.7	R1507881-006	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-04-2.0-2.5	R1507881-007	Soil	09/18/2015	PCBs	No	
FTMM-57-SS-04-3.0-3.5	R1507881-008	Soil	09/18/2015	PCBs	No	
FTMM-57-SS-05-1.5-2.0	R1507881-009	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-05-2.5-3.0	R1507881-010	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-06-1.5-2.0	R1507881-011	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-06-2.5-3.0	R1507881-012	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-07-1.5-2.0	R1507881-013	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-07-2.5-3.0	R1507881-014	Soil	09/18/2015	PCBs	Yes	
FTMM-57-SS-08-1.9-2.4	R1507881-015	Soil	09/21/2015	PCBs	Yes	
FTMM-57-SS-08-2.5-3.0	R1507881-016	Soil	09/21/2015	PCBs	Yes	
FTMM-57-SS-01-0.5-1.0	R1507882-001	Soil	09/18/2015	PCBs	No	Lab selected MS/MSD; Cooler out of temperature
FTMM-57-SS-02-1.3-1.8	R1507882-002	Soil	09/18/2015	PCBs	No	Cooler out of temperature
FTMM-57-SS-03-0.5-1.0	R1507882-003	Soil	09/18/2015	PCBs	No	Cooler out of temperature
FTMM-57-SS-04-1.0-1.5	R1507882-004	Soil	09/18/2015	PCBs	No	Cooler out of temperature
FTMM-57-SS-05-0.5-1.0	R1507882-005	Soil	09/18/2015	PCBs	No	Cooler out of temperature
FTMM-57-SS-06-0.5-1.0	R1507882-006	Soil	09/18/2015	PCBs	No	Cooler out of temperature
FTMM-57-SS-07-0.5-1.0	R1507882-007	Soil	09/18/2015	PCBs	No	Cooler out of temperature
FTMM-57-SS-08-0.9-1.4	R1507882-008	Soil	09/21/2015	PCBs	No	Cooler out of temperature
FIELD BLANK-09182015	R1507882-009	Water	09/18/2015	PCBs	No	Field Blank; Cooler out of temperature
FIELD BLANK-09212015	R1507882-010	Water	09/21/2015	PCBs	No	Field Blank; Cooler out of temperature
FTMM-57-SS-10-0.0-0.5	R1508456-001	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-10-3.0-3.5	R1508456-002	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-10-7.0-7.5	R1508456-003	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-11-0.0-0.5	R1508456-004	Soil	10/01/2015	PAHs (6)	No	MS/MSD
FTMM-57-SS-11-3.0-3.5	R1508456-005	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-111-3.0-3.5	R1508456-006	Soil	10/01/2015	PAHs (6)	No	FD of FTMM-57-SS-11-3.0-3.5
FTMM-57-SS-11-7.0-7.5	R1508456-007	Soil	10/01/2015	PAHs (6)	No	MS/MSD
FTMM-57-SS-12-0.0-0.5	R1508456-008	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-12-3.0-3.5	R1508456-009	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-12-7.0-7.5	R1508456-010	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-13-0.0-0.5	R1508456-011	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-14-0.0-0.5	R1508456-014	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-09-0.5-1.0	R1508459-001	Soil	10/01/2015	PAHs (6)	No	Lab selected MS/MSD
FTMM-57-SS-09-2.0-2.5	R1508459-002	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-09-5.5-6.0	R1508459-003	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-16-0.0-0.5	R1508459-004	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-16-1.5-2.0	R1508459-005	Soil	10/01/2015	PAHs (6)	No	

SAMPLE ID	LAB ID	MATRIX	COLLECTED	ANALYSIS	HOLD	COMMENTS
FTMM-57-SS-16-6.0-6.5	R1508459-006	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-13-3.0-3.5	R1508459-007	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-13-6.5-7.0	R1508459-008	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-14-3.0-3.5	R1508459-009	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-14-5.0-5.5	R1508459-010	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-15-0.0-0.5	R1508459-011	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-15-3.0-3.5	R1508459-012	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-15-5.5-6.0	R1508459-013	Soil	10/01/2015	PAHs (6)	No	
Rinse Blank-10022015	R1508459-016	Water	10/02/2015	PAHs (6)	No	Rinse Blank
Rinse Blank-10012015	R1508459-017	Water	10/01/2015	PAHs (6)	No	Rinse Blank
FTMM-57-SS-112-0.0-0.5	R1508459-019	Soil	10/01/2015	PAHs (6)	No	FD of FTMM-57-SS-12-0.0-0.5
FTMM-57-SS-17-5.5-6.0	R1508466-001	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-18-0.0-0.5	R1508466-002	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-18-3.0-3.5	R1508466-003	Soil	10/01/2015	PAHs (6)	Yes	
FTMM-57-SS-18-5.0-5.5	R1508466-004	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-20-0.0-0.5	R1508466-005	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-20-3.0-3.5	R1508466-006	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-20-5.0-5.5	R1508466-007	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-17-0.0-0.5	R1508466-008	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-17-3.0-3.5	R1508466-009	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-21-0.0-0.5	R1508466-010	Soil	10/02/2015	PAHs (6)	No	
FTMM-57-SS-21-3.0-3.5	R1508466-011	Soil	10/02/2015	PAHs (6)	No	
FTMM-57-SS-21-6.5-7.0	R1508466-012	Soil	10/02/2015	PAHs (6)	Yes	
FTMM-57-SS-22-0.0-0.5	R1508466-013	Soil	10/02/2015	PAHs (6)	No	
FTMM-57-SS-22-3.0-3.5	R1508466-014	Soil	10/02/2015	PAHs (6)	No	
FTMM-57-SS-22-7.0-7.5	R1508466-015	Soil	10/02/2015	PAHs (6)	Yes	
FTMM-57-SS-23-0.0-0.5	R1508466-016	Soil	10/02/2015	PAHs (6)	No	
FTMM-57-SS-23-3.0-3.5	R1508466-017	Soil	10/02/2015	PAHs (6)	No	
FTMM-57-SS-23-8.0-8.5	R1508466-018	Soil	10/02/2015	PAHs (6)	Yes	
FTMM-57-SS-24-0.0-0.5	R1508466-019	Soil	10/02/2015	PAHs (6)	No	
FTMM-57-SS-24-3.0-3.5	R1508466-020	Soil	10/02/2015	PAHs (6)	Yes	
FTMM-57-SS-24-8.5-9.0	R1508466-021	Soil	10/02/2015	PAHs (6)	Yes	
FTMM-57-SS-25-0.0-0.5	R1508466-022	Soil	10/02/2015	PAHs (6)	No	
FTMM-57-SS-25-3.0-3.5	R1508466-023	Soil	10/02/2015	PAHs (6)	Yes	
FTMM-57-SS-25-5.0-5.5	R1508466-024	Soil	10/02/2015	PAHs (6)	Yes	
FTMM-57-SS-19-0.0-0.5	R1508466-025	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-19-3.0-3.5	R1508466-026	Soil	10/01/2015	PAHs (6)	Yes	
FTMM-57-SS-19-5.5-6.0	R1508466-027	Soil	10/01/2015	PAHs (6)	No	
FTMM-57-SS-1019-3.0-3.5	R1508466-028	Soil	10/01/2015	PAHs (6)	Yes	FD of FTMM-57-SS-19-3.0-3.5; Parent/FD not activated
FTMM-57-SS-1025-3.0-3.5	R1508466-029	Soil	10/02/2015	PAHs (6)	Yes	FD of FTMM-57-SS-25-3.0-3.5; Parent/FD not activated

S = Soil; W = Water

EXTRACTION AND ANALYTICAL METHODS:

PARAMETER	MATRIX	EXTRACTION METHOD	ANALYTICAL METHOD	UNITS	DRY WT. VS. WET WT
PAHs	S	3541	8270D	µg/kg	Dry Wt.
PAHs	W	3510C	8270D	µg/L	NA
PCBs	S	3541	8082A	µg/kg	Dry Wt.
PCBs	W	3510C	8082A	µg/L	NA

EVALUATION CRITERIA

The data submitted by the laboratory has been validated following the guidelines outlined in the project-specific UFP-QAPP. A "Level IV" validation was performed and the information reviewed in the data packages included sample results; field and laboratory quality control results; calibrations; case narratives; raw data; cooler receipt forms; and chain-of-custody (COC) forms. The analyses and findings presented in this report are based on the reviewed information, and whether guidelines in the UFP-QAPP were met.

The precision criterion for the relative percent difference (RPD) of the field duplicate samples is RPD $\leq$ 40 for water and $\leq$ 70 for soils, as per the project-specific UFP-QAPP.

It should be noted that in R1508459, a water sample (FTMM-59-GG7-12.0) and its associated trip blank (Trip Blank-10062015) were included on the COC for VOCs and SVOC analysis. These results will be discussed in a separate data validation report.

POLYCHLORINATED BIPHENYLS (PCBS)

General

The PCB portion of SDGs R1507881 and R1507882 consisted of the samples listed in the Sample ID table above. The samples were collected on September 18 and 21, 2015 and were analyzed for the full list of PCBs as specified in the UFP-QAPP.

The PCB analyses were performed according to the United States Environmental Protection Agency (USEPA) SW846 Method 8082A. All samples in this SDG were analyzed following the procedures outlined in the project-specific UFP-QAPP. All samples were prepared and analyzed within the holding time required by the method.

All analyses were performed undiluted with the following exceptions:

FTMM-57-SS-04-2.0-2.5 at 2x for all PCBs;

FTMM-57-SS-04-3.0-3.5 at 100x for all PCBs;

FTMM-57-SS-04-1.0-1.5, FTMM-57-SS-05-0.5-1.0, FTMM-57-SS-06-0.5-1.0 and FTMM-57-SS-07-0.5-1.0 all diluted at 5x for all PCBs.

It should be noted that some of the dilutions were due to high concentrations of Aroclor in the sample analyzed; while others required diluting due to the nature of the matrix itself (i.e. soil is dark colored, coarse or the extract is viscous) and/or high concentrations of non-target analytes.

It should also be noted that the lab reported Aroclor 1254 for FTMM-57-SS-01-1.0-1.5 with a "P" which means the difference between the GC columns on the instrument was greater than 40%. In this case, as per the method, the lower of the two results was reported as final.

The cooler that held all soils in R1507882 was received out of temperature; therefore a "J/UJ" qualifier was added to all PCB results in the affected samples.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control samples (LCSs), laboratory control sample duplicates (LCSDs), matrix spike/matrix spike duplicate (MS/MSD) and the surrogate spikes. It should be noted that only Aroclor 1016 and 1260 were spiked in the lab QC samples, as per QSM version 4.2. There were no samples selected on the COC for MS/MSD purposes, although the lab randomly chose sample FTMM-57-SS-01-0.5-1.0 for batch QC purposes.

All LCS, LCSD, MS and MSD recoveries were within acceptance criteria.

All surrogate spike recoveries were within acceptance criteria except the surrogates did not recover in FTMM-57-SS-04-3.0-3.5 due to the 100x dilution required.

Precision

Precision was evaluated using the RPD obtained from the LCS/LCSD and MS/MSD concentrations. There were no field duplicate samples collected in association with the two SDGs analyzed for PCBs.

All LCS/LCSD and MS/MSD RPDs were within acceptance criteria.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating holding times; and
- Examining the laboratory blanks for cross contamination of samples during sample analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the Work Plan. All samples were prepared and analyzed within the holding time required by the method.

- All initial calibration criteria were met.
- All secondary source verification (SSV) criteria were met.
- All continuing calibration verification (CCV) criteria were met.
- All breakdown criteria were met.
- The MDLs met the requirements listed in the DoD QSM version 4.2.

There was one method blank and two field blanks associated with the PCB analyses in the PCB SDGs. All blanks were non-detect for all target PCBs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All PCB results for the samples in this SDG were considered usable. The completeness for the PCB portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)

General

The PAH portion of SDGs R1508466, R1508456, and R1508459 consisted of the samples listed in the Sample ID table above. The samples were collected on September 18 and 21, 2015 and were analyzed for the following short list of PAHs: Benz(a)Anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene.

The PAH analyses were performed according to USEPA SW846 Method 8270D. The samples were prepared and analyzed following the procedures outlined in the UFP-QAPP. The samples were prepared and analyzed within the holding time required by the method.

All analyses were performed undiluted, except as follows:

FTMM-57-SS-10-0.0-0.5, FTMM-57-SS-11-0.0-0.5, FTMM-57-SS-13-0.0-0.5, FTMM-57-SS-14-0.0-0.5, FTMM-57-SS-21-3.0-3.5, FTMM-57-SS-22-0.0-0.5, FTMM-57-SS-23-0.0-0.5 at 2x;

FTMM-57-SS-12-0.0-0.5, FTMM-57-SS-20-5.0-5.5 at 10x;

FTMM-57-SS-09-0.5-1.0, FTMM-57-SS-09-5.5-6.0, FTMM-57-SS-112-0.0-0.5, FTMM-57-SS-18-0.0-0.5, FTMM-57-SS-17-0.0-0.5, FTMM-57-SS-19-0.0-0.5 at 5x;

FTMM-57-SS-21-0.0-0.5 at 25x.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS, LCSD, MS, MSD samples, and the surrogate spikes. Samples FTMM-57-11-0.0-0.5 and FTMM-57-SS-11-7.0-7.5 were designated for MS/MSD analysis on the COC.

The LCSs and LCSDs were analyzed for target PAHs and all spike recoveries were within acceptance criteria.

All surrogate spike recoveries were within acceptance criteria, except the following soils didn't recover any surrogates due to the dilutions required:

FTMM-57-SS-12-0.0-0.5; FTMM-57-SS-09-0.5-1.0; FTMM-57-SS-09-5.5-6.0; FTMM-57-SS-18-0.0-0.5; FTMM-57-SS-17-0.0-0.5; FTMM-57-SS-21-0.0-0.5, and FTMM-57-SS-19-0.0-0.5.

No qualifiers were required since dilutions of greater than 5x were performed. In addition to the failed surrogates noted above, FTMM-57-SS-12-3.0-3.5 reported a high recovery for Nitrobenzene-d5 at 126% with an acceptance range of 35-113%. Since only one of the three surrogates reported recovered outside of acceptance criteria, qualifying the data was deemed unnecessary.

All MS/MSD recoveries for FTMM-57-SS-11-7.0-7.5 were within acceptance criteria, although the recoveries for FTMM-57-SS-11-0.0-0.5 had failures, as follows:

FTMM-57-SS-11-0.0-0.5

Analyte	MS %R	MSD %R	Criteria
Benz(a)anthracene	130	280	50-110%
Benzo(a)pyrene	130	200	50-110%
Benzo(b)fluoranthene	157	286	45-115%
Benzo(k)fluoranthene	(118)	178	45-125%
Indeno(1,2,3-cd)pyrene	(70)	166	40-120%

( ) = indicates criteria was met

The parent sample results for all PAHs listed above were flagged "J" due to the high recoveries in the sample spiked.

The recoveries for FTMM-57-SS-11-0.0-0.5 had failures, as follows:

FTMM-57-SS-09-0.5-1.0

Analyte	MS %R	MSD %R	Criteria
Benz(a)anthracene	513	611	50-110
Benzo(a)pyrene	438	423	50-110
Benzo(b)fluoranthene	489	510	45-115
Benzo(k)fluoranthene	200	187	45-125
Benzo(a,h)anthracene	(125)	174	40-125
Indeno(1,2,3-cd)pyrene	163	261	40-120

( ) = indicates criteria was met

For the first three PAHs listed, the sample contained these PAHs at greater than 5 times the spike amount; therefore qualifiers were deemed unnecessary. For the last 3 PAHs listed, a "J" flag was applied to the PAHs in the parent sample due to the non-compliant MS/MSD recoveries.

Precision

Precision was evaluated using the RPD obtained from the LCS/LCSD and MS/MSD concentrations. Precision was further evaluated by comparing the field duplicate analyte values. FTMM-57-SS-111-3.0-3.5 was collected and analyzed as the FD for FTMM-57-SS-11-3.0-3.5 and FTMM-57-SS-112-0.0-0.5 was collected and analyzed as the FD for FTMM-57-SS-12-0.0-0.5. It should be noted there were other FDs collected, although they were not activated.

All LCS/LCSD RPDs were within acceptance criteria.

The MS/MSD RPDs for FTMM-57-SS-11-7.0-7.5 were within acceptance criteria. For FTMM-57-SS-11-0.0-0.5, the following PAHs failed RPD criteria, as follows:

Analyte	RPD	Criteria
Benz(a)anthracene	40	$\leq$30
Benzo(b)fluoranthene	31	
Indeno(1,2,3-cd)pyrene	46	

Benzo(a)anthracene and Benzo(b)fluoranthene were flagged "J" due to the RPD failures. Indeno(1,2,3-cd)pyrene was previously flagged "J" due to the failed recoveries in the MS/MSD, therefore no further action was required.

All PAHs detected above the LOQ in the parent/FD samples for FTMM-57-SS-11-3.0-3.5 met RPD criteria, as follows:

Analyte	Parent (mg/kg)	FD (mg/kg)	RPD	Criteria
Benz(a)anthracene	0.010	0.015	40	RPD $\leq$ 70
Benzo(a)pyrene	0.012	0.015	22	
Benzo(b)fluoranthene	0.016	0.019	17	

All PAHs detected above the LOQ in the parent/FD samples for FTMM-57-SS-12-0.0-0.5 failed RPD criteria, as follows:

Analyte	Parent (µg/kg)	FD (µg /kg)	RPD	Criteria
Benz(a)anthracene	4700	240	181	RPD ≤ 70
Benzo(a)pyrene	3700	260	174	
Benzo(b)fluoranthene	4500	370	170	
Benzo(k)fluoranthene	2000	110	179	
Benzo(a,h)anthracene	850	46	180	
Indeno(1,2,3-cd)pyrene	2300	160	174	

All target PAHs failed RPD criteria as noted above. These PAHs results were flagged "J" in both the parent and field duplicate samples.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

All samples were analyzed following the COC and the analytical procedures described in the QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All initial calibration criteria were met.
- All SSV criteria were met.
- All instrument performance check criteria were met.
- All CCV criteria were met.
- All internal standard criteria were met.
- All manual integrations performed by the laboratory were reviewed and verified.
- The MDLs were compliant with the requirements of the DOD QSM Version 4.2.

One method blank per batch, plus two (2) rinse blanks were analyzed for PAHs. The blanks were non-detect for all target PAHs.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All PAH results for the samples in this SDG were considered usable. The completeness for the PAH portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

DATA USABILITY

The purpose of this data validation report is to ensure the integrity and reliability of analytical laboratory data. The data quality is evaluated based on precision, accuracy, representativeness, comparability, and completeness (PARCC) characteristics of the data. The validated data indicated that the laboratory correctly performed the analyses. Based on the data quality assessment, none of the data were qualified as rejected. All data in this SDG are considered usable for the purposes of this project. All sample LODs and LOQs met the requirements listed in the project QAPP. All Method Quality Objectives have been met.

DATA VALIDATION SUMMARY REPORT

for samples collected from

FORT MONMOUTH

OCEANPORT, NEW JERSEY

Data Validation by: Sandra de las Fuentes

Date: December 16, 2015

Parsons - Austin

INTRODUCTION

The following data validation summary report covers water samples and the associated field quality control (QC) samples collected from Fort Monmouth in Oceanport, New Jersey on November 23 and 24, 2015. Samples were logged in under the following Sample Delivery Group (SDGs):

R1510345

The samples in this SDG were analyzed for target analyte list (TAL) metals. The field QC samples collected included two field duplicate (FD) samples, one for total metals and one for dissolved metals.

All samples were collected by Parsons and shipped to ALS Environmental in Rochester, New York. There was one cooler shipped and was received by the laboratory at a temperature of 2.4°C, which was within the 2-6°C range recommended by the project-specific UFP-QAPP.

The laboratory is DOD ELAP and NELAP certified. All samples were prepared and analyzed following the procedures outlined in the Department of Defense (DoD) Quality Systems Manual (QSM) version 4.2, and the procedures outlined in the Standard Subcontract and the project-specific Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP).

SAMPLE IDs AND REQUESTED PARAMETERS

Sample ID	SDG	Matrix	TAL Metals (Total)	TAL Metals (Dissolved)	Comments
PAR57-GW-MW02-20.25	R1510345	W	X	X	
RAR57-GW-MW02-15.25	R1510345	W	X	X	
PAR57-GW-MW01-15.1	R1510345	W	X	X	
PAR57-GW-MW101-15.1	R1510345	W	X	X	FD of PAR57-GW-MW01-15.1

W = Water

EXTRACTION AND ANALYTICAL METHODS:

PARAMETER	MATRIX	EXTRACTION METHOD	ANALYTICAL METHOD	UNITS	DRY WT. VS. WET WT
Metals	W	3010A	6010C	µg/L	NA
Mercury	W	7470A	7470A	µg/L	NA

EVALUATION CRITERIA

The data submitted by the laboratory has been validated following the guidelines outlined in the project-specific UFP-QAPP. A "Level IV" validation was performed and the information reviewed in the data packages included sample results; field and laboratory quality control results; calibrations; case narratives; raw data; cooler receipt forms; and chain-of-custody (COC) forms. The analyses and findings presented in this report are based on the reviewed information, and whether guidelines in the UFP-QAPP were met.

The precision criterion for the relative percent difference (RPD) of the field duplicate samples is RPD $\leq$ 40 for water, as per the project-specific UFP-QAPP.

METALS

General

The metals portion consisted of four (4) water samples, including one field duplicate sample, all analyzed for both total and dissolved TAL metals. The samples were collected on November 24 and 25, 2015.

The metals analyses were performed using USEPA SW846 Method 6010C. All samples in this SDG were analyzed following the procedures outlined in the project-specific UFP-QAPP. All samples were prepared and analyzed within the holding time required by the method.

The samples for metals analyses were performed undiluted, except as follows:

PAR57-GW-MW02-20.25 were diluted 5x for calcium and sodium for both total and dissolved analyses;

PAR57-GW-MW02-15.25 were diluted 5x for sodium for both total and dissolved analyses

PAR57-GW-MW01-15.1 and PAR57-GW-MW101-15.1 were diluted 5x for calcium for both total and dissolved analyses.

It should be noted that several metals were reported at different LOQs than as stated in the UFP-QAPP. The LOQs are routinely updated by the laboratory, and are generally done so annually.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control sample (LCS). There were no samples designated on the COC for MS/MSD purposes.

All LCS recoveries were within acceptance criteria.

Precision

Precision was evaluated by comparing the field duplicate analyte values. Sample PAR57-GW-MW01-15.1 was collected and analyzed as the FD of PAR57-GW-MW101-15.1 for both total and dissolved metals analyses.

All target metals were non-detect above the Limit of Quantitation (LOQ) in both sets of parent and field duplicate samples, except as follows:

Parent: PAR57-GW-MW01-15.1 (Totals)

Analyte	Parent (µg/L)	FD (µg/L)	RPD	Criteria
Aluminum	990	1010	2.0	RPD ≤ 40
Barium	50	56	11	
Calcium	169000	228000	30	
Iron	31300	35800	13	

Analyte	Parent (µg/L)	FD (µg/L)	RPD	Criteria
Potassium	7400	8900	18	
Magnesium	12200	14300	16	
Manganese	644	771	18	
Sodium	30400	28100	8.0	

All target metals were non-detect above the Limit of Quantitation (LOQ) in both the parent and field duplicate samples, except as follows:

Parent: PAR57-GW-MW01-15.1 (Dissolved)

Analyte	Parent (µg/L)	FD (µg/L)	RPD	Criteria
Barium	47	51	8.2	RPD ≤ 40
Calcium	191000	192000	0.5	
Iron	35200	32900	6.8	
Potassium	8000	8400	4.9	
Magnesium	14200	13800	2.9	
Manganese	746	740	0.8	
Sodium	30700	31300	1.9	

All metals listed in both sets of Parent/FD samples met acceptance criteria for RPDs.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating preservation and holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the QAPP. The samples were prepared and analyzed within the holding times required by the method.

- All instrument calibration criteria were met.
- All second source criteria were met. The ICV samples were prepared using a secondary source.
- All continuing calibration verification (CCV) criteria were met.
- All interference check (ICSA/ICSAB) criteria were met.

- The MDLs met the requirements listed in the DoD QSM version 4.2.
- The dilution test (DT) was performed on the dissolved sample Par57-GW-MW02-20.25. Only metals greater than 50 times the method detection limit (MDL) were evaluated.

Metal	%R	Criteria
Calcium	2	≤10%
Iron	15	
Potassium	8	
Magnesium	14	
Manganese	13	
Sodium	1	

Iron, magnesium and manganese failed the DT, and were therefore flagged "J" in all associated samples. It should be noted the lab applied "E" flags that the data validator replaced with "J" flags for estimated results due to high recoveries in the DT.

- The post digestion spike (PDS) was performed on a non-project sample and therefore not applicable to this data set.

There was one (1) method blank, and several calibration blanks associated with the metals analyses in this SDG. All blanks were compliant, although the following metals had detections below one-half the Project quantitation Limit (PQL), as required by the UFP-QAPP:

Blank ID	Analyte	Conc. (µg/L)	PQL (µg/L)
Method Blank Batch # 251222; SDG R1510345	Aluminum	23	100
	Chromium	1.0	10
	Copper	2.0	20
	Potassium	47	2000
	Magnesium	18	1000
	Sodium	13	1000
	Antimony	2.5	60
	Thallium	2.3	10

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All metals results for the samples in this SDG were considered usable. Therefore, the completeness for the metals portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

MERCURY

General

The mercury portion consisted of four (4) water samples, including one field duplicate sample, all analyzed for both total and dissolved mercury. The samples were collected on November 24 and 25, 2015.

The mercury analyses were performed using USEPA SW846 Method 7470A. All samples in this SDG were analyzed following the procedures outlined in the project-specific UFP-QAPP. All samples were prepared and analyzed within the holding time required by the method.

The samples for mercury were digested in two batches, #251454 and #251455. The samples were analyzed in a single batch under one ICAL. All analyses were performed undiluted for mercury.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control sample. There were no samples designated on the COC for MS/MSD purposes.

The LCS recovery for mercury was within acceptance criteria.

Precision

Precision was evaluated by comparing the field duplicate analyte values. Sample PAR57-GW-MW01-15.1 was collected and analyzed as the FD of PAR57-GW-MW101-15.1 for both total and dissolved mercury analyses.

Mercury was non-detect in either the parent and field duplicate samples for total or dissolved mercury.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating preservation and holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the QAPP. The samples were prepared and analyzed within the holding times required by the method.

- All instrument calibration criteria were met.
- All second source criteria were met. The ICV samples were prepared using a secondary source.
- All CCV criteria were met.

- The MDLs met the requirements listed in the DoD QSM version 4.2.
- A dilution test was not required for mercury because all sample results for mercury were non-detect.

There was a method blank, and several calibration blanks associated with the metals analyses in this SDG. Mercury was non-detect in the method blank and all calibration blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All mercury results for the samples in this SDG were considered usable. Therefore, the completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

COMPARABILITY

All data was generated using contract-specific standard methods and reported with known data quality, type of analysis, units, etc.

DATA USABILITY

The purpose of this data validation report is to ensure the integrity and reliability of analytical laboratory data. The data quality is evaluated based on precision, accuracy, representativeness, comparability, and completeness (PARCC) characteristics of the data. The validated data indicated that the laboratory correctly performed the analyses. Based on the data quality assessment, none of the data were qualified as rejected. All data in this SDG are considered usable for the purposes of this project. All sample LODs and LOQs met the requirements listed in the project QAPP. All Method Quality Objectives have been met.

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DATA VALIDATION REPORT FOR PARCEL 57

FORT MONMOUTH, OCEANPORT, MONMOUTH COUNTY, NEW JERSEY

BRAC 05 Facility
Contract W912DY-09-D-0062
Task Order: 0012, Project No. 369857

Submitted To:

U.S. Army Engineering and Support Center Huntsville, Alabama

and

U.S. Army Corps of Engineers, New York District

Prepared By:

PARSONS

401 Diamond Dr. NW, Huntsville, AL 35806

Revision No. 0
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LIST OF ATTACHMENTS

Attachment A Validated Laboratory Data

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SECTION 1
DATA USABILITY SUMMARY

Soil and groundwater samples were collected from the FTMM Parcel 57 site in Oceanport, New Jersey on April 21, 2016, April 22, 2016, May 23, 2016, and May 24, 2016. Analytical results from these samples were validated and reviewed by Parsons for usability with respect to the following requirements:

- 2013 FTMM Sampling and Analysis Plan (SAP); and
- Department of Defense (DoD) Quality Systems Manual (QSM)

The analytical laboratory for this project was ALS Environmental (ALS) in Rochester, New York and Middletown, Pennsylvania. This laboratory is certified to conduct project analyses through the New Jersey Department of Environmental Protection (NJDEP) and DoD Environmental Laboratory Approval Program (ELAP).

1.1 SAMPLING AND CHAIN-OF-CUSTODY

The samples were collected, properly preserved, shipped under a COC record, and received at ALS within one to five days of sampling. All samples were received intact and in good condition at the laboratory.

1.2 LABORATORY DATA PACKAGES

The laboratory data package turnaround time, defined as the time from sample receipt by the laboratory to receipt of the analytical data packages by Parsons, was 32-44 days for the samples.

The laboratory data packages received from ALS were paginated, complete, and overall were of good quality. Comments on specific quality control (QC) and other requirements are discussed in detail in Section 2.

1.3 LABORATORY ANALYTICAL METHODS

The soil samples were collected from the site and analyzed for certain polynuclear aromatic hydrocarbons, PCB-1254, and PCB-1260. The groundwater samples were collected from the site and analyzed for total and dissolved metals. Summaries of issues concerning these laboratory analyses are presented in Subsections 1.3.1 through 1.3.3. The data qualifications resulting from the data validation review and statements on the laboratory analytical precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) are discussed for each analytical method in Section 2. The laboratory data were reviewed and may be qualified with the following validation flags:

"U" - not detected at the value given,
"UJ" - estimated and not detected at the value given,
"J" - estimated at the value given,
"J+" - estimated biased high at the value given,
"J-" - estimated biased low at the value given,
"B" - compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank,
"N" - presumptive evidence at the value given, and

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"R" - unusable value.

The validated laboratory data were tabulated and are presented in Attachment A.

1.3.1 PAH Organic Analysis

Soil samples were analyzed for certain PAHs using the USEPA SW-846 8270D analytical method. The reported results for these samples did not require qualification resulting from data validation. The reported PAH analytical results were 100% complete (i.e., usable) for the project data. PARCCS requirements were met.

1.3.2 PCB-1254 and PCB-1260 Organic Analysis

Soil samples were analyzed for PCB-1254 and PCB-1260 using the USEPA SW-846 8280A analytical method. The reported results for these samples did not require qualification resulting from data validation. The reported PCB-1254 and PCB-1260 analytical results were considered 100% complete (i.e., usable) for the project data. PARCCS requirements were met.

1.3.3 Metals Analysis

Groundwater samples collected from the site were analyzed for total and dissolved metals using the USEPA SW-846 6010C/6020/7470A analytical methods. Certain reported results for these samples were qualified as estimated based upon matrix spike recoveries. The reported metals results were considered 100% complete (i.e., usable) for the data presented by ALS. PARCCS requirements were met.

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SECTION 2
DATA VALIDATION REPORT

2.1 SOIL SAMPLES

Data review has been completed for data packages generated by ALS containing soil samples collected from the site. These samples were contained within sample delivery groups (SDGs) R1604094, R1604095, and R1604096. All of these samples were properly preserved, shipped under a COC record, and received intact by the analytical laboratory. The validated laboratory data were tabulated and are presented in Attachment A-1.

Data validation was performed for all samples in accordance with the project SAP and DoD QSM. This data validation and usability report is presented by analysis type.

2.1.1 PAHs

The following items were reviewed for compliancy in the PAH analysis:

- Custody documentation
- Holding times
- Surrogate recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy
- Laboratory control sample (LCS) recoveries
- Laboratory method blank and equipment blank contamination
- GC/MS instrument performance
- Initial and continuing calibrations
- Internal standard area counts and retention times
- Field duplicate precision
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols.

Usability

All PAH soil sample results were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, comparability, and sensitivity. The PAH soil data presented by ALS were 100% complete (i.e., usable). The validated PAH laboratory data are tabulated and presented in Attachment A-1.

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2.1.2 PCB-1254 and PCB-1260

The following items were reviewed for compliancy in the PCBs analysis:

- Custody documentation
- Holding times
- Surrogate recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy
- Laboratory control sample (LCS) recoveries
- Laboratory method blank and equipment blank contamination
- Initial calibrations
- Verification calibrations
- Chromatogram quality
- Sample result verification and identification
- Field duplicate precision
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols.

Usability

All PCB soil sample results were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, comparability, and sensitivity. The PCB soil data presented by ALS were 100% complete (i.e., usable). The validated laboratory data are tabulated and presented in Attachment A-1.

2.2 GROUNDWATER SAMPLES

Data review has been completed for data packages generated by ALS containing groundwater samples collected from the site. These samples were contained within sample delivery groups (SDGs) 2146059 and 2146757. All of these samples were properly preserved, shipped under a COC record, and received intact by the analytical laboratory. The validated laboratory data were tabulated and are presented in Attachment A-2.

Data validation was performed for all samples in accordance with the project SAP and DoD QSM. This data validation and usability report is presented by analysis type.

2.2.1 Metals

The following items were reviewed for compliancy in the metals analysis:

- Custody documentation
- Holding times

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- Initial and continuing calibration verifications
- Initial and continuing calibration blank, and laboratory preparation blank contamination
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries
- Laboratory duplicate precision
- Laboratory control sample (LCS) recoveries
- Serial dilutions
- Interference check sample recoveries
- Field duplicate precision
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of MS/MSD recoveries as discussed below.

MS/MSD Recoveries

All MS/MSD recoveries for designate spiked project samples were considered acceptable and within the 80-120%R QC limit with the exception of the MS/MSD recoveries for total aluminum (167%R, 178%R), total magnesium (121%R), and total iron (129%R) associated with sample 800MW01-10.06; and total chromium (162%R, 159%R), total magnesium (189%R, 178%R), total manganese (131%R, 133%R), and total vanadium (141%R, 138%R) associated with sample 812MW14-10.27. Therefore, positive results for these analytes were considered estimated and qualified "J" for the affected parent sample.

Usability

All metals results for the groundwater samples were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, comparability, and sensitivity. The metals data for the groundwater samples presented by ALS were 100% complete (i.e., usable). The validated laboratory data are tabulated and presented in Attachment A-2.

It was noted that the dissolved concentration was greater than the total concentration for zinc (91%RPD), sodium (33%RPD), cadmium (56%RPD), cobalt (88%RPD), manganese (63%RPD), and nickel (88%RPD) associated with sample PAR-57-GW-MW02-20.8. Therefore, total and dissolved results for these analytes were considered estimated and qualified "J" for this sample.

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ATTACHMENT A
VALIDATED LABORATORY DATA

ATTACHMENT A-1
VALIDATED LABORATORY DATA FOR SOIL SAMPLES

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB26				SB27
Sample ID				PAR-57-SB-126-3.5-4	PAR-57-SB-26-0.5-1	PAR-57-SB-26-3.5-4	PAR-57-SB-26-7.5-8	PAR-57-SB-27-0-0.5
Sample Date				4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)anthracene	600	2,000	800	**3.5 J**	**120**	< 4	**4.1 J**	**120**
Benzo(a)pyrene	200	200	200	< 4.2	**120**	< 4	**2.1 J**	**170**
Benzo(b)fluoranthene	600	2,000	2,000	< 4.2	**150**	< 4	**3.1 J**	**200**
Dibenz(a,h)anthracene	200	200	800	< 4.2	**24**	< 4	< 3.9	**27**
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	< 4.2	**99**	< 4	< 3.9	**120**
PCBs (µg/kg)								
Aroclor-1254	200	1,000	NLE	NA	NA	NA	NA	NA
Aroclor-1260	200	1,000	NLE	NA	NA	NA	NA	NA
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**78.5**	**82.6**	**83.2**	**83.5**	**92.6**

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB27		SB28		
Sample ID				PAR-57-SB-27-3.5-4	PAR-57-SB-27-7.5-8	PAR-57-SB-28-0.5-1	PAR-57-SB-28-3.5-4	PAR-57-SB-28-7.5-8
Sample Date				4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)anthracene	600	2,000	800	< 3.9	< 3.9	**400**	**3.2 J**	< 4.2
Benzo(a)pyrene	200	200	200	< 3.9	< 3.9	**320**	< 4.2	< 4.2
Benzo(b)fluoranthene	600	2,000	2,000	< 3.9	< 3.9	**280**	< 4.2	< 4.2
Dibenz(a,h)anthracene	200	200	800	< 3.9	< 3.9	**57**	< 4.2	< 4.2
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	< 3.9	< 3.9	**160**	< 4.2	< 4.2
PCBs (µg/kg)								
Aroclor-1254	200	1,000	NLE	NA	NA	NA	NA	NA
Aroclor-1260	200	1,000	NLE	NA	NA	NA	NA	NA
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**83.8**	**85.3**	**87.4**	**77.9**	**78.1**

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB29			SB30	
Sample ID				PAR-57-SB-29-0.5-1	PAR-57-SB-29-3.5-4	PAR-57-SB-29-7.5-8	PAR-57-SB-30-0.5-1	PAR-57-SB-30-3.5-4
Sample Date				4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)anthracene	600	2,000	800	**1,600**	**7.3 J**	**2.5 J**	**300**	< 4
Benzo(a)pyrene	200	200	200	**1,200**	**5 J**	< 4.1	**320**	< 4
Benzo(b)fluoranthene	600	2,000	2,000	**1,100**	**3.8 J**	< 4.1	**430**	< 4
Dibenz(a,h)anthracene	200	200	800	**210**	< 3.9	< 4.1	**57**	< 4
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	**670**	**2.3 J**	< 4.1	**190**	< 4
PCBs (µg/kg)								
Aroclor-1254	200	1,000	NLE	NA	NA	NA	NA	NA
Aroclor-1260	200	1,000	NLE	NA	NA	NA	NA	NA
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**94.2**	**84**	**80**	**96**	**83.1**

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB30	SB31			SB32
Sample ID				PAR-57-SB-30-7.5-8	PAR-57-SB-31-0.5-1	PAR-57-SB-31-3.5-4	PAR-57-SB-31-7.5-8	PAR-57-SB-32-0.5-1
Sample Date				4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)anthracene	600	2,000	800	**2.7 J**	**35**	**52**	**2.6 J**	**250**
Benzo(a)pyrene	200	200	200	**3 J**	**61**	**70**	< 3.9	**270**
Benzo(b)fluoranthene	600	2,000	2,000	< 3.6	**53**	**62**	< 3.9	**340**
Dibenz(a,h)anthracene	200	200	800	< 3.6	**14**	**18**	< 3.9	**35**
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	**3.3 J**	**47**	**56**	< 3.9	**210**
PCBs (µg/kg)								
Aroclor-1254	200	1,000	NLE	NA	NA	NA	NA	NA
Aroclor-1260	200	1,000	NLE	NA	NA	NA	NA	NA
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**90.8**	**86.4**	**93.3**	**84.6**	**82.2**

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB32	SB33		SB34	
Sample ID				PAR-57-SB-32-3.5-4	PAR-57-SB-33-0.5-1	PAR-57-SB-33-3.5-4	PAR-57-SB-34-0.5-1	PAR-57-SB-34-3.5-4
Sample Date				4/22/2016	4/22/2016	4/22/2016	4/22/2016	4/22/2016
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)anthracene	600	2,000	800	**3.5 J**	**9**	< 4.2	**3.3 J**	< 3.8
Benzo(a)pyrene	200	200	200	< 3.8	**13**	< 4.2	< 4.1	< 3.8
Benzo(b)fluoranthene	600	2,000	2,000	< 3.8	**14**	< 4.2	< 4.1	< 3.8
Dibenz(a,h)anthracene	200	200	800	< 3.8	**2.6 J**	< 4.2	< 4.1	< 3.8
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	< 3.8	**9.8**	< 4.2	< 4.1	< 3.8
PCBs (µg/kg)								
Aroclor-1254	200	1,000	NLE	NA	NA	NA	NA	NA
Aroclor-1260	200	1,000	NLE	NA	NA	NA	NA	NA
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**86.1**	**88.3**	**79.2**	**80.6**	**85.8**

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB35		SB36	SB37	
Sample ID				PAR-57-SB-35-0.5-1	PAR-57-SB-35-3.5-4	PAR-57-SB-36-4.5-5	PAR-57-SB-137-2.5-3	PAR-57-SB-37-0.5-1
Sample Date				4/22/2016	4/22/2016	4/21/2016	4/21/2016	4/21/2016
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)anthracene	600	2,000	800	< 3.8	< 4	NA	NA	NA
Benzo(a)pyrene	200	200	200	< 3.8	< 4	NA	NA	NA
Benzo(b)fluoranthene	600	2,000	2,000	< 3.8	< 4	NA	NA	NA
Dibenz(a,h)anthracene	200	200	800	< 3.8	< 4	NA	NA	NA
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	< 3.8	< 4	NA	NA	NA
PCBs (µg/kg)								
Aroclor-1254	200	1,000	NLE	NA	NA	< 24	< 22	< 21
Aroclor-1260	200	1,000	NLE	NA	NA	< 22	< 20	**57**
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**86.2**	**83.2**	**80.8**	**89**	**91**

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB37		SB38		
Sample ID				PAR-57-SB-37-2.5-3	PAR-57-SB-37-4.5-5	PAR-57-SB-38-0.5-1	PAR-57-SB-38-2.5-3	PAR-57-SB-38-4.5-5
Sample Date				4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)anthracene	600	2,000	800	NA	NA	NA	NA	NA
Benzo(a)pyrene	200	200	200	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	600	2,000	2,000	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	200	200	800	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	NA	NA	NA	NA	NA
PCBs (µg/kg)								
Aroclor-1254	200	1,000	NLE	< 22	< 23	< 22	< 23	< 24
Aroclor-1260	200	1,000	NLE	< 19	< 21	**48**	< 20	< 22
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**89.9**	**84.5**	**88.8**	**85.1**	**80.2**

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB39			SB40	
Sample ID				PAR-57-SB-39-0.5-1	PAR-57-SB-39-2.5-3	PAR-57-SB-39-4.5-5	PAR-57-SB-140-2.5-3	PAR-57-SB-40-0.5-1
Sample Date				4/21/2016	4/21/2016	4/21/2016	4/21/2016	4/21/2016
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)anthracene	600	2,000	800	NA	NA	NA	NA	NA
Benzo(a)pyrene	200	200	200	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	600	2,000	2,000	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	200	200	800	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	NA	NA	NA	NA	NA
PCBs (µg/kg)								
Aroclor-1254	200	1,000	NLE	< 22	< 22	< 23	< 22	< 24
Aroclor-1260	200	1,000	NLE	< 20	< 20	< 21	< 20	**68**
Wet Chemistry - Solids								
Percent Solids (percent)	NLE	NLE	NLE	**89.2**	**87.1**	**82.9**	**86.5**	**80.9**

Attachment A
Validated Laboratory Data for Soil Samples
Parcel 57

Loc ID	NJ Residential Direct Contact SRS	NJ Non-Residential Direct Contact SRS	NJ Impact to GW Soil Screening Level	SB40	
Sample ID				PAR-57-SB-40-2.5-3	PAR-57-SB-40-4.5-5
Sample Date				4/21/2016	4/21/2016
Semivolatile Organic Compounds (µg/kg)					
Benzo(a)anthracene	600	2,000	800	NA	NA
Benzo(a)pyrene	200	200	200	NA	NA
Benzo(b)fluoranthene	600	2,000	2,000	NA	NA
Dibenz(a,h)anthracene	200	200	800	NA	NA
Indeno(1,2,3-cd)pyrene	600	2,000	7,000	NA	NA
PCBs (µg/kg)					
Aroclor-1254	200	1,000	NLE	< 32	< 24
Aroclor-1260	200	1,000	NLE	< 29	< 22
Wet Chemistry - Solids					
Percent Solids (percent)	NLE	NLE	NLE	**89.4**	**80**

ATTACHMENT A-2
VALIDATED LABORATORY DATA FOR GROUNDWATER SAMPLES

Attachment A
Validated Laboratory Data for Groundwater Samples
Parcel 57

Loc ID	NJ Ground Water Quality Criteria	Weston 1995 Background (Main Post)	800MW01				800MW02		
Sample ID			800MW01-10.06	800MW01-10.06 DISSOLVED	800MW101-10.06	800MW101-10.06 DISSOLVED	800MW02-11.9	800MW02-11.9 DISSOLVED	800MW02-16.9
Sample Date			5/23/2016	5/23/2016	5/23/2016	5/23/2016	5/23/2016	5/23/2016	5/23/2016
Sample Round									
Filtered			Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Inorganics (mg/l)									
Aluminum	0.2	121	**0.39**	< 0.033	**0.41**	< 0.033	**0.21**	**0.12**	**0.23**
Antimony	0.006	0.0207	< 0.01	< 0.0066	< 0.01	< 0.0066	< 0.01	< 0.0066	< 0.01
Arsenic	0.003	0.0893	< 0.001	**0.0029 J**	< 0.001	**0.0036 J**	**0.0012 J**	< 0.0026	**0.0027 J**
Barium	6	0.699	**0.0052 J**	**0.0034 J**	**0.0056 J**	**0.0068 J**	**0.033**	**0.034**	**0.031**
Beryllium	0.001	0.0021	< 0.0003	< 0.0013	< 0.0003	< 0.0013	< 0.0003	< 0.0013	< 0.0003
Cadmium	0.004	0.0095	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007
Calcium	NLE	45.4	**20.7**	**23.1**	**20.8**	**23.1**	**3.6**	**3.7**	**3.5**
Chromium	0.07	0.191	< 0.002	< 0.0016	< 0.002	< 0.0016	< 0.002	< 0.0016	< 0.002
Cobalt	0.1	0.0183	< 0.002	< 0.0016	< 0.002	< 0.0016	**0.0027 J**	**0.0024 J**	**0.0028 J**
Copper	1.3	0.0656	**0.0083 J**	**0.005 J**	**0.0088 J**	**0.0057 J**	< 0.0036	< 0.0033	< 0.0036
Iron	0.3	431	**0.86**	**0.022 J**	**0.88**	**0.025 J**	**1.9**	**0.04 J**	**3.8**
Lead	0.005	0.0227	< 0.0022	< 0.002	< 0.0022	< 0.002	**0.0026 J**	< 0.002	< 0.0022
Magnesium	NLE	62.7	**4.4**	**4.9**	**4.4**	**4.9**	**2.5**	**2.7**	**2.4**
Manganese	0.05	0.331	**0.028**	**0.015**	**0.027**	**0.015**	**0.056**	**0.059**	**0.054**
Mercury	0.002	0.00026	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002
Nickel	0.1	0.187	< 0.0073	< 0.0066	< 0.0073	< 0.0066	**0.01 J**	**0.01 J**	**0.0099 J**
Potassium	NLE	137	**1.7**	**2**	**1.7**	**2**	**2.5**	**2.9**	**2.5**
Selenium	0.04	0.0296	< 0.0073	< 0.0066	< 0.0073	< 0.0066	< 0.0073	< 0.0066	< 0.0073
Silver	0.04	ND	< 0.0014	< 0.0013	< 0.0014	< 0.0013	< 0.0014	< 0.0013	< 0.0014
Sodium	50	21.5	**2.7**	**3**	**2.7**	**3**	**17.5**	**18.7**	**17.3**
Thallium	0.002	0.0055	< 0.0003	< 0.0066	< 0.0003	< 0.0066	< 0.0003	< 0.0066	< 0.0003
Vanadium	NLE	0.108	**0.0032 J**	**0.0018 J**	**0.0032 J**	**0.0016 J**	< 0.002	< 0.0016	< 0.002
Zinc	2	0.233	**0.01 J**	< 0.0066	**0.011 J**	**0.0067 J**	**0.021 J**	**0.026**	**0.022**

Attachment A
Validated Laboratory Data for Groundwater Samples
Parcel 57

Loc ID	NJ Ground Water Quality Criteria	Weston 1995 Background (Main Post)	800MW02			812MW14			866MW02
Sample ID			800MW02-16.9 DISSOLVED	800MW02-6.9	800MW02-6.9 DISSOLVED	812-MW114-10.27	812MW14-10.27	812MW14-10.27 DISSOLVED	866MW02-14.35
Sample Date			5/23/2016	5/23/2016	5/23/2016	5/24/2016	5/24/2016	5/24/2016	5/24/2016
Sample Round									
Filtered			Dissolved	Total	Dissolved	Total	Total	Dissolved	Total
Inorganics (mg/l)									
Aluminum	0.2	121	**0.11**	**0.2**	**0.12**	**9.5**	**9.6**	< 0.033	**0.48**
Antimony	0.006	0.0207	< 0.0066	< 0.01	< 0.0066	< 0.01	< 0.01	< 0.0066	< 0.01
Arsenic	0.003	0.0893	**0.0029 J**	< 0.001	< 0.0026	**0.0055**	**0.0067**	< 0.0026	**0.0018 J**
Barium	6	0.699	**0.032**	**0.028**	**0.031**	**0.055**	**0.056**	**0.0033 J**	**0.062**
Beryllium	0.001	0.0021	< 0.0013	< 0.0003	< 0.0013	**0.0008 J**	**0.0013**	< 0.0013	< 0.0003
Cadmium	0.004	0.0095	< 0.0007	< 0.0007	< 0.0007	**0.0009 J**	**0.001 J**	< 0.0007	**0.0078**
Calcium	NLE	45.4	**3.6**	**3.3**	**3.4**	**13**	**12.4**	**11.7**	**117**
Chromium	0.07	0.191	< 0.0016	< 0.002	< 0.0016	**0.041**	**0.043**	< 0.0016	**0.0024 J**
Cobalt	0.1	0.0183	**0.0023 J**	**0.0027 J**	**0.0023 J**	**0.0044 J**	**0.0052 J**	< 0.0016	**0.011**
Copper	1.3	0.0656	< 0.0033	< 0.0036	< 0.0033	**0.0097 J**	**0.0097 J**	< 0.0033	**0.031**
Iron	0.3	431	**0.089**	**0.87**	**0.025 J**	**18.7**	**19**	**0.059 J**	**3.2**
Lead	0.005	0.0227	**0.0024 J**	< 0.0022	**0.0028 J**	**0.014**	**0.013**	< 0.002	**0.011**
Magnesium	NLE	62.7	**2.6**	**2.4**	**2.5**	**2.6**	**2.6**	**1.4**	**9.4**
Manganese	0.05	0.331	**0.058**	**0.053**	**0.056**	**0.4**	**0.42**	< 0.0016	**0.52**
Mercury	0.002	0.00026	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0002
Nickel	0.1	0.187	**0.0096 J**	**0.0093 J**	**0.0094 J**	< 0.0073	< 0.0073	< 0.0066	< 0.0073
Potassium	NLE	137	**2.8**	**2.2**	**2.5**	**2.4**	**2.5**	**1**	**11.8**
Selenium	0.04	0.0296	< 0.0066	< 0.0073	< 0.0066	< 0.0073	< 0.0073	< 0.0066	< 0.0073
Silver	0.04	ND	< 0.0013	< 0.0014	< 0.0013	< 0.0014	< 0.0014	< 0.0013	< 0.0014
Sodium	50	21.5	**18.4**	**17.2**	**18.1**	**26.8**	**25.6**	**28.2**	**33.4**
Thallium	0.002	0.0055	< 0.0066	< 0.0003	< 0.0066	< 0.0003	< 0.0003	< 0.0066	< 0.0003
Vanadium	NLE	0.108	< 0.0016	< 0.002	< 0.0016	**0.042**	**0.044**	< 0.0016	< 0.002
Zinc	2	0.233	**0.023**	**0.021 J**	**0.023**	**0.034**	**0.037**	< 0.0066	**0.2**

Attachment A
Validated Laboratory Data for Groundwater Samples
Parcel 57

Loc ID	NJ Ground Water Quality Criteria	Weston 1995 Background (Main Post)	866MW02	86MW02		P57MW01		
Sample ID			866MW02-14.35 DISSOLVED	86MW02-9.35	86MW02-9.35 DISSOLVED	PAR-57-GW-MW01-12.5	PAR-57-GW-MW01-12.5 DISSOLVED	PAR-57-GW-MW01-17.5
Sample Date			5/24/2016	5/24/2016	5/24/2016	5/23/2016	5/23/2016	5/24/2016
Sample Round								
Filtered			Dissolved	Total	Dissolved	Total	Dissolved	Total
Inorganics (mg/l)								
Aluminum	0.2	121	< 0.033	**0.36**	< 0.033	**0.26**	< 0.033	**0.25**
Antimony	0.006	0.0207	< 0.0066	< 0.01	< 0.0066	< 0.01	< 0.0066	< 0.01
Arsenic	0.003	0.0893	< 0.0026	**0.0013 J**	**0.0026 J**	**0.011**	**0.023**	**0.0096**
Barium	6	0.699	**0.062**	**0.06**	**0.067**	**0.055**	**0.057**	**0.049**
Beryllium	0.001	0.0021	< 0.0013	< 0.0003	< 0.0013	< 0.0003	< 0.0013	< 0.0003
Cadmium	0.004	0.0095	< 0.0007	**0.0039**	< 0.0007	< 0.0007	< 0.0007	< 0.0007
Calcium	NLE	45.4	**127**	**82.7**	**93.2**	**144**	**153**	**138**
Chromium	0.07	0.191	< 0.0016	< 0.002	< 0.0016	< 0.002	< 0.0016	< 0.002
Cobalt	0.1	0.0183	**0.0095**	**0.021**	**0.022**	< 0.002	< 0.0016	< 0.002
Copper	1.3	0.0656	< 0.0033	**0.056**	< 0.0033	< 0.0036	< 0.0033	< 0.0036
Iron	0.3	431	**2.6**	**2.8**	**2.8**	**74**	**75.3**	**55.2**
Lead	0.005	0.0227	**0.0049 J**	**0.012**	< 0.002	< 0.0022	< 0.002	< 0.0022
Magnesium	NLE	62.7	**10.3**	**8**	**9.1**	**27.4**	**28.8**	**24.7**
Manganese	0.05	0.331	**0.58**	**0.82**	**0.94**	**0.63**	**0.67**	**0.56**
Mercury	0.002	0.00026	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002
Nickel	0.1	0.187	< 0.0066	**0.0093 J**	**0.009 J**	< 0.0073	< 0.0066	< 0.0073
Potassium	NLE	137	**12.8**	**10.1**	**11.2**	**5.7**	**6.4**	**6.4**
Selenium	0.04	0.0296	< 0.0066	< 0.0073	< 0.0066	< 0.0073	**0.015 J**	< 0.0073
Silver	0.04	ND	< 0.0013	< 0.0014	< 0.0013	< 0.0014	< 0.0013	< 0.0014
Sodium	50	21.5	**36.1**	**43.9**	**49.5**	**45.9**	**47.9**	**43.1**
Thallium	0.002	0.0055	< 0.0066	< 0.0003	< 0.0066	< 0.0003	< 0.0066	< 0.0003
Vanadium	NLE	0.108	< 0.0016	**0.0036 J**	**0.0032 J**	**0.0042 J**	**0.0028 J**	**0.0032 J**
Zinc	2	0.233	< 0.0066	**0.19**	**0.0075 J**	< 0.0073	< 0.0066	< 0.0073

Attachment A
Validated Laboratory Data for Groundwater Samples
Parcel 57

Loc ID	NJ Ground Water Quality Criteria	Weston 1995 Background (Main Post)	P57MW01	P57MW02			
Sample ID			PAR-57-GW-MW01-17.5 DISSOLVED	PAR-57-GW-MW02-15.8	PAR-57-GW-MW02-15.8 DISSOLVED	PAR-57-GW-MW02-20.8	PAR-57-GW-MW02-20.8 DISSSOLVED
Sample Date			5/24/2016	5/24/2016	5/24/2016	5/24/2016	5/24/2016
Sample Round							
Filtered			Dissolved	Total	Dissolved	Total	Dissolved
Inorganics (mg/l)							
Aluminum	0.2	121	< 0.033	**24.6**	**3.1**	**3.8**	**4.6**
Antimony	0.006	0.0207	< 0.0066	< 0.05	< 0.0066	< 0.01	< 0.0066
Arsenic	0.003	0.0893	**0.017**	**0.0057**	**0.0048 J**	**0.0061**	**0.0066 J**
Barium	6	0.699	**0.052**	**0.12**	**0.036**	**0.044**	**0.032**
Beryllium	0.001	0.0021	< 0.0013	**0.0036**	**0.0033**	**0.0044**	**0.0043**
Cadmium	0.004	0.0095	< 0.0007	**0.015**	**0.0035 J**	**0.0027**	**0.0048 J**
Calcium	NLE	45.4	**152**	**219**	**66.1**	**109**	**65.1**
Chromium	0.07	0.191	< 0.0016	< 0.01	< 0.0016	< 0.002	< 0.0016
Cobalt	0.1	0.0183	< 0.0016	**0.28**	**0.082**	**0.037**	**0.095**
Copper	1.3	0.0656	< 0.0033	**0.031 J**	**0.0046 J**	**0.0049 J**	**0.0079 J**
Iron	0.3	431	**60.2**	**141**	**42.8**	**48.1**	**35.9**
Lead	0.005	0.0227	< 0.002	< 0.011	**0.0021 J**	< 0.0022	**0.002 J**
Magnesium	NLE	62.7	**26.5**	**77.7**	**23.8**	**24**	**24.1**
Manganese	0.05	0.331	**0.63**	**8.5**	**2.6**	**1.3**	**2.5**
Mercury	0.002	0.00026	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001
Nickel	0.1	0.187	< 0.0066	**0.61**	**0.18**	**0.079**	**0.2**
Potassium	NLE	137	**7.1**	**19.5**	**6.1**	**6.3**	**6.3**
Selenium	0.04	0.0296	**0.0069 J**	< 0.037	< 0.0066	< 0.0073	< 0.0066
Silver	0.04	ND	< 0.0013	< 0.007	< 0.0013	< 0.0014	< 0.0013
Sodium	50	21.5	**45.2**	**280**	**86**	**57.3**	**79.4**
Thallium	0.002	0.0055	< 0.0066	< 0.0003	< 0.0066	< 0.0003	< 0.0066
Vanadium	NLE	0.108	**0.0029 J**	**0.03**	**0.0074**	**0.0062**	**0.0068**
Zinc	2	0.233	< 0.0066	**1.9**	**0.56**	**0.27**	**0.72**

APPENDIX F

Alternative Soil Remediation Standard Application

New Jersey Department of Environmental Protection
Site Remediation Program

ALTERNATIVE OR NEW REMEDIATION STANDARD AND/OR SCREENING LEVEL APPLICATION FORM

Date Stamp
(For Department use only)

NOTE: This form shall be completed for all contaminants for which a direct contact exposure pathway alternative or new remediation standard, alternative impact to ground water soil remediation standard, alternative vapor intrusion screening level, ecological risk-based remediation goal, and/or ecological risk management decision goal is being implemented and/or requested for a site or area of concern. The form shall be used regardless of whether Department pre-approval is required.

SECTION A. SITE NAME AND LOCATION

Site Name: _____

List all AKAs: _____

Street Address: Fort Monmouth - Main Post

Municipality: _____ (Township, Borough or City)

County: _____ Zip Code: 07757

Program Interest (PI) Number(s): _____

Case Tracking Number(s): _____

SECTION B. REMEDIATION STANDARD NOTIFICATION SPREADSHEET

Complete and attach the Remediation Standard Notification Spreadsheet which can be found at: http://www.nj.gov/dep/srp/srra/forms/. This form will not be processed by the NJDEP if the spreadsheet is not attached.

SECTION C. PURPOSE FOR SUBMISSION

Pre-Approval Required:

- ☐ Ingestion/Dermal Alternative Soil Remediation Standard
- ☐ Inhalation Alternative Soil Remediation Standard (New Toxicity Data, New Modeling, etc.)
- ☐ Development of New Remediation Standard
- ☐ Ecological Risk Based Remediation Goal
- ☐ Ecological Risk Management Decision Goal

No Pre-Approval Required:

- ☐ Inhalation Alternative Soil Remediation Standard (Calculation Spreadsheet)
- ☐ Impact to Groundwater Alternative Soil Remediation Standard
- ☐ Vapor Intrusion Alternative Screening Level
- ☐ Development of New Vapor Intrusion Screening Level

SECTION D. PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: William R. Colvin

Representative First Name: William Representative Last Name: Colvin

Title: BRAC Environmental Coordinator

Phone Number: (732) 380-7064 Ext: _____ Fax: _____

Mailing Address: P.O. Box 148

City/Town: Oceanport State: NJ Zip Code: 07757

Email Address: william.r.colvin18.civ@mail.mil

This certification shall be signed by the person responsible for conducting the remediation who is submitting this notification in accordance with Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, including all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

Signature: _____ Date: _____

Name/Title: William R. Colvin BRAC Environmental Coordinator

No changes to contact information since last submittal ☐

SECTION E. LICENSED SITE REMEDIATION PROFESSIONAL INFORMATION AND STATEMENT

LSRP ID Number: _____

First Name: _____ Last Name: _____

Phone Number: _____ Ext: _____ Fax: _____

Mailing Address: _____

City/Town: _____ State: _____ Zip Code: _____

Email Address: _____

This statement shall be signed by the LSRP who is submitting this notification in accordance with N.J.S.A. 58:10C-14, and N.J.S.A. 58:10B-1.3b(1) and (2).

I certify that I am a Licensed Site Remediation Professional authorized pursuant to N.J.S.A. 58:10C to conduct business in New Jersey. As the Licensed Site Remediation Professional of record for this remediation, I:

[SELECT ONE OR BOTH OF THE FOLLOWING AS APPLICABLE]:

☐ *directly oversaw and supervised all of the referenced remediation, and\or*

☐ *personally reviewed and accepted all of the referenced remediation presented herein.*

I believe that the information contained herein, and including all attached documents, is true, accurate and complete.

It is my independent professional judgment and opinion that the remediation conducted at this site, as reflected in this submission to the Department, conforms to, and is consistent with, the remediation requirements in N.J.S.A. 58:10C-14.

My conduct and decisions in this matter were made upon the exercise of reasonable care and diligence, and by applying the knowledge and skill ordinarily exercised by licensed site remediation professionals practicing in good standing, in accordance with N.J.S.A. 58:10C-16, in the State of New Jersey at the time I performed these professional services.

I am aware pursuant to N.J.S.A. 58:10C-17 that for purposely, knowingly or recklessly submitting false statement, representation or certification in any document or information submitted to the board or Department, etc., that there are significant civil, administrative and criminal penalties, including license revocation or suspension, fines and being punished by imprisonment for conviction of a crime of the third degree.

LSRP Signature: _____ Date: _____

LSRP Name/Title: _____

Company Name: _____

Completed forms should be sent to:

Bureau of Case Assignment & Initial Notice
Site Remediation Program
NJ Department of Environmental Protection
401-05H
PO Box 420
Trenton, NJ 08625-0420

APPENDIX G

Interim Removal Action Report

TETRA TECH

October 18, 2016

Mr. James Moore
U.S. Army Corps of Engineers, New York District
Attn: CENAN-PP-E
26 Federal Plaza, Room 1811
New York, NY 10278

Subject: Excavation at Parcels 49 and 57 Environmental Contamination Assessments/Support, Fort Monmouth, Oceanport, New Jersey
Contract Number W912DY-10-D-0015, Task Order 0007
DCN: TTEC-WERS-17-0008

Dear Mr. Moore:

In accordance with the requirements of the Performance Work Statement for Task Order 0007 of Contract Number W9128DY-10-D-0015 as amended, Tetra Tech is pleased to submit this Letter Report for the interim removal actions at Parcels 49 and 57 at Fort Monmouth, New Jersey. Copies of this letter report have also been submitted to the recipients on the attached distribution list, quantities as indicated.

At the request of the U.S. Army Corps of Engineers, Tetra Tech initiated an interim removal action for polychlorinated biphenyls (PCBs) at two locations – Parcel 49 and Parcel 57. **Attachment 1** contains figures showing relevant sample locations and excavation areas. Within Parcel 49, historic soil sample P49-SS8, located in the Building 283 courtyard, exhibited an exceedance of PCBs at a concentration of 8.85 milligrams per kilogram (mg/kg) which is above the Residential Soil Remediation Standard (RSRS) of 0.2 mg/kg and the Non-Residential Soil Remediation Standard (NRSRS) of 1 mg/kg. This location was resampled during the Shaw Site Investigation and exhibited a high concentration of 1.6 mg/kg for PCBs at 0.5-1 feet (ft.) below ground surface (bgs) (sample PAR-49-SS-SB-04). Based on this data, Tetra Tech performed an interim removal action via excavation. The excavation dimensions were 5 ft. by 5 ft. to a depth of 3 ft. bgs centered on the P49-SS8 location with confirmation sampling for PCBs and extractable petroleum hydrocarbons (EPH). The goal of this interim action was to achieve compliance with the NRSRS. **Figure 1** shows these sample locations and final excavation boundaries.

Within Parcel 57, Parsons detected PCBs in subsurface soils near the former railroad tracks. The highest exhibited concentration was 8.8 mg/kg at 3-3.5 ft. bgs (PAR-57-SS-04) which is above the RSRS and NRSRS of 1 mg/kg. Step-out sampling was performed to delineate the extent of PCB contamination. Based on the data, Tetra Tech performed an interim removal action via excavation. The excavation was 5 ft. by 5 ft. to a depth of 5 ft. bgs and centered on PAR-57-SS-04 with confirmation sampling for PCBs and EPH. **Figure 2** shows this sample location and final excavation boundaries.

Tetra Tech and its subcontractor AWT Environmental Services mobilized to the site and began locating underground utilities and soil excavation areas on 22 July 2016. Photographs documenting site activities are provided in **Attachment 2**.

Excavation activities at Parcel 49 began on 29 July 2016. The final dimensions of the excavation were 5.4 ft. (east-west direction) by 6 ft. (north-south direction) by 3 ft. deep. Excavated materials were placed in a roll off box. Prior to backfilling, a confirmation sample was collected from the bottom of the excavation and analyzed for PCBs and EPH, and neither PCBs nor EPH was detected in the confirmation sample. Full laboratory results are provided in **Attachment 3**. The excavation was filled with dense gravel aggregate and topsoil, compacted with the excavator bucket, and the surface was seeded and covered with straw.

Tetra Tech, Inc.
1093 Commerce Park Drive Suite 100, Oak Ridge, Tennessee 37830
Tel 865.483.9900 Fax 865.425.1182 www.tetratech.com

TETRA TECH

Work at Parcel 57 began on 28 July 2016. At 5 ft. depth, water began seeping into the excavation. Soil and material removed was placed in a roll off box. The final dimensions of the excavation were 7.6 ft. (east-west direction) by 5.5 ft. (north-south direction) by 5 ft. deep. A confirmation sample was collected from the bottom of the excavation and analyzed for PCBs and EPH. PCBs were not detected in the confirmation sample and thus below the NRSRS and RSRS. EPH was detected at 120 mg/kg, which is below the 1700 mg/kg New Jersey Department of Environmental Protection Category 2 EPH Protocol. Full laboratory results are provided in **Attachment 3**. The excavation was filled with dense gravel aggregate, compacted with the excavator bucket, and the surface was patched with asphalt (see Photograph 12).

Both Parcel 49 and Parcel 57 excavations were filled with backfill material provided by Maddox Materials, LLC who provided a certification of clean fill. The certification and lab results for the backfill are provided in **Attachment 4**.

On 1-3 August 2016, Tetra Tech coordinated the loadout of potentially PCB-impacted soils from Parcels 49 and 57 in conjunction with the loadout of materials from Parcel 97. The material was transported to the Wayne Disposal, Inc. landfill facility in Belleville, Michigan. The waste disposal information for the August 2016 removal are included in **Attachment 5**.

This report summarizes the interim removal action and confirmation sampling activities conducted 28-29 July 2016 for the presence of PCBs in soil at Parcels 49 and 57 and the soil loadout on 1-3 August 2016. Should you have any questions or require additional information, please do not hesitate to contact the undersigned at (865) 220-4757 or via e-mail at mikael.spangberg@tetratech.com.

Sincerely,

mikael.spangberg@tetratech.com

Digitally signed by: mikael.spangberg@tetratech.com
DN: CN = mikael.spangberg@tetratech.com
Date: 2016.10.18 08:06:03 -05'00'

Mikael L. Spangberg, P.E., PMP
Project Manager

Attachments:

Attachment 1 – Figures
Attachment 2 – Photographs
Attachment 3 – Laboratory Analytical Reports
Attachment 4 – Backfill Material Certification
Attachment 5 – Waste Disposal

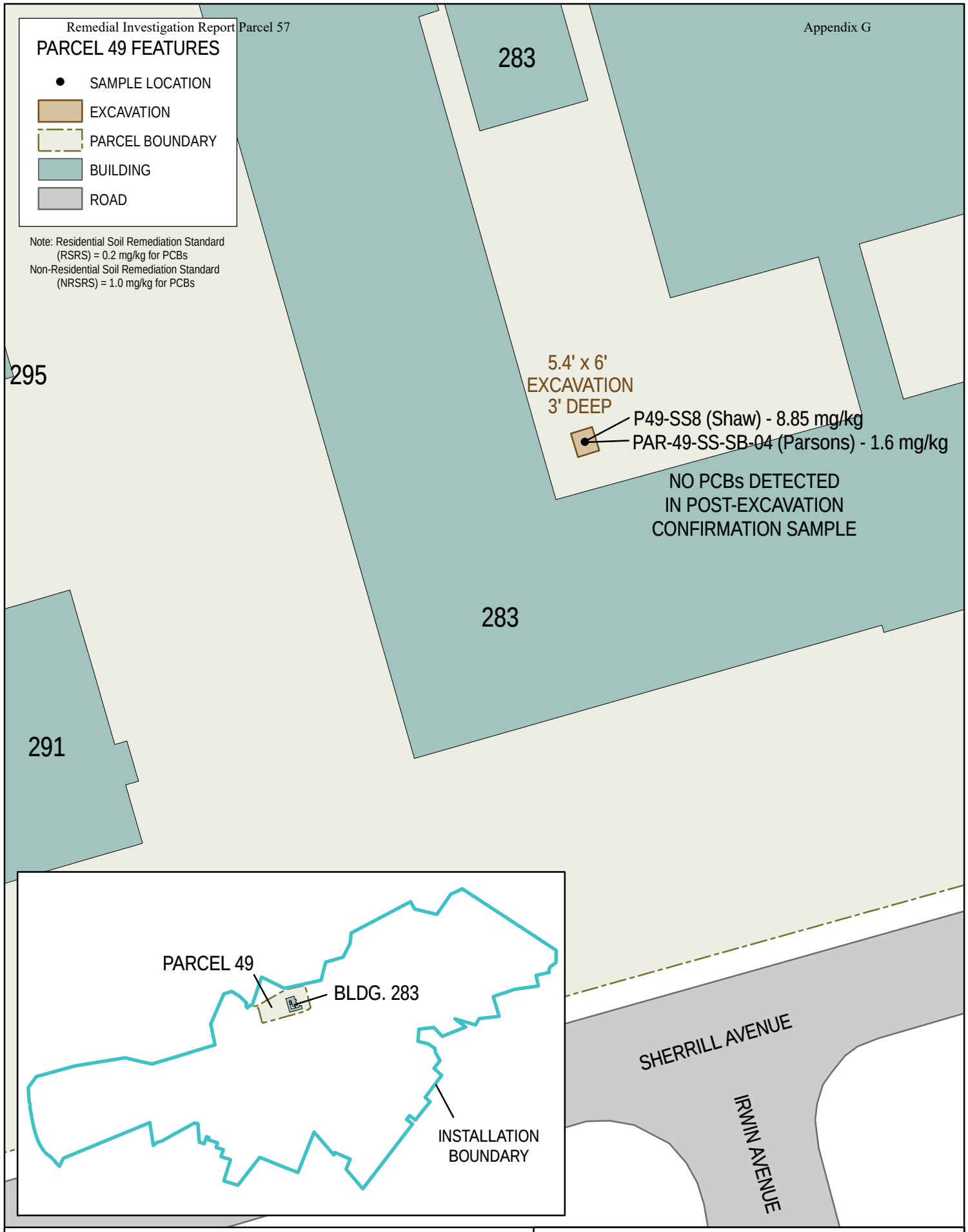
TETRA TECH

Document Distribution List

U.S. Army Engineering & Support Center, Huntsville Project Manager and Contracting Officer's Representative Attn: CEHNC-ED-CS-P (Mary Young) 4820 University Square Huntsville, AL 35816-1822	1 electronic (via email)
U.S. Army Corps of Engineers, New York District Attn: CENAN-PP-E (Mr. James Moore) 26 Federal Plaza, Room 1811 New York, NY 10278	1 electronic (via email)

ATTACHMENT 1

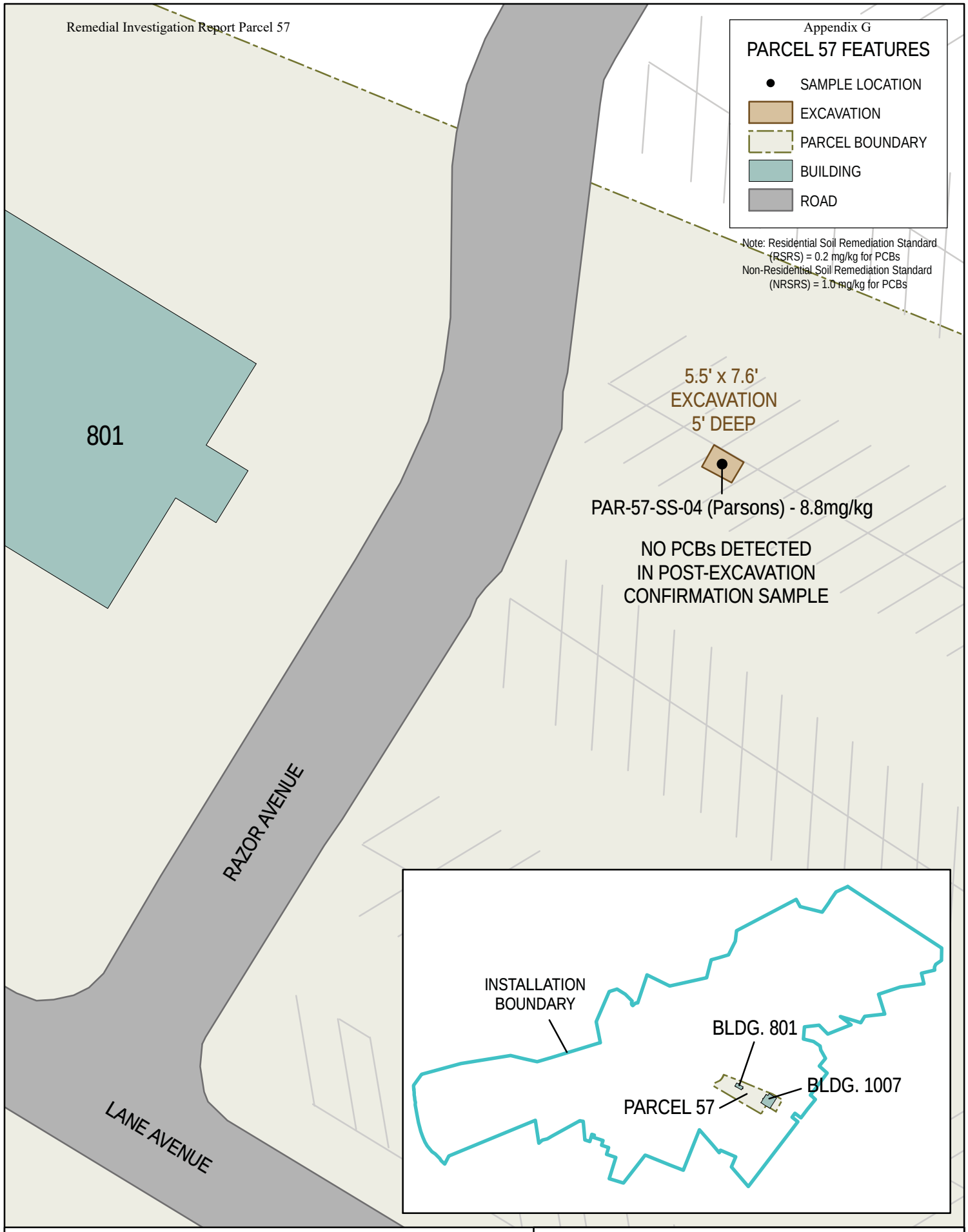
FIGURES



FORT MONMOUTH, NJ

FIGURE 1
PARCEL 49 SOIL SAMPLIN

TETRA TECH



FORT MONMOUTH, NJ

FIGURE 2
PARCEL 57 SOIL SAMPLIN

TETRA TECH

ATTACHMENT 2

PHOTOGRAPHS



Photograph 1. Parcel 49, north wall of excavation, view north, 29 July 2016.



Photograph 2. Parcel 49, west wall of excavation, view west, 29 July 2016.

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Photograph 3. Parcel 49, excavation floor and east wall, view east, 29 July 2016.



Photograph 4. Parcel 49, backfilled excavation, view west, 01 August 2016.



Photograph 5. Parcel 49, backfilled excavation and adjacent area, view west, 01 August 2016.



Photograph 6. Parcel 49, adjacent area after seed and straw, view west, 26 August 2016.



Photograph 7. Parcel 57, marked excavation area, view west, 28 July 2016.



Photograph 8. Parcel 57, prior to excavation, view north, 28 July 2016.



Photograph 9. Parcel 57, excavation completed, view north, 28 July 2016.



Photograph 10. Parcel 57, east wall of excavation, view east, 28 July 2016.



Photograph 11. Parcel 57, bottom of excavation with water seeping in, 28 July 2016.



Photograph 12. Parcel 57, backfilled excavation, view west, 28 July 2016.



Photograph 13 – Parcel 57, excavation with asphalt patch, view west, 26 August 2016.

ATTACHMENT 3

LABORATORY ANALYTICAL REPORTS

HC Report of Analysis

Client: Tetra Tech Inc. **HC Project #:** 6080102

Project: Fort Monmouth Additional

Sample ID: FM-PAR-57-SS-04-05 **Collection Date:** 7/28/2016
Lab#: AC92683-001 **Receipt Date:** 8/1/2016
Matrix: Soil

% Solids SM2540G

Analyte	DF	Units	RL	Result
% Solids	1	percent		84

NJ EPH Category 2

Analyte	DF	Units	RL	Result
C9-C40	1	mg/kg	71	120

PCB 8082

Analyte	DF	Units	RL	Result
Aroclor (Total)	1	mg/kg	0.030	ND
Aroclor-1016	1	mg/kg	0.030	ND
Aroclor-1221	1	mg/kg	0.030	ND
Aroclor-1232	1	mg/kg	0.030	ND
Aroclor-1242	1	mg/kg	0.030	ND
Aroclor-1248	1	mg/kg	0.030	ND
Aroclor-1254	1	mg/kg	0.030	ND
Aroclor-1260	1	mg/kg	0.030	ND
Aroclor-1262	1	mg/kg	0.030	ND
Aroclor-1268	1	mg/kg	0.030	ND

Sample ID: FM-P49-SS8-C
Lab#: AC92683-002
Matrix: Soil
Collection Date: 7/29/2016
Receipt Date: 8/1/2016

% Solids SM2540G

Analyte	DF	Units	RL	Result
% Solids	1	percent		80

NJ EPH Category 2

Analyte	DF	Units	RL	Result
C9-C40	1	mg/kg	75	ND

PCB 8082

Analyte	DF	Units	RL	Result
Aroclor (Total)	1	mg/kg	0.031	ND
Aroclor-1016	1	mg/kg	0.031	ND
Aroclor-1221	1	mg/kg	0.031	ND
Aroclor-1232	1	mg/kg	0.031	ND
Aroclor-1242	1	mg/kg	0.031	ND
Aroclor-1248	1	mg/kg	0.031	ND
Aroclor-1254	1	mg/kg	0.031	ND
Aroclor-1260	1	mg/kg	0.031	ND
Aroclor-1262	1	mg/kg	0.031	ND
Aroclor-1268	1	mg/kg	0.031	ND

Hampton-Clarke, Inc. (WBE/DBE/SBE)
175 Route 46 West and 2 Madison Road, Fairfield, New Jersey 07004
Ph: 800-426-9992 | 973-244-9770 Fax: 973-244-9787 | 973-439-1458
Service Center: 137-D Gaither Drive, Mount Laurel, New Jersey 08054
Ph (Service Center): 856-780-6057 Fax: 856-780-6056

Hampton-Clarke WBE/DBE/SBE 800-426-9992

A Women-Owned, Disadvantaged, Small Business Enterprise

CHAIN OF CUSTODY RECORD

Project # (Lab Use Only): 608102

Page 1 of 1

NELAC/NJ #07071 | PA #68-00463 | NY #11408 | CT #PH-0671 | KY #90124 | DE HSCA Approved

3) Reporting Requirements (Please Circle)

Turnaround	Report Type	Electronic Deliv.
When Available:	Data Summary	Hazsite/CSV
1 Business Day (100%)*	Results + QC (Waste)	EnviroData
2 Business Days (75%)*	NJ Reduced	Excel - NJ Regulatory
3 Business Days (50%)*	NY Reduced	Excel - NY Regulatory
4 Business Days (35%)*	PA Reduced	Excel - PA Regulatory
5 Business Days (25%)	Full / Category B	EQuIS (specify below):
10 Business Days (Stand.)	Category A	4-File/EZ/NYS/Reg. 2 or 5
Other:	Electronic (PDF)	Other: PDF

* Expedited TAT Not Always Available. Please Check with Lab.

Customer Information

1a) Customer: Tetra Tech
Address: 1093 Commerce Park Dr. Ste 100, Oak Ridge TN 37830
1b) Email/Cell/Fax/Ph: Rob Rolon 407-448-9553
1c) Send Invoice to: Maureen McMyler 865-220-4762
1d) Send Report to: Maureen McMyler

Project Information

2a) Project: Fort Monmouth Additional Areas
2b) Project Mgr: Mikael Spangberg
2c) Project Location (City/State): Ft. Monmouth NJ
2d) Quote/PO # (If Applicable): 4817

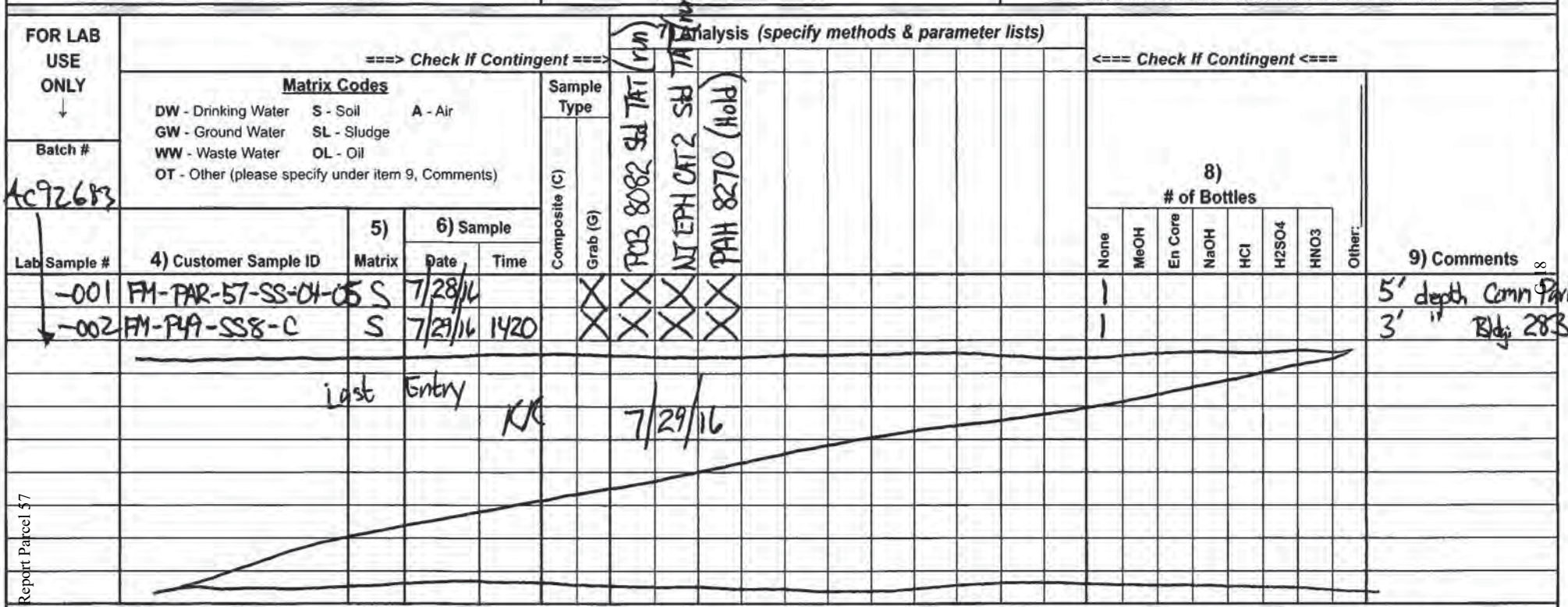
FOR LAB USE ONLY

Batch # AC92683

===> Check If Contingent ===>

Matrix Codes
DW - Drinking Water; S - Soil; A - Air; GW - Ground Water; SL - Sludge; WW - Waste Water; OL - Oil; OT - Other (please specify under item 9, Comments)

Analysis (specify methods & parameter lists)



Lab Sample #	4) Customer Sample ID	5) Matrix	6) Sample Date	6) Sample Time	Sample Type: Composite (C)	Sample Type: Grab (G)	PCB 8082 Std TAT (rush)	NJ EPH CT2 Std TAT (Rush)	PAH 8270 (Hold)	8) # of Bottles: None	MeOH	En Core	NaOH	HCl	H2SO4	HNO3	Other:	9) Comments
-001	FM-PAR-57-SS-01-05	S	7/28/16			X	X	X	X	1								5' depth Comm Parking
-002	FM-P49-SS8-C	S	7/29/16	1420		X	X	X	X	1								3' " Bldg 283
			last Entry															
				KK			7/29/16											

10) Relinquished by: / Accepted by:

Relinquished by:	Accepted by:	Date	Time
		7/29/16	1630 hrs
		8/1/16	10:15

Additional Notes

Comments, Notes, Special Requirements, HAZARDS

Indicate if low-level methods required to meet current groundwater standards (SPLP for soil):
- ☐ BN or BNA (8270D SIM)
- ☐ VOC (8260C SIM or 8011)
- ☐ SPLP (BN, BNA, Metals)

For NJ LSRP projects, indicate which standards need to be met:
- ☐ NJDEP GWQS
- ☐ NJDEP SRS
- ☐ NJDEP SPLP
- ☐ Other (specify):

Check if applicable:
- ☐ Project-Specific Reporting Limits
- ☐ High Contaminant Concentrations
- ☐ NJ LSRP Project (also check boxes above/right)

Cooler Temperature: 3.0

11) Sampler (print name): Date:

Please note NUMBERED items. If not completed your analytical work may be delayed.
A fee of $5/sample will be assessed for storage should sample not be activated for any analysis.

ATTACHMENT 4

BACKFILL MATERIAL CERTIFICATION

Accredited Analytical Resources, LLC.

14 January 2015 AAR Work Order: 1500027

Bill Maddox
MADDOX MATERIALS
323 Main Street
Spotswood, NJ 08884

RE: Fred McDowell Inc. Schoolhouse Rd.

Enclosed are the results of analyses for samples received by the laboratory on 01/07/2015 15:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Daniel Miguel
Technical Director New Jersey Certification Number 12007

Accredited Analytical Resources, LLC.

MADDOX MATERIALS		
323 Main Street	Project: Fred McDowell Inc. Schoolhouse Rd.	**Reported:**
Spotswood NJ, 08884	Project Manager: Bill Maddox	01/14/2015 14:59

Analytical Report for Samples

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S1	1500027-01	Soil	01/07/2015 11:45	01/07/2015 15:25

Notes and Definitions

U	Analyte included in the analysis, but not detected
J	Indicates estimated value for TICs and all results when detected below the RL
D	Data reported from a dilution
B	Indicates compound found in associated blank
ND	Indicates compound analyzed for but not detected
U	Indicates compound analyzed for but not detected
dry	Sample results reported on a dry weight basis
RL	Reporting Limit
MDL	Method Detection Limit

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

MADDOX MATERIALS		
323 Main Street	Project: Fred McDowell Inc. Schoolhouse Rd.	**Reported:**
Spotswood NJ, 08884	Project Manager: Bill Maddox	01/14/2015 14:59

Methodology Summary

EPA 6010B

A 1-5 gram portion of soil is digested with nitric acid and hydrogen peroxide. The digestate is then refluxed with either nitric acid or hydrochloric acid. The basis of ICAP method is the measurement of atomic emission by an optical spectroscope technique. The ICAP technique is specified in Method 6010B.

EPA 7471A

The mercury in the sample is reduced to the elemental state and detected by the cold vapor technique in a closed system. The analytical procedure associated with the Cold Vapor technique is derived from EPA Method 7470A.

EPA 8081/8082

A 30g portion of soil is mixed with anhydrous sodium sulfate and is serially extracted with 1:1 methylene chloride and acetone. The extract is dried and solvent/exchanged to hexane during concentration. A measured amount is injected onto a GC and the analytes are detected by an electron capture detector.

EPA 8260

An inert gas is purged through a 5g sample by EPA Method 5035. Alternatively the soil is extracted with methanol. A portion of extract is spiked into a purging vessel and purged by an inert gas. The vapor is swept through a sorbent column where the purgeables are trapped. The sorbent column is heated and back-flushed with the inert gas to desorb the purgeables onto a GC capillary column. The GC is temperature programmed to separate the purgeables which are then detected with a mass spectrometer

EPA 8270

A 30g portion of soil is mixed with anhydrous sodium sulfate and is extracted with 1:1 methylene chloride and acetone mixture. The methylene chloride extract is dried and concentrated and a measured amount is injected onto a GC and the analytes are detected with a mass spectrometer.

EPA 9014

A representative portion of sample is weighed and placed into a cyanide distillation apparatus. The cyanide as hydrocyanic acid is released from cyanide complexes by means of a reflux-distillation operation and absorbed in a scrubber containing sodium hydroxide solution. The cyanide ion in the absorbing solution is then determined colorimetrically.

NJDEP EPH

Approximately 15 grams of sample is extracted with Methylene Chloride by Pressurized Fluid Extraction technique. The extract is then dried with sodium sulfate, concentrated and analyzed by GC-FID.

SM 2540 G

A representative 5-10 grams of solid sample is placed in a preweighed weighing dish. The sample is dried in an oven at 103-105oC for 12-24 hrs. Alternatively the constant weight of dried sample is attained for the drying period less than 12 hrs. The remaining weight of sample after drying to the original weight expressed in percentage is determined as percent solid.

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

MADDOX MATERIALS		
323 Main Street	Project: Fred McDowell Inc. Schoolhouse Rd.	**Reported:**
Spotswood NJ, 08884	Project Manager: Bill Maddox	01/14/2015 14:59

Client ID: S1

Lab ID: 1500027-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260

Sample Prepared by Method:EPA 5035A

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
107-02-8	Acrolein	ND	6.59	11.0	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
107-13-1	Acrylonitrile	ND	2.20	11.0	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
67-64-1	**Acetone**	**2.80**	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	B
75-71-8	Dichlorodifluoromethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
74-87-3	Chloromethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-01-4	Vinyl chloride	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
74-83-9	Bromomethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-00-3	Chloroethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-69-4	Trichlorofluoromethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
76-13-1	Freon 113	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-35-4	1,1-Dichloroethene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-15-0	Carbon disulfide	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
79-20-9	Methyl Acetate	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-09-2	Methylene Chloride	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
156-60-5	trans-1,2-Dichloroethene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-34-3	1,1-Dichloroethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
78-93-3	2-Butanone	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
156-59-4	cis-1,2-Dichloroethene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
67-66-3	Chloroform	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
74-97-5	Bromochloromethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
110-82-7	Cyclohexane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
71-55-6	1,1,1-Trichloroethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-65-0	t-Butyl alcohol	ND	5.49	22.0	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
56-23-5	Carbon Tetrachloride	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
107-06-2	1,2-Dichloroethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
71-43-2	Benzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
79-01-6	Trichloroethene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U

Accredited Analytical Resources LLC

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Daniel Miguel, Technical Director

Accredited Analytical Resources, LLC.

MADDOX MATERIALS
323 Main Street
Spotswood NJ, 08884

Project: Fred McDowell Inc. Schoolhouse Rd.
Project Manager: Bill Maddox

Reported:
01/14/2015 14:59

Client ID: S1

Lab ID: 1500027-01 (Soil)

Accredited Analytical Resources LLC

Volatile Organic Compounds EPA Method SW846 8260

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
108-87-2	Methylcyclohexane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
78-87-5	1,2-Dichloropropane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-27-4	Bromodichloromethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
10061-01-5	cis-1,3-Dichloropropene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
108-88-3	Toluene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
10061-02-6	trans-1,3-Dichloropropene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
79-00-5	1,1,2-Trichloroethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
108-10-1	4-Methyl-2-pentanone	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
106-93-4	1,2-Dibromoethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
591-78-6	2-Hexanone	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
127-18-4	Tetrachloroethene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
124-48-1	Dibromochloromethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
100-41-4	Ethylbenzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
108-90-7	Chlorobenzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
108-38-3/106-4	m,p-Xylenes	ND	2.20	4.39	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
95-47-6	o-Xylene	ND	2.20	4.39	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
100-42-5	Styrene	ND	1.10	4.39	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
75-25-2	Bromoform	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
98-82-8	Isopropylbenzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
541-73-1	1,3-Dichlorobenzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
106-46-7	1,4-Dichlorobenzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
95-50-1	1,2-Dichlorobenzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
96-12-8	1,2-Dibromo-3-chloropropane	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
120-82-1	1,2,4-Trichlorobenzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
87-61-6	1,2,3-Trichlorobenzene	ND	1.10	2.20	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
1634-04-4	Methyl tert-Butyl Ether	ND	2.20	4.39	ug/kg dry	1	01/10/15 21:14	01/10/15 21:14/SCS	EPA 8260B	U
Surrogate: 1,2-Dichloroethane-d4				*99 %*	*70-121*		*01/10/15 21:14*	*01/10/15 21:14/SCS*	*EPA 8260B*	

Accredited Analytical Resources LLC



Daniel Miguel, Technical Director

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Accredited Analytical Resources, LLC.

MADDOX MATERIALS
323 Main Street
Spotswood NJ, 08884

Project: Fred McDowell Inc. Schoolhouse Rd.
Project Manager: Bill Maddox

Reported:
01/14/2015 14:59

Client ID: S1

Lab ID: 1500027-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
	Accredited Analytical Resources LLC									
Volatile Organic Compounds EPA Method SW846 8260										
Surrogate: Toluene-d8		*102 %*		*81-117*			*01/10/15 21:14*	*01/10/15 21:14/SCS*	*EPA 8260B*	
Surrogate: Bromofluorobenzene		*103 %*		*74-121*			*01/10/15 21:14*	*01/10/15 21:14/SCS*	*EPA 8260B*	
Semivolatile Organic Compounds EPA Method SW846 8270										
Sample Prepared by Method:EPA 3550B GCMS										
62-75-9	N-Nitrosodimethylamine	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
100-52-7	Benzaldehyde	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
108-95-2	Phenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
111-44-4	bis(2-chloroethyl)ether	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
95-57-8	2-Chlorophenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
95-48-7	2-Methylphenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
39638-32-9	bis(2-chloroisopropyl)ether	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
98-86-2	Acetophenone	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
106-44-5	3 & 4-Methylphenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
621-64-7	N-Nitroso-di-n-propylamine	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
67-72-1	Hexachloroethane	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
98-95-3	Nitrobenzene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
78-59-1	Isophorone	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
88-75-5	2-Nitrophenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
105-67-9	2,4-Dimethylphenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
111-91-1	bis(2-chloroethoxy)methane	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
120-83-2	2,4-Dichlorophenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
91-20-3	Naphthalene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
106-47-8	4-Chloroaniline	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
87-68-3	Hexachlorobutadiene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
105-60-2	Caprolactam	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
59-50-7	4-Chloro-3-methylphenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
91-57-6	2-Methylnaphthylene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U

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Daniel Miguel, Technical Director

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MADDOX MATERIALS		
323 Main Street	Project: Fred McDowell Inc. Schoolhouse Rd.	**Reported:**
Spotswood NJ, 08884	Project Manager: Bill Maddox	01/14/2015 14:59

Client ID: S1

Lab ID: 1500027-01 (Soil)

Accredited Analytical Resources LLC

Semivolatile Organic Compounds EPA Method SW846 8270

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
77-47-4	Hexachlorocyclopentadiene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
88-06-2	2,4,6-Trichlorophenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
95-95-4	2,4,5-Trichlorophenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
91-58-7	2-Chloronaphthalene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
92-52-4	1,1-Biphenyl	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
88-74-4	2-Nitroaniline	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
131-11-3	Dimethylphthalate	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
208-96-8	Acenaphthylene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
99-09-2	3-Nitroaniline	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
83-32-9	Acenaphthene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
51-28-5	2,4-Dinitrophenol	ND	36.6	366	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
100-02-7	4-Nitrophenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
132-64-9	Dibenzofuran	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
606-20-2	2,6-Dinitrotoluene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
121-14-2	2,4-Dinitrotoluene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
58-90-2	2,3,4,6-Tetrachlorophenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
84-66-2	Diethyl phthalate	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
7005-72-3	4-Chlorophenyl-phenylether	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
86-73-7	Fluorene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
100-01-6	4-Nitroaniline	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
534-52-1	4,6-Dinitro-2-methylphenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
86-74-8	Carbazole	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
86-30-6	N-Nitrosodiphenylamine	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
122-66-7	1,2-Diphenylhydrazine	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
101-55-3	4-Bromophenyl-phenylether	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
1912-24-9	Atrazine	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
118-74-1	Hexachlorobenzene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
87-86-5	Pentachlorophenol	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
85-01-8	Phenanthrene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U

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Daniel Miguel, Technical Director

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MADDOX MATERIALS
323 Main Street
Spotswood NJ, 08884

Project: Fred McDowell Inc. Schoolhouse Rd.
Project Manager: Bill Maddox

Reported:
01/14/2015 14:59

Client ID: S1

Lab ID: 1500027-01 (Soil)

Accredited Analytical Resources LLC

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
Semivolatile Organic Compounds EPA Method SW846 8270										
120-12-7	Anthracene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
84-74-2	Di-n-butyl phthalate	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
206-44-0	Fluoranthene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
92-87-5	Benzidine	ND	91.1	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
129-00-0	Pyrene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
85-68-7	Butylbenzylphthalate	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
91-94-1	3,3'-Dichlorobenzidine	ND	91.1	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
56-55-3	Benzo[a]anthracene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
117-81-7	bis(2-ethylhexyl)phthalate	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
218-01-9	Chrysene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
117-84-0	Di-n-octyl phthalate	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
205-99-2	Benzo[b]fluoranthene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
207-08-9	Benzo[k]fluoranthene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
50-32-8	Benzo[a]pyrene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
53-70-3	Dibenzo(a,h)anthracene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
191-24-2	Benzo[ghi]perylene	ND	36.6	183	ug/kg dry	1	01/08/15 08:55	01/08/15 15:58/JMM	EPA 8270C	U
Surrogate: 2-Fluorophenol				*80 %*	*25-121*		*01/08/15 08:55*	*01/08/15 15:58/JMM*	*EPA 8270C*	
Surrogate: Phenol-d5				*94 %*	*24-113*		*01/08/15 08:55*	*01/08/15 15:58/JMM*	*EPA 8270C*	
Surrogate: Nitrobenzene-d5				*69 %*	*23-120*		*01/08/15 08:55*	*01/08/15 15:58/JMM*	*EPA 8270C*	
Surrogate: 2-Fluorobiphenyl				*80 %*	*30-115*		*01/08/15 08:55*	*01/08/15 15:58/JMM*	*EPA 8270C*	
Surrogate: 2,4,6-Tribromophenol				*108 %*	*19-122*		*01/08/15 08:55*	*01/08/15 15:58/JMM*	*EPA 8270C*	
Surrogate: Terphenyl-d14				*78 %*	*18-137*		*01/08/15 08:55*	*01/08/15 15:58/JMM*	*EPA 8270C*	
EPA Method SW846 8081/8082										
Sample Prepared by Method:EPA 3550B										
319-84-6	alpha-BHC	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
319-85-7	beta-BHC	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
319-86-8	delta-BHC	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U

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Daniel Miguel, Technical Director

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MADDOX MATERIALS		
323 Main Street	Project: Fred McDowell Inc. Schoolhouse Rd.	**Reported:**
Spotswood NJ, 08884	Project Manager: Bill Maddox	01/14/2015 14:59

Client ID: S1

Lab ID: 1500027-01 (Soil)

Accredited Analytical Resources LLC

EPA Method SW846 8081/8082

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
58-89-9	gamma-BHC [Lindane]	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
76-44-8	Heptachlor	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
309-00-2	Aldrin	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
1024-57-3	Heptachlor Epoxide	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
959-98-8	Endosulfan I	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
60-57-1	Dieldrin	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
72-55-9	4,4'-DDE	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
72-20-8	Endrin	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
33213-65-9	Endosulfan II	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
72-54-8	4,4'-DDD	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
1031-07-8	Endosulfan sulfate	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
50-29-3	4,4'-DDT	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
72-43-5	Methoxychlor	ND	7.31	7.31	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
53494-70-5	Endrin ketone	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
7421-93-4	Endrin aldehyde	ND	1.46	1.46	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
5103-71-9	alpha-Chlordane	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
5566-34-7	gamma-Chlordane	ND	0.724	0.724	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
8001-35-2	Toxaphene	ND	36.6	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
12674-11-2	Aroclor-1016	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
11104-28-2	Aroclor-1221	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
11141-16-5	Aroclor-1232	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
53469-21-9	Aroclor-1242	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
12672-29-6	Aroclor-1248	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
11097-69-1	Aroclor-1254	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
11096-82-5	Aroclor-1260	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
37324-23-5	Aroclor-1262	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
11100-14-4	Aroclor-1268	ND	18.2	36.6	ug/kg dry	1	01/08/15 05:50	01/09/15 15:26/JAM	EPA 8081A/8082	U
Surrogate: Tetrachloro-m-xylene				*77.7 %*	*30-150*		*01/08/15 05:50*	*01/09/15 15:26/JAM*	*EPA 8081A/8082*	

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MADDOX MATERIALS
323 Main Street
Spotswood NJ, 08884

Project: Fred McDowell Inc. Schoolhouse Rd.
Project Manager: Bill Maddox

Reported:
01/14/2015 14:59

Client ID: S1

Lab ID: 1500027-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
					Accredited Analytical Resources LLC					
EPA Method SW846 8081/8082										
Surrogate: Tetrachloro-m-xylene				*91.0 %*	*30-150*		*01/08/15 05:50*	*01/09/15 15:26/JAM*	*EPA 8081A/8082*	
Surrogate: Decachlorobiphenyl				*88.3 %*	*30-150*		*01/08/15 05:50*	*01/09/15 15:26/JAM*	*EPA 8081A/8082*	
Surrogate: Decachlorobiphenyl				*97.5 %*	*30-150*		*01/08/15 05:50*	*01/09/15 15:26/JAM*	*EPA 8081A/8082*	
Total Metals by EPA Method SW846 6010B										
Sample Prepared by Method:EPA 3050B										
7429-90-5	**Aluminum**	**919**	22.0	22.0	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	
7440-36-0	Antimony	ND	4.39	4.39	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-38-2	Arsenic	ND	1.10	1.10	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-39-3	Barium	ND	22.0	22.0	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-41-7	Beryllium	ND	0.549	0.549	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-43-9	Cadmium	ND	0.549	0.549	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-70-2	Calcium	ND	27.4	27.4	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-47-3	**Chromium**	**3.10**	2.20	2.20	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	
7440-48-4	Cobalt	ND	5.49	5.49	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-50-8	Copper	ND	3.29	3.29	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7439-89-6	**Iron**	**5560**	27.4	27.4	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	
7439-92-1	**Lead**	**2.67**	1.10	1.10	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	
7439-95-4	Magnesium	ND	54.9	54.9	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7439-96-5	**Manganese**	**8.49**	2.20	2.20	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	
7440-02-0	Nickel	ND	4.39	4.39	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-09-7	**Potassium**	**107**	54.9	54.9	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	
7782-49-2	Selenium	ND	4.39	4.39	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-22-4	Silver	ND	1.10	1.10	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-23-5	Sodium	ND	54.9	54.9	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-28-0	Thallium	ND	1.65	3.29	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-62-2	Vanadium	ND	5.49	5.49	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U
7440-66-6	Zinc	ND	6.59	6.59	mg/kg dry	1	01/08/15 07:34	01/09/15 13:54/LIT	EPA 6010B	U

Accredited Analytical Resources LLC



Daniel Miguel, Technical Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Accredited Analytical Resources, LLC.

MADDOX MATERIALS		
323 Main Street	Project: Fred McDowell Inc. Schoolhouse Rd.	**Reported:**
Spotswood NJ, 08884	Project Manager: Bill Maddox	01/14/2015 14:59

Client ID: S1

Lab ID: 1500027-01 (Soil)

CAS #	Analyte	Result	MDL	RL	Units	Dilution	Prepared Date	Analyzed Date/By	Method	Notes
				Accredited Analytical Resources LLC						
Total Mercury by SW846 7471										
Sample Prepared by Method:EPA 7471A										
7439-97-6	Mercury	ND	0.0823	0.0823	mg/kg dry	1	01/08/15 07:30	01/08/15 12:28/STM	EPA 7471A	
Wet Chemistry										
Sample Prepared by Method:EPA 9010C										
NA	Cyanide (total)	ND	1.10	1.10	mg/kg dry	1	01/12/15 09:23	01/12/15 16:41/NNM	EPA 9014	
Sample Prepared by Method:Percent Solids										
NA	**Percent Solids**	**91.1**	0.100	0.100	%	1	01/09/15 10:30	01/09/15 14:38/CLD	SM 2540 G	
Extractable Petroleum Hydrocarbons by NJ EPH										
Sample Prepared by Method:EPA 3545A										
NA	Extractable Petroleum Hydrocarbons (EP	ND	17.6	17.6	mg/kg dry	1	01/09/15 09:02	01/09/15 13:38/MS	NJDEP EPH	U
Surrogate: o-Terphenyl				*74.1 %*	*40-140*		*01/09/15 09:02*	*01/09/15 13:38/MS*	*NJDEP EPH*	
Surrogate: 1-Chlorooctadecane				*83.5 %*	*40-140*		*01/09/15 09:02*	*01/09/15 13:38/MS*	*NJDEP EPH*	

Accredited Analytical Resources LLC

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Daniel Miguel, Technical Director

Page ____ of ____

ACCREDITED ANALYTICAL RESOURCES, LLC

20 PERSHING AVENUE
CARTERET, NEW JERSEY 07008
PHONE (732) 969-6112 FAX (732) 541-1383
accreditedanalytical.com

CHAIN OF CUSTODY FORM

STATE AGENCY NJ NY PA CT DE OTHER ____

CLIENT	Maddox Materials llc
ADDRESS	323 Main Street
CITY	Spotswood
STATE	NJ ZIP 08884

PROJECT	Fred McDowell Inc Schoolhouse Rd
CONTACT	Bill Maddox
PHONE	732 251-0054
FAX	
E-MAIL	jrmadd@verizon.net

LABORATORY SAMPLE #	CLIENT FIELD ID	# OF CONTAINERS	MATRIX	PRESERVATIVE	DATE / TIME SAMPLED	SAMPLE DESCRIPTION: GRAB	COMPOSITE	DEPTH	ANALYSIS: TCL/TAL
1500027-01	S1	2	S		1-7-15 11:45	✓			SRS/NJSCC +EPH

** M = MATRIX CODE: S=SOIL G=SLUDGE O=OIL F=FILTER K=SOLID X=OTHER
GW=GROUND WATER WW=WASTE WATER SW=SURFACE WATER P=POTABLE WATER

TURNAROUND TIME: 5 Days Spread Sheet (IF BLANK, STD. 3 WEEKS)

RECIEVED W/ ICE? YES ☒ NO ☐ TEMPERATURE: 4°C NJSCC+ INGW

QA/QC DELIVERABLES (circle one): STD (NJ REDUCED) NJ FULL OTHER : NYASP Cat. A NYASP Cat. B

PRESERVATIVE CODE: 1=HCL 2=HNO_3 3=H_2SO_4 4=$Na_2S_2O_3$ 5=NaOH 6=MeOH 7=OTHER

RELINQUISHED BY: PRINT	RELINQUISHED BY: SIGN	RECEIVED BY: PRINT	RECEIVED BY: SIGN	ORGANIZATION	DATE	TIME	REASON
William Maddox		K. Muniz	K. Muñiz	AAR	1/7/15	15:25	Analysis

PERSON(S) ASSUMING RESPONSIBILITY FOR SAMPLING: PRINT: William Maddox SIGN:

COMMENTS: Rosano Trucking / Fred Mc Dowell Inc
Block 930 Lot 1
Monmouth County

AAR QUOTE #
AAR CASE # 1500027
P.O. #

See Reverse for Instructions

Maddox Materials, LLC
Quality Aggregates & Construction Soils

February 9, 2015

AWT Environmental
PO Box 128
Sayreville, NJ 08871

Attn: Mario Postorino
Phone: 732-613-1660
Fax: 732-613-1536

Project: Clean Fill

To whom it may concern:

Please be advised the sand Maddox Materials llc supplies is a clean virgin material originating from the Fred McDowell sand and gravel property. The mining permit is #003911 Rosano Trucking Schoolhouse Rd., Block 930, Lot 1, Township of Wall, Monmouth County NJ. The entrance to this location is Route 33 Wall Township which is referenced on our certified weight ticket used during delivery.

The site was historically a wooded lot and is now being used as a registered mining operation. To the best of our knowledge, the material is not contaminated pursuant to any applicable remediation standards. Our belief is based on the fact that this site has been tested by Accredited Analytical Resources, LLC work order# 1500027 and found to be acceptable for residential development.

If you need any additional information please contact me at 732-251-0054.

Respectfully Submitted,

William Maddox
Member

323 Main Street • Spotswood, NJ 08884 • PH: 732-251-0054 • Fax: 732-251-0461

FRENCH & PARRELLO
ASSOCIATES, P.A., CONSULTING ENGINEERS

SUMMARY OF LABORATORY TESTING

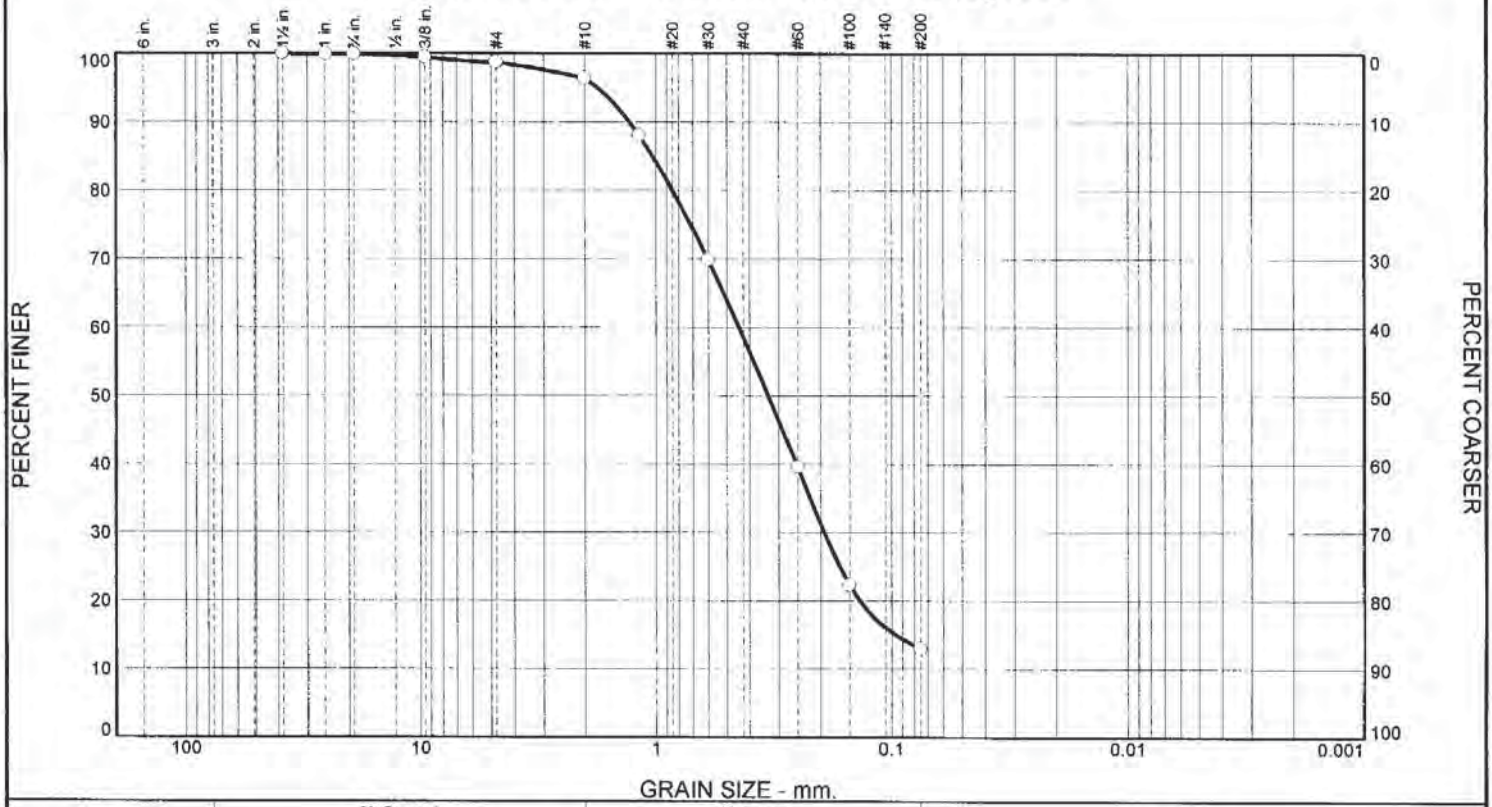
AASHTO Accreditated Laboratory

PROJECT: Maddox **PROJECT #:** 07L001A **DATE:** 1/15

Sample Number & Date Received	Source	Classification	Natural Water Content %	Atterberg Limits		Unconfined Compression		Unit Dry Weight PCF	Specific Gravity	Permeability cm/sec @ 20 deg C	Compaction	Grain Size	Consolidation	Triaxial	CBR	pH	Organic Content %
				Liquid Limit	Plastic Limit	Stress TSF	Strain %										
S-119 1/21/15	Rosano	Orange Brown cmf SAND, little- Silt, trace f Gravel	9								*	*					

* SEE TEST CURVES

Particle Size Distribution Report



% +3"	% Gravel			% Sand			% Fines
	Coarse	Medium	Fine	Coarse	Medium	Fine	
0.0	0.1	0.5	3.0	26.6	30.3	26.5	13.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	99.9		
.75	99.9		
.375	99.4		
#4	98.7		
#10	96.4		
#16	88.0		
#30	69.8		
#60	39.5		
#100	22.3		
#200	13.0		

* (no specification provided)

Material Description

Orange Brown cmf SAND, little- Silt, trace f Gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 1.3023 D_{85}= 1.0353 D_{60}= 0.4434
D_{50}= 0.3327 D_{30}= 0.1929 D_{15}= 0.0961
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Location: Rosano Sand
Sample Number: S-119

Date: 1/21/15

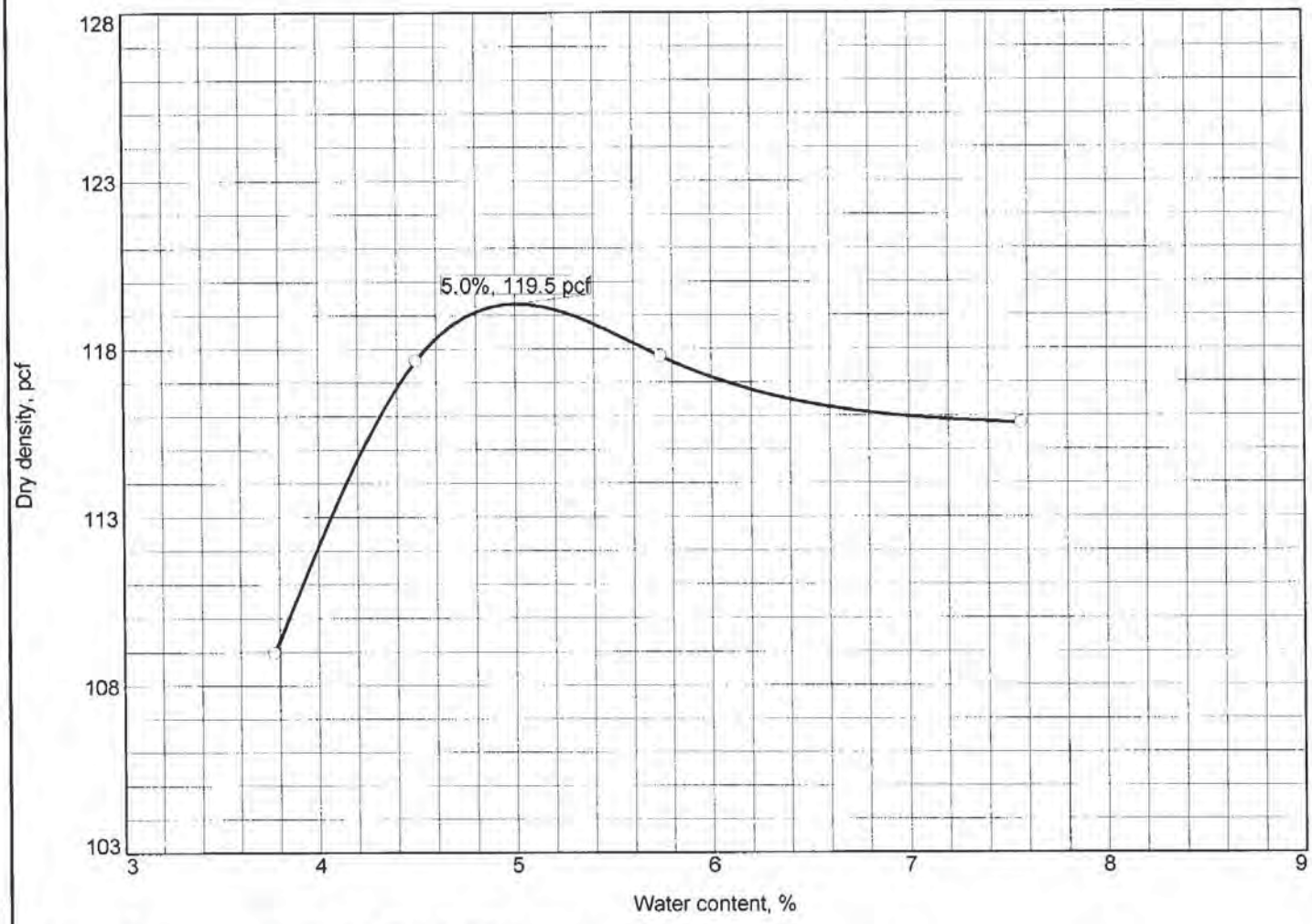
FRENCH & PARRELLO ASSOCIATES, P.A.
CONSULTING ENGINEERS
Wall, NJ

Client: Maddox Materials, LLC
Project: Maddox
Project No: 07L001A

Figure

Tested By: MP **Checked By:** RT

COMPACTION TEST REPORT



Test specification: ASTM D 1557-07 Method C Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
	SM	A-2-4(0)	9		NP	NP	0.1	13.0

TEST RESULTS

Maximum dry density = 119.5 pcf

Optimum moisture = 5.0 %

MATERIAL DESCRIPTION

Orange Brown cmf SAND, little- Silt, trace f Gravel

Project No. 07L001A **Client:** Maddox Materials, LLC

Project: Maddox

Location: Rosano Sand **Sample Number:** S-119

Remarks:

FRENCH & PARRELLO ASSOCIATES, P.A.
CONSULTING ENGINEERS
Wall, NJ

Figure

Tested By: MP **Checked By:** RT

ATTACHMENT 5

WASTE DISPOSAL INFORMATION

FREEHOLD CARTAGE INC.

P.O. BOX 5010 • FREEHOLD, NJ 07728-5010
(732) 462-1001 • FAX (732) 308-0924

BILL OF LADING

FCI EPA ID NO. NJD054126164

S 590773

350 Pigeon Point Road	175 Bartow Mun. Airport	5533 Dynham Road	108 Monahan Avenue	132 Myrtle Beach Hwy
New Castle, DE 19720	Bartow, FL 33830	Maple Heights, OH 44137	Dunmore, PA 18512	Sumter, SC 29153
Phone: (302) 658-2005	Phone: (863) 533-4599	Phone: (330) 835-3473	Phone: (570) 342-7232	Phone (803) 773-2611
Fax: (302) 658-6229	Fax: (863) 533-1613	Fax: (330) 835-3732	Fax. (570) 342-7367	Fax. (803) 773-2942

SHIPPER NAME/ADDRESS	PHONE (AREA CODE)	
US Army Ft. McMurray Cheyenne WS	TRACTOR [illegible]	TRAILER 4445
		APPOINTMENT TIME :

FCI REP. LOADING (PRINT)	PROCEDURE	EQUIP. SPOTTED	EQUIP. REMOVED	TIME AT SHIPPER	(MILITARY TIME ONLY)
D Lollie	Dump		0714	14:30 ARRIVAL TIME	15:30 DEPARTURE TIME

COMMENTS OR DELAYS AT SHIPPER	EQUIPMENT USED

BROKER:

PO#: WO#: 1117613

MANIFEST/DOCUMENT NO: 011852570JK

(X) HM		PROPER U.S. D.O.T. SHIPPING NAME	U.S. D.O.T HAZARDOUS CLASS	NA/UN NO	PACKING GROUP	NO. CONT	CONT TYPE	NET QUANTITY	UNIT MEASURE	WASTE NO.	FORM
	1	Sc. Materials	—	—	—	1	CM	30	YD	—	S
	2										
	3										

SPECIAL HANDLING INSTRUCTIONS INCLUDING CONTAINER EXEMPTION NUMBER

SHIPPER'S CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, U.S. EPA and the State. The materials described above were consigned to the Transporter named. The consignee can and will accept the shipment and has a valid permit to do so if required. I certify that the foregoing is true and correct to the best of my knowledge.

Payment to the contractor for waste removal does not constitute payment to the carrier and if the contractor does not pay the carrier, the shipper is obligated to pay the agreed rate offered to the contractor.

PLEASE PRINT NAME/TITLE	SHIPPER'S SIGNATURE	DATE LOADED
William R Colvin	X William R Colvin for US Army — I HAVE READ THE ABOVE AND UNDERSTAND AND AGREE TO ALL OF ITS CONTENT.	8/13/16 MO. DAY YR.

CONSIGNEE NAME/ADDRESS	PHONE (AREA CODE)	
[illegible] Belvidere MT	TRACTOR 54	TRAILER 4445
		APPOINTMENT TIME :

FCI REP. UNLOADING (PRINT)	PROCEDURE	EQUIP. SPOTTED	EQUIP. REMOVED	TIME AT CONSIGNEE	(MILITARY TIME ONLY)
D. White	Dump	07	14	16:30 ARRIVAL TIME	18:15 DEPARTURE TIME

COMMENTS OR DELAYS AT CONSIGNEE	EQUIPMENT USED

PLEASE PRINT NAME/TITLE	CONSIGNEE SIGNATURE	DATE UNLOADED
	X [signature]	8/14/16 MO. DAY YR.

AR H-0257	MD HWH-167	MO H-1490	OH UPW-0190713-OH	TX 40705
CT CT-HW-307	2001-OPV-2335	ND WH-429	OK UPW-0190713-OH	WI 11602
DE DE-HW-203	ME ME-HWT-47	NH TNH-0047	ONTARIO, CANADA A 840943	WV UPW-0190713-OH
DE-SW-203	ME-WOT-47	NJ S-2265	PA PA-AH-0067	
IL UPW-0190713-OH	MI UPW-0190713-OH	15939	QUEBEC, CANADA QC-6ML-047	
MA MA-294	MN UPW-0190713-OH	NY NJ-113	RI RI-535	

White - FCI Original
Yellow - FCI Billing
Blue - FCI Office/Customer
Green - Retained by TSDF
Gold - Retained by Generator

S 590773

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NJ321000206607
2. Page 1 of: 1
3. Emergency Response Phone: 732-813-1888
4. Manifest Tracking Number: 011852570 JJK

GENERATOR

5. Generator's Name and Mailing Address
US Dept of Army Fort Monmouth - Main Post
P.O. Box 148
Oceanport, NJ 07757
Generator's Phone:

Generator's Site Address (if different than mailing address)
Main Post
Fort Monmouth NJ 07703

6. Transporter 1 Company Name: Freehold Cartage Inc. (FCI)
U.S. EPA ID Number: NJD 054126164

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Wayne Disposal Inc Site #2 Landfill
49350 N I-94 Service Drive
Belleville, MI 48111
Facility's Phone: 800-592-5489
U.S. EPA ID Number: MID 048090633

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt/Vol	13. Waste Codes
X	1. RQ, UN 3432, Polychlorinated Biphenyls, Solid Mixture, Class 9, PG III ERG# 171	XX1	CM	18000	Y	PCB1
	2. 111-46-13					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
150185WDI - PCB Soil & Concrete
AWI PO # 14486 MF
Truck # 895 Trailer # 4445
Box # 0714

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true

Generator's/Offeror's Printed/Typed Name: William L Calvin
Signature: [signature] for USARMY
Month: 08 Day: 03 Year: 16

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: [illegible]
Signature: [signature]
Month: 08 Day: 03 Year: 16

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
PCB			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in item 18a

Printed/Typed Name: [illegible]
Signature: [signature]
Month: 08 Day: 11 Year: 16

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

TRANSPORTER'S COPY

Wayne Disposal, Inc.

49350 North I-94 Service Drive, Belleville, Michigan 48111

Receipt

AWT ENVIRONMENTAL SERVICES, INC
ATTN: ACCOUNTS PAYABLE
P.O. BOX 128
SAYERVILLE, NJ 08871

Receipt ID: 1266872
EQ Account #: 1070
Manifest / BOL: 011852570JJK
Transporter: FCI
Date: 08/04/2016
Time In: 4:38 PM
Time Out: 5:54 PM

Line	Description Generator	Qty. Unit
1 - 1	I150185WDI - PCB Concrete	21.050 TONS
	Hazardous Surcharge Ton	21.050 TONS
	NJ3210020597 US DEPT. OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 79,020 **Tare:** 36,920 **Net:** 42,100	
2	Wayne Disposal Host Community Agreement Royalty Fee	21.050 TONS
	NJ3210020597 US DEPT. OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 79,020 **Tare:** 36,920 **Net:** 42,100	

NO SALVAGING ON PREMISES

FREEHOLD CARTAGE INC.
P.O. BOX 5010 • FREEHOLD, NJ 07728-5010
(732) 462-1001 • FAX (732) 308-0924

BILL OF LADING

FCI EPA ID NO. NJD054126164

S 590931

350 Pigeon Point Road, New Castle, DE 19720, Phone: (302) 658-2005, Fax: (302) 658-6229
175 Bartow Mun. Airport, Bartow, FL 33830, Phone: (863) 533-4599, Fax: (863) 533-1613
5533 Dunham Road, Maple Heights, OH 44137, Phone: (330) 835-3473, Fax: (330) 835-3732
108 Monahan Avenue, Dunmore, PA 18512, Phone: (570) 342-7232, Fax: (570) 342-7367
132 Myrtle Beach Hwy, Sumter, SC 29153, Phone: (803) 773-2611, Fax. (803) 773-2942

SHIPPER NAME/ADDRESS: Ft Monmouth, Charleston NJ	PHONE (AREA CODE)			
	TRACTOR: 796	TRAILER: 4161	APPOINTMENT TIME: :	
FCI REP. LOADING (PRINT): Richard Plavcan	PROCEDURE: Removal	EQUIP. SPOTTED: —	EQUIP. REMOVED: ~~0450~~ 0504	TIME AT SHIPPER: 12:00 ARRIVAL TIME; (MILITARY TIME ONLY) 13:30 DEPARTURE TIME
COMMENTS OR DELAYS AT SHIPPER: Load Transferred (gross to Coal) RM				EQUIPMENT USED: —
BROKER:				MANIFEST / DOCUMENT NO.
PO#:	WO#: 1116968			

(X) HM		PROPER U.S. D.O.T. SHIPPING NAME	U.S. D.O.T. HAZARDOUS CLASS	NA/UN/NO.	PACKING GROUP	NO. CONT.	CONT. TYPE	NET QUANTITY	UNIT MEASURE	WASTE NO.	FORM
X	1	See Manifest	9	3432	II	1	CM	7	Y		
	2										
	3										

SPECIAL HANDLING INSTRUCTIONS INCLUDING CONTAINER EXEMPTION NUMBER.

SHIPPER'S CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, U.S. EPA and the State. The materials described above were consigned to the Transporter named. The consignee can and will accept the shipment and has a valid permit to do so if required. I certify that the foregoing is true and correct to the best of my knowledge.

Payment to the contractor for waste removal does not constitute payment to the carrier and if the contractor does not pay the carrier, the shipper is obligated to pay the agreed rate offered to the contractor.

PLEASE PRINT NAME/TITLE	SHIPPER'S SIGNATURE	DATE LOADED
William R Colon	X William R Colon for US Army I HAVE READ THE ABOVE AND UNDERSTAND AND AGREE TO ALL OF ITS CONTENT	8/3/16 MO. DAY YR.

CONSIGNEE NAME/ADDRESS: (illegible) Belle II MI	PHONE (AREA CODE)			
	TRACTOR: 796	TRAILER: 4165	APPOINTMENT TIME: :	
FCI REP. UNLOADING (PRINT): Ken Meyers	PROCEDURE: Dump	EQUIP. SPOTTED: 0504	EQUIP. REMOVED	TIME AT CONSIGNEE: 13:30 ARRIVAL TIME; (MILITARY TIME ONLY) 15: DEPARTURE TIME
COMMENTS OR DELAYS AT CONSIGNEE				EQUIPMENT USED

PLEASE PRINT NAME/TITLE	CONSIGNEE SIGNATURE	DATE UNLOADED
	X	8/9/16 MO. DAY YR.

AR H-0257	MD HWH-167	MO H-1490	OH UPW-0190713-OH	TX 40705
CT CT-HW-307	2001-OPV-2335	ND WH-429	OK UPW-0190713-OH	WI 11602
DE DE-HW-203	ME ME-HWT-47	NH TNH-0047	ONTARIO, CANADA A 840943	WV UPW-0190713-OH
DE-SW-203	ME-WOT-47	NJ S-2265	PA PA-AH-0067	
IL UPW-0190713-OH	MI UPW-0190713-OH	15939	QUEBEC, CANADA QC-6ML-047	
MA MA-294	MN UPW-0190713-OH	NY NJ-113	RI RI-535	

White - FCI Original
Yellow - FCI Billing
Blue - FCI Office/Customer
Green - Retained by TSDF
Gold - Retained by Generator

S 590931

Please print or type (Form designed for use on elite (12-pitch) typewriter.) Form Approved OMB No 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NJS210012667	1	732 813 1820	011852565 JJK

GENERATOR

5. Generator's Name and Mailing Address
US Dept of Army-Fort Monmouth - Main Post
P O Box 148
Oceanport, NJ 07757

Generator's Site Address (if different than mailing address)
Main Post
Fort Monmouth NJ 07703

Generator's Phone:

6. Transporter 1 Company Name: Freehold Cartage Inc. (FCI) — U.S. EPA ID Number: NJD 054126164

7. Transporter 2 Company Name: N/A — U.S. EPA ID Number: N/A

8. Designated Facility Name and Site Address
Wayne Disposal Inc Site #2 Landfill
49350 N I-94 Service Drive
Belleville, MI 48111
800-592-2469
U.S. EPA ID Number: MID048090633
Facility's Phone:

9a. HM	9b U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10 Containers No.	10 Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA UN 3432 Polychlorinated biphenyls, Solid, Marine Pollutant, PG III ERG# 171	XX1	CM	30,000	Kg	PCB1
	2.					
	3.					
	4					

14. Special Handling Instructions and Additional Information
115411 USWDI - PCB soil & Concrete
Truck # 796, Trailer # 405
AWP PO # 14485 MP
Lot # 9450 Cell RM

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: William Cahill — Signature: [signature] — Month: 08 Day: 03 Year: 16

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Kevin M — Signature: [signature] — Month: 08 Day: 03 Year: 16

Transporter 2 Printed/Typed Name: — Signature: — Month: Day: Year:

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
D15			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: — Signature: — Month: Day: Year:

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete

TRANSPORTER'S COPY

Wayne Disposal, Inc.

49350 North I-94 Service Drive, Belleville, Michigan 48111

Receipt

AWT ENVIRONMENTAL SERVICES, INC
ATTN ACCOUNTS PAYABLE
P.O. BOX 128
SAYERVILLE, NJ 08871

Receipt ID: 1267046
EQ Account #: 1070
Manifest / BOL: 011852565JJK
Transporter: FCI
Date: 08/09/2016
Time In: 1:42 PM
Time Out: 2:42 PM

Line	Description	Qty. Unit
	Generator	
1 - 1	I150185WDI - PCB Concrete	21.020 TONS
	Hazardous Surcharge Ton	21.020 TONS
	NJ3210020597 US DEPT OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 78,600 Tare: 36,560 Net: 42.040	
2	Wayne Disposal Host Community Agreement Royalty Fee	21.020 TONS
	NJ3210020597 US DEPT OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 78,600 Tare: 36,560 Net: 42.040	

NO SALVAGING ON PREMISES

FREEHOLD CARTAGE INC.

P.O. BOX 5010 • FREEHOLD, NJ 07728-5010
(732) 462-1001 • FAX (732) 308-0924

BILL OF LADING

FCI EPA ID NO. NJD054126164

S 590772

350 Pigeon Point Road	175 Bartow Mun. Airport	5533 Dunham Road	108 Monahan Avenue	132 Myrtle Beach Hwy
New Castle, DE 19720	Bartow, FL 33830	Maple Heights, OH 44137	Dunmore, PA 18512	Sumter, SC 29153
Phone: (302) 658-2005	Phone: (863) 533-4599	Phone: (330) 835-3473	Phone: (570) 342-7232	Phone (803) 773-2611
Fax: (302) 658-6229	Fax: (863) 533-1613	Fax: (330) 835-3732	Fax: (570) 342-7367	Fax (803) 773-2942

SHIPPER NAME/ADDRESS	PHONE (AREA CODE)	TRACTOR	TRAILER	APPOINTMENT TIME
US Army Corps of Engineers Newport, NY		85	4415	:

FCI REP. LOADING (PRINT)	PROCEDURE	EQUIP. SPOTTED	EQUIP. REMOVED	TIME AT SHIPPER	(MILITARY TIME ONLY)
D Cahill	Load		0605	14:15 ARRIVAL TIME	16:40 DEPARTURE TIME

COMMENTS OR DELAYS AT SHIPPER	EQUIPMENT USED

BROKER:

PO#: WO#: 111839

MANIFEST/DOCUMENT NO. 011595566JJ

	(X) HM	PROPER U.S. D.O.T. SHIPPING NAME	U.S. D.O.T HAZARDOUS CLASS	NA/UN NO.	PACKING GROUP	NO. CONT	CONT TYPE	NET QUANTITY	UNIT MEASURE	WASTE NO.	FORM
1		Soil Non-haz	—	—	—	1	DM	30	YD	—	5
2											
3											

SPECIAL HANDLING INSTRUCTIONS INCLUDING CONTAINER EXEMPTION NUMBER.

SHIPPER'S CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, U.S. EPA and the State. The materials described above were consigned to the Transporter named. The consignee can and will accept the shipment and has a valid permit to do so if required. I certify that the foregoing is true and correct to the best of my knowledge.

Payment to the contractor for waste removal does not constitute payment to the carrier and if the contractor does not pay the carrier, the shipper is obligated to pay the agreed rate offered to the contractor.

PLEASE PRINT NAME/TITLE	SHIPPER'S SIGNATURE	DATE LOADED
William R Colvin	X William R Colvin for US Army I HAVE READ THE ABOVE AND UNDERSTAND AND AGREE TO ALL OF ITS CONTENT	6/1/16 MO. DAY YR.

CONSIGNEE NAME/ADDRESS	PHONE (AREA CODE)	TRACTOR	TRAILER	APPOINTMENT TIME
Waste Depot Bethany, NY		87	37	:

FCI REP. UNLOADING (PRINT)	PROCEDURE	EQUIP. SPOTTED	EQUIP. REMOVED	TIME AT CONSIGNEE	(MILITARY TIME ONLY)
D Cahill	Dump	Clear		: ARRIVAL TIME	16:12 DEPARTURE TIME

COMMENTS OR DELAYS AT CONSIGNEE	EQUIPMENT USED

PLEASE PRINT NAME/TITLE	CONSIGNEE SIGNATURE	DATE UNLOADED
	X	6/10/16 MO. DAY YR.

AR H-0257	MD HWH-167	MO H-1490	OH UPW-0190713-OH	TX 40705
CT CT-HW-307	2001-OPV-2335	ND WH-429	OK UPW-0190713-OH	WI 11602
DE DE-HW-203	ME ME-HWT-47	NH TNH-0047	ONTARIO, CANADA A 840943	WV UPW-0190713-OH
DE-SW-203	ME-WOT-47	NJ S-2265	PA PA-AH-0067	
IL UPW-0190713-OH	MI UPW-0190713-OH	15939	QUEBEC, CANADA QC-6ML-047	
MA MA-294	MN UPW-0190713-OH	NY NJ-113	RI RI-535	

White - FCI Original
Yellow - FCI Billing
Blue - FCI Office/Customer
Green - Retained by TSDF
Gold - Retained by Generator

S 590772

Form Approved OMB No 2050-0039

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NJ3210020597
2. Page 1 of: 1
3. Emergency Response Phone: 732-532-1689
4. Manifest Tracking Number: 011352564 JJK

GENERATOR

5. Generator's Name and Mailing Address
US Dept of Army Fort Monmouth Main Post
PO Box 148
Oceanport, NJ 07757

Generator's Site Address (if different than mailing address)
Main Post
Fort Monmouth, NJ 07703

Generator's Phone:

6. Transporter 1 Company Name: Freehold Cartage Inc.
U.S EPA ID Number: NJD 054126164

7. Transporter 2 Company Name
U.S EPA ID Number

8. Designated Facility Name and Site Address
Wayne Disposal Inc Site #2 Landfill
49350 N I-94 Service Drive
Belleville, MI 48111

U.S. EPA ID Number: MID048090634

Facility's Phone: 800-592-6888

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10 Containers No	10 Containers Type	11 Total Quantity	12 Unit Wt./Vol.	13 Waste Codes
X	1. RQ, UN-3432, Polychlorinated biphenyls, Solid, Mixture, Class 9, PG III ERG# 171 Trk # 895 Box 0405	001	CM	2000	KG	PCB1
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
Use (B)WM - PCB Soil & Concrete Trk # 895
WM PO # 114854MP Box # 0405

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: William L. Alwood
Signature
Month 05 Day 01 Year 12

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only) Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name
Signature
Month Day Year
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
U.S. EPA ID Number

18b. Alternate Facility (or Generator)
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. D99 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete

TRANSPORTER'S COPY

Wayne Disposal, Inc.

49350 North I-94 Service Drive, Belleville, Michigan 48111

Receipt

AWT ENVIRONMENTAL SERVICES, INC
ATTN: ACCOUNTS PAYABLE
P.O. BOX 128
SAYERVILLE, NJ 08871

Receipt ID: 1267113
EQ Account #: 1070
Manifest / BOL: 011852564JJK
Transporter: FCI
Date: 08/10/2016
Time In: 3:22 PM
Time Out: 4:26 PM

Line	Description Generator	Qty. Unit
1 - 1	I150185WDI - PCB Concrete	20 950 TONS
	Hazardous Surcharge Ton	20 950 TONS
	NJ3210020597 US DEPT. OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 78,980 Tare: 37,080 Net: 41,900	
2	Wayne Disposal Host Community Agreement Royalty Fee	20 950 TONS
	NJ3210020597 US DEPT. OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 78,980 Tare: 37,080 Net: 41,900	

NO SALVAGING ON PREMISES

FREEHOLD CARTAGE INC.

P.O. BOX 5010 • FREEHOLD, NJ 07728-5010
(732) 462-1001 • FAX (732) 308-0924

BILL OF LADING

FCI EPA ID NO. NJD054126164

S 590953

350 Pigeon Point Road New Castle, DE 19720 Phone: (302) 658-2005 Fax: (302) 658-6229	175 Bartow Mun. Airport Bartow, FL 33830 Phone: (863) 533-4599 Fax: (863) 533-1613	5533 Dunham Road Maple Heights, OH 44137 Phone: (330) 835-3473 Fax: (330) 835-3732	108 Monahan Avenue Dunmore, PA 18512 Phone: (570) 342-7232 Fax: (570) 342-7367	132 Myrtle Beach Hwy Sumter, SC 29153 Phone (803) 773-2611 Fax (803) 773-2942

SHIPPER NAME/ADDRESS: [illegible]	PHONE (AREA CODE)			
	TRACTOR: 796	TRAILER: 4165	APPOINTMENT TIME :	
FCI REP. LOADING (PRINT): [illegible]	PROCEDURE: Removal	EQUIP. SPOTTED	EQUIP. REMOVED: 1301	TIME AT SHIPPER (MILITARY TIME ONLY) : ARRIVAL TIME : DEPARTURE TIME
COMMENTS OR DELAYS AT SHIPPER: Original In House - Lost by wayne Saltzhouse (S-590952)				EQUIPMENT USED

BROKER:

PO#: WO#: 111840

MANIFEST/DOCUMENT NO.

(X) HM		PROPER U.S. D.O.T. SHIPPING NAME	U.S. D.O.T HAZARDOUS CLASS	NA/ID/NO.	PACKING GROUP	NO CONT.	CONT TYPE	NET QUANTITY	UNIT MEASURE	WASTE NO	FORM
X	1		~~9~~ [illegible]	3432	III	1	CM	[illegible]	Y		
	2										
	3										

SPECIAL HANDLING INSTRUCTIONS INCLUDING CONTAINER EXEMPTION NUMBER.

SHIPPER'S CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, U.S. EPA and the State. The materials described above were consigned to the Transporter named. The consignee can and will accept the shipment and has a valid permit to do so if required. I certify that the foregoing is true and correct to the best of my knowledge.

Payment to the contractor for waste removal does not constitute payment to the carrier and if the contractor does not pay the carrier, the shipper is obligated to pay the agreed rate offered to the contractor.

PLEASE PRINT NAME/TITLE	SHIPPER'S SIGNATURE	DATE LOADED
	X _____ I HAVE READ THE ABOVE AND UNDERSTAND AND AGREE TO ALL OF ITS CONTENT	8 / 1 / 16 MO. DAY YR.

CONSIGNEE NAME/ADDRESS: [illegible] Perkville Mill	PHONE (AREA CODE)			
	TRACTOR: 796	TRAILER: 4165	APPOINTMENT TIME :	
FCI REP. UNLOADING (PRINT): [illegible]	PROCEDURE: Dump	EQUIP. SPOTTED	EQUIP. REMOVED	TIME AT CONSIGNEE (MILITARY TIME ONLY) 07:30 ARRIVAL TIME 12:30 DEPARTURE TIME
COMMENTS OR DELAYS AT CONSIGNEE: Original In House - Lost By Wayne Saltzhouse (S-590952)				EQUIPMENT USED

PLEASE PRINT NAME/TITLE	CONSIGNEE SIGNATURE	DATE UNLOADED
	X _____	8 / 2 / 16 MO. DAY YR.

AR H-0257	MD HWH-167 2001-OPV-2335	MO H-1490	OH UPW-0190713-OH	TX 40705
CT CT-HW-307	ME ME-HWT-47 ME-WOT-47	ND WH-429	OK UPW-0190713-OH	WI 11602
DE DE-HW-203 DE-SW-203	MI UPW-0190713-OH	NH TNH-0047	ONTARIO, CANADA A 840943	WV UPW-0190713-OH
IL UPW-0190713-OH	MN UPW-0190713-OH	NJ S-2265 15939	PA PA-AH-0067	
MA MA-294		NY NJ-113	QUEBEC, CANADA QC-6ML-047	
			RI RI-535	

White - FCI Original
Yellow - FCI Billing
Blue - FCI Office/Customer
Green - Retained by TSDF

S 590953

Please print or type. (Form designed for use on elite (12-pitch) typewriter)

Form Approved OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	1		011852563 JJK

GENERATOR

5. Generator's Name and Mailing Address

Generator's Site Address (if different than mailing address)

Generator's Phone

6. Transporter 1 Company Name — U.S. EPA ID Number

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address — U.S. EPA ID Number

Facility's Phone:

9a HM	9b U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. Truck # 196			32,000	Kg	
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information

AWT PO. # 14485-MP

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name — Signature — Month — Day — Year

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter signature (for exports only): Date leaving U.S.

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name — Signature — Month — Day — Year

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month — Day — Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

TRANSPORTER'S COPY

Wayne Disposal, Inc.

49350 North I-94 Service Drive, Belleville, Michigan 48111

Receipt

AWT ENVIRONMENTAL SERVICES INC.
ATTN ACCOUNTS PAYABLE
P.O BOX 128
SAYERVILLE NJ 08871

Receipt ID: 1266731
EQ Account #: 1070
Manifest / BOL: 011852563 JJK
Transporter: FCI
Date: 08/02/2016
Time In: 8 58 AM
Time Out: 10 19 AM

Line	Description Generator	Qty Unit
1 - 1	I150185WDI - PCB Concrete	20 360 TONS
	Hazardous Surcharge Ton	20 350 TONS
	NJ3210020597 US DEPT OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 78,020 Tare: 37,300 Net: 40 720	
2	Wayne Disposal Host Community Agreement Royalty Fee	20 360 TONS
	NJ3210020597 US DEPT OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 78,020 Tare: 37,300 Net: 40 720	

NO SALVAGING ON PREMISES

FREEHOLD CARTAGE INC.
P.O. BOX 5010 • FREEHOLD, NJ 07728-5010
(732) 462-1001 • FAX (732) 308-0924

BILL OF LADING
FCI EPA ID NO. NJD054126164
S 579185

350 Pigeon Point Road, New Castle, DE 19720, Phone: (302) 658-2005, Fax: (302) 658-6229
175 Bartow Mun. Airport, Bartow, FL 33830, Phone: (863) 533-4599, Fax: (863) 533-1613
5533 Dunham Road, Maple Heights, OH 44137, Phone: (330) 835-3473, Fax: (330) 835-3732
108 Monahan Avenue, Dunmore, PA 18512, Phone: (570) 342-7232, Fax: (570) 342-7367
132 Myrtle Beach Hwy, Sumter, SC 29153, Phone: (803) 773-2611, Fax: (803) 773-2942

SHIPPER NAME/ADDRESS: US Dept of Army - Fort Monmouth - Main Post
PO Box 148
Fort Monmouth NJ

PHONE (AREA CODE): 732) 613 - 1660

STATE/PROV: NJ

TRACTOR: 7417

TRAILER:

APPOINTMENT TIME: :

FCI REP. LOADING (PRINT): J. Peters

PROCEDURE: Remove

EQUIP. SPOTTED:

EQUIP. REMOVED: 9741

TIME AT SHIPPER (MILITARY TIME ONLY): 12:15 ARRIVAL TIME; 13:30 DEPARTURE TIME

COMMENTS OR DELAYS AT SHIPPER:

EQUIPMENT USED:

BROKER:

PO#:

WO#: 1116967

MANIFEST/DOCUMENT NO 011852566 SJK

(X) HM		PROPER U.S. D.O.T. SHIPPING NAME	U.S. D.O.T. HAZARDOUS CLASS	NA/UN NO.	PACKING GROUP	NO. CONT.	CONT. TYPE	NET QUANTITY	UNIT MEASURE	WASTE NO.	FORM
X	1	See manifest	9	3432	III	01	CM	20 GOT	K	PCBI	5
	2										
	3										

SPECIAL HANDLING INSTRUCTIONS INCLUDING CONTAINER EXEMPTION NUMBER:

SHIPPER'S CERTIFICATION: This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, U.S. EPA and the State. The materials described above were consigned to the Transporter named. The consignee can and will accept the shipment and has a valid permit to do so if required. I certify that the foregoing is true and correct to the best of my knowledge.

Payment to the contractor for waste removal does not constitute payment to the carrier and if the contractor does not pay the carrier, the shipper is obligated to pay the agreed rate offered to the contractor.

PLEASE PRINT NAME/TITLE: William R Colvin

SHIPPER'S SIGNATURE: x William R Colvin for U.S Army
I HAVE READ THE ABOVE AND UNDERSTAND AND AGREE TO ALL OF ITS CONTENT

DATE LOADED: 08 / 03 / 16 (MO. DAY YR.)

CONSIGNEE NAME/ADDRESS:
Wayne Disposal
Belleville MI

PHONE (AREA CODE): 800) 592 - 9189

STATE/PROV: MI

TRACTOR: 880

TRAILER: 335

APPOINTMENT TIME: :

FCI REP. UNLOADING (PRINT): S Myder

PROCEDURE: Unload

EQUIP. SPOTTED: 9741

EQUIP. REMOVED:

TIME AT CONSIGNEE (MILITARY TIME ONLY): 16.00 ARRIVAL TIME; 17.00 DEPARTURE TIME

COMMENTS OR DELAYS AT CONSIGNEE:

EQUIPMENT USED:

PLEASE PRINT NAME/TITLE:

CONSIGNEE SIGNATURE: X

DATE UNLOADED: 8 / 9 / 16 (MO. DAY YR.)

AR H-0257	MD HWH-167 2001-OPV-2335	MO H-1490	OH UPW-0190713-OH	TX 40705
CT CT-HW-307	ME ME-HWT-47 ME-WOT-47	ND WH-429	OK UPW-0190713-OH	WI 11602
DE DE-HW-203 DE-SW-203	MI UPW-0190713-OH	NH TNH-0047	ONTARIO, CANADA A 840943	WV UPW-0190713-OH
IL UPW-0190713-OH	MN UPW-0190713-OH	NJ S-2265 15939	PA PA-AH-0067	
MA MA-294		NY NJ-113	QUEBEC, CANADA QC-6ML-047	
			RI RI-535	

White - FCI Original
Yellow - FCI Billing
Blue - FCI Office/Customer
Green - Retained by TSDF
Gold - Retained by Generator

S 579185

Please print or type (Form designed for use on elite (12-pitch) typewriter)

Form Approved OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NJ3210020597	1	732-813-1888	011852566 JJK

GENERATOR

5. Generator's Name and Mailing Address
US Dept of Army Fort Monmouth - Main Post
P O Box 148
Oceanport, NJ 07757
Generator's Phone

Generator's Site Address (if different than mailing address)
Main Post
Fort Monmouth, NJ 07703

6. Transporter 1 Company Name: Freehold Cartage Inc. (FCI) — U.S. EPA ID Number: NJD 054126114

7. Transporter 2 Company Name: n/a — U.S. EPA ID Number: n/a

8. Designated Facility Name and Site Address
Wayne Disposal Inc Site #2 Landfill
49350 N I-94 Service Drive
Belleville, MI 48111
Facility's Phone: 800-592-5489
U.S. EPA ID Number: MID048090633

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number and Packing Group (if any))	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, UN-3432, Polychlorinated Biphenyls, Solid Mixture, Class 9, PG III ERG# 171	XX1	CM	20,000	Kg	PCB1
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
150185WDI - PCB Soil & Concrete Truck # 747 Box # 0741
AWI PO # 14486 MP

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true

Generator's/Offeror's Printed/Typed Name: William R Colvin
Signature: William R Colvin for U.S. Army
Month: 08 Day: 03 Year: 16

INT'L

16. International Shipments ☐ Import to U.S ☐ Export from U.S
Transporter signature (for exports only)
Port of entry/exit:
Date leaving U.S

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Ken Greco
Signature: Ken Greco
Month: 08 Day: 03 Year: 16

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e. codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
P 15			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name:
Signature:
Month: Day: Year:

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete

TRANSPORTER'S COPY

Wayne Disposal, Inc.

49350 North I-94 Service Drive, Belleville, Michigan 48111

Receipt

AWT ENVIRONMENTAL SERVICES, INC
ATTN: ACCOUNTS PAYABLE
P.O. BOX 128
SAYERVILLE, NJ 08871

Receipt ID: 1267058
EQ Account #: 1070
Manifest / BOL: 011852566JJK
Transporter: FCI
Date: 08/09/2016
Time In: 4:18 PM
Time Out: 5:03 PM

Line	Description Generator	Qty. Unit
1 - 1	I150185WDI - PCB Concrete	20.300 TONS
	Hazardous Surcharge Ton	20.300 TONS
	NJ3210020597 US DEPT. OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 77,720 Tare: 37,120 Net: 40,600	
2	Wayne Disposal Host Community Agreement Royalty Fee	20.300 TONS
	NJ3210020597 US DEPT. OF ARMY-FORT MONMOUTH MAIN POST	
	Gross: 77,720 Tare: 37,120 Net: 40,600	

NO SALVAGING ON PREMISES

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NJ3210020597	1	732-613-1660	011852576 JJK

GENERATOR

5. Generator's Name and Mailing Address
US Dept of Army-Fort Monmouth - Main Post
P.O. Box 148
Oceanport, NJ 07757

Generator's Site Address (if different than mailing address)
Main Post
Fort Mounmouth, NJ 07703

Generator's Phone:

6. Transporter 1 Company Name: Maumee Express, Inc. — U.S. EPA ID Number: NJD986607380

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Cycle Chem, Inc.
217 South First Street
Elizabeth, NJ 07206
Facility's Phone: 908-355-5800

U.S. EPA ID Number: NJRAA2200046

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN-2315 - Polychlorinated Biphenyls - Liquid, Class 9, PG II	16	DM	5,600	P	
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
PCB Contaminated Water 90-100%, Soil/Debris 0-10%
AWT P.O. # 14485-MP

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: William R. Colvin for US Army — Signature: William Colvin for US Army — Month: 08 Day: 29 Year: 16

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: M. Anderson — Signature: — Month: 8 Day: 29 Year: 16

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
14-1) 2545 13-1) K 14-1) 0588/29/16 Manifest Reference Number: 5) 732 583 5140

18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month — Day — Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H141			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: M. Anderson — Signature: — Month: 08 Day: 29 Year: 16

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

APPENDIX H

Human Health Risk Assessment

HUMAN HEALTH RISK ASSESSMENT
FORT MONMOUTH
PARCEL 57

July 3, 2018

Contract Number W912DY-09-D-0062, Task Order 0012

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ACRONYMS AND ABBREVIATIONS

µg	micrograms
ADAF	Age Dependent Adjustment Factor
AST	aboveground storage tank
atm	atmosphere
ATSDR	Agency for Toxic Substances and Disease Registry
BaP	benzo(a)pyrene
bgs	below ground surface
C_a	contaminant concentration in air
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	constituent of potential concern
C_{sat}	chemical-specific soil saturation
CSM	conceptual site model
DAD	dermal absorbed dose
EC(air)	exposure concentration in air
EPC	exposure point concentration
ELCR	excess lifetime cancer risk
ft	feet
FTMM	Fort Monmouth
FS	Feasibility Study
g	grams
GIABS	gastrointestinal absorption factors
HEAST	Health Effects Assessment Tables
Hg	mercury
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
kg	kilograms
LOAEL	lowest observed adverse effect level
m^3	cubic meters
mg	miligrams
mm	milimeters
MOA	mode of action
MP	Main Post
MRL	Minimal Risk Level
NCP	National Contingency Plan
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NOAEL	no observed adverse effect level
OAF	oral absorption factors
OEHHA	Office of Environmental Health Hazard Assessment

ACRONYMS AND ABBREVIATIONS (*continued*)

PAH	polycyclic aromatic hydrocarbon
PEF	particulate emission factor
PPRTV	Provisional Peer Reviewed Toxicity Value
Q/C	Site-Specific Dispersion Model
RAGS	Risk Assessment Guidance for Superfund
RfC	reference concentration
RfD	reference dose
RfD_d	dermal reference dose
RfD_o	oral reference dose
RI	Remedial Investigation
RME	reasonable maximum exposure
RPF	relative potency factor
RSL	Regional Screening Levels
s	seconds
SF	slope factor
SF_d	dermal slope factor
SF_o	oral slope factor
THQ	target hazard quotient
TR	target risk
TRSR	Technical Requirements for Site Remediation
UCL	upper confidence limit
USEPA	United Stattes Environmental Protection Agency
UST	underground storage tank
UU/UE	unlimited use and unrestricted exposure
VF	volatilization factor

SECTION 1
INTRODUCTION

1.1 Overall Introduction

This risk assessment is part of the Remedial Investigation (RI) report for Parcel 57 at Fort Monmouth, New Jersey. Specific activities that are being performed under this project include:

1. Performance of RIs and Feasibility Studies (FS), and preparation of RI/FS reports to achieve acceptance of Decision Documents in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300 and to the extent possible to meet the substantive remedial requirements of New Jersey Administrative Code (N.J.A.C.) 7:26E Technical Requirements for Site Remediation (TRSR); and
2. Support for the closure of environmental sites to facilitate the efficient transfer of real property to other parties.

This risk assessment was conducted according to the Final Human Health Risk Assessment Work Plan for RI/FS at Fort Monmouth Army Installation, Non-Landfill Sites (Parsons, 2015).

Section 1 of this risk assessment is a brief introduction including a description of the site and the data evaluation for the human health risk assessment. Section 2 describes the human health risk assessment (HHRA) and Section 3 presents the references used in the preparation of this document. Tables and figures referenced in this report follow Section 3.

1.2 Site Description

Parcel 57 is located in the south-central portion of the Main Post (MP) (RI report Figure 1). A coal storage area and fuel unloading area formerly existed along the former railroad corridor in the vicinity of Buildings 800, 801, and 1007 (US Army BRAC, 2008). Fort Monmouth (FTMM) real property records indicate that the T-805 coal storage concrete slab was constructed in 1945, and was replaced by new construction in 1977. The concrete pad was 96 feet (ft) wide by 563 ft long. Coal piles are visible in aerial photographs taken in 1947, 1957, and 1963, but are no longer visible in photographs from 1969 and 1970. The aerial photographs indicate coal storage on the concrete pad and also on an adjoining area east of the pad (RI report Figure 2).

A substantial portion of the Parcel 57 vicinity is currently covered by Buildings 800, 801, 1005, 1007, and 1010, and portions of Building 1000 and 1002 (RI report Figure 3). Asphalt pavement for parking areas and roads covers approximately half of the parcel, and a relatively small portion of the parcel (less than 10 percent) consists of landscaped areas. The site is currently unoccupied. Future land use includes low-to-medium-density residential housing and some supporting retail, office, and civic/institutional uses (education-medical campus).

Multiple fuel oil underground storage tanks (USTs), a bulk fuel oil aboveground storage tank (AST), and several structures related to fuel storage or transfer were once present at or near Parcel 57 as shown on a historical 1956 engineering drawing of the site (RI report Figure 2). Also shown on this figure is the location of the former concrete coal storage pad and coal storage area. The 250,000 gallon bulk fuel oil AST was located at adjacent IRP site FTMM-66 to the east of Parcel 57. Former gasoline

USTs were located at adjacent IRP site FTMM-64 to the southeast, as well as a pipeline to a fuel loading/unloading area at the former railroad tracks.

The soil at Parcel 57 consists primarily of sand with some silt to at least six feet below ground surface (ft bgs). In some borings, deeper soils below six ft bgs consist of olive green sandy clays, indicating glauconitic materials. The depth to groundwater at Parcel 57 typically ranged from approximately 5 to 11 ft bgs. Groundwater is expected to flow north to northwest toward Husky Brook Creek based on wells at Parcel 57 and IRP Sites FTMM-64 and FTMM-66. Several borings encountered indications of fill at Parcel 57 such as pieces of concrete, wood, coal, or asphalt at varying depths from the ground surface to 7.5 ft bgs.

1.3 Data Evaluation

Parcel 57 has previously been sampled by others as well as by Parsons in 2015 and 2016. The available sampling data are summarized in the RI report. Sample data associated with Parcel 57 include soil and groundwater samples. Soil samples were collected in areas where it was expected that soil contamination could be present. Groundwater samples were collected from monitoring wells within and adjacent to Parcel 57.

Chemical results with final validation qualifiers of any letter other than "U," "UJ," or "R" will be considered detected and suitable for use in risk assessment; therefore "J," "E" or "ER", and "D" qualified data results will be used in the risk assessment (United States Environmental Protection Agency [USEPA], 1989). "B" and "BJ" qualified data results will be included in the risk assessment data set, as recommended by USEPA, but will be considered not detected (USEPA, 1989).

1.3.1 Selection of Constituents of Potential Concern

Constituents of potential concern (COPCs) in soil were identified by comparing the maximum detected concentration of each analyte to the USEPA residential Regional Screening Levels (RSL) (Target Risk [TR] = $1x10^{-6}$ and Target Hazard Quotient [THQ] = 0.1) (USEPA, 2017a). The THQ of 0.1 was used during screening and selection of COPCs to account for cumulative effects of non-carcinogenic chemicals. The results of the COPC identification process are presented in the RI report. For the purposes of the risk assessment (i.e., because different receptors may be exposed to different soil intervals), COPCs in soil were identified for surface soil (0 to 2 feet bgs) and for combined surface and subsurface soil (0 to 15 feet bgs).

It should be noted that only residential screening values were used in determining COPCs for this risk assessment, although a number of site receptors evaluated (e.g., onsite worker, construction worker) do not conform to a conventional residential site use pattern. Developing one COPC list for all receptors based on residential screening values is very conservative; it ensures that every site chemical that could possibly contribute to risk or hazard is considered.

COPCs in groundwater were identified by comparing the maximum detected concentrations of samples collected from permanent wells between February 2011 and May 2016 to the USEPA tapwater RSL (TR = $1x10^{-6}$ and THQ = 0.1) (USEPA, 2017a). Analytes that are detected at concentrations greater than USEPA tapwater RSLs are considered COPCs unless they are determined to be associated with non-site-related contamination (i.e., contamination introduced at the laboratory or during field sampling, or emanating from an upgradient source unrelated to the site). Detected analytes that exceed the tapwater RSL are then assessed more holistically to determine whether exceedances are representative of site-related contamination, or are due to other factors such as turbidity or upgradient sources. The process used, and the results of the COPC identification process, are presented in the RI report.

Elevated turbidity can result in concentrations of metals in groundwater that are higher than that found in better quality groundwater resources. Metals exceeding screening levels were exempted from being identified as COPCs as a result of this holistic assessment if any of the following conditions were met:

- There are only a small number of exceedances during the most recent sampling events such that the exceedances were anomalous outliers and not representative of the vast majority of the data;
- The exceedances occur early in the time period encompassed by the most recent sampling events, and concentrations in subsequent samples are below the screening value;
- The exceedances only occur in an upgradient monitoring well; and/or
- The metal is classified as an essential human nutrient (i.e., calcium, iron, magnesium, potassium, and sodium).

The screening levels referenced are based on the most current published values at the time this risk assessment report was prepared.

SECTION 2
HUMAN HEALTH RISK ASSESSMENT

2.1 Risk Assessment Process

The HHRA provides an evaluation of the potential risks to human health posed by chemicals detected in surface soil, combined surface and subsurface soil, and groundwater associated with Parcel 57 at the Former Fort Monmouth. As presented in USEPA guidance documents, the HHRA is a four-step evaluation process which includes:

- Data evaluation and identification of COPC;
- Exposure assessment;
- Toxicity assessment; and
- Risk characterization.

Each of these steps is discussed in detail in the following subsections.

2.2 Identification of Constituents of Potential Concern

2.2.1 Selection of Constituents of Potential Concern

Concentrations of detected chemicals were compared to screening levels to identify COPCs. COPCs were selected by comparing the maximum concentration of each detected analyte in soil and groundwater samples to selected screening levels. Generally, those analytes that are present at concentrations greater than screening levels were retained as COPCs for further evaluation; chemicals detected at concentrations below these screening levels were not considered COPCs. The screening process is presented in Section 1.3 above.

2.2.2 Constituents of Potential Concern Results

Surface Soil (0 to 2 feet bgs): As shown on Table 3 of the RI report, benzo(a)anthracene, benzo(a)pyrene (BaP), benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic, cobalt, and vanadium are identified as COPCs in soil. Of these COPCs, benzo(a)anthracene, BaP, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene are considered mutagens by the USEPA (USEPA, 2017a).

Combined Surface and Subsurface Soil (0 to 15 feet bgs): As shown on Table 3 of the RI report, benzo(a)anthracene, BaP, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic, cobalt, and vanadium are identified as COPCs in soil. Of these COPCs, benzo(a)anthracene, BaP, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene are considered mutagens by the USEPA (USEPA, 2017a).

Groundwater: As shown on Table 6 of the RI report, aluminum, cadmium, nickel, and zinc are COPCs in groundwater. None of these are considered mutagens by the USEPA (USEPA, 2017a).

Vapor Intrusion: As described above, four COPCs were identified in groundwater. Only volatile COPCs are evaluated for vapor intrusion. Volatile compounds are operationally defined as those COPCs with a Henry's Law constant greater than or equal to 1×10^{-5} atmosphere-cubic meters ($atm\text{-}m^3$) per mole or a vapor pressure greater than or equal to 1 millimeter of mercury (mm Hg) (USEPA, 2017b). There are no volatile COPCs in groundwater.

2.3 Exposure Assessment

The exposure assessment consists of three main elements:

1. Evaluation of exposure pathways and identification of receptors;
2. Estimation of exposure point concentrations (EPCs); and
3. Estimation of human intake.

The RA evaluates the reasonable maximum exposure (RME), as defined by USEPA (1993a). The RME is designed to be a measure of "high-end" exposure. USEPA (2004a) describes the selection of exposure parameters to support the RME as follows:

> In comparison with the average exposure, the "high end" exposure estimate is defined as the highest exposure that is reasonably expected to occur at a site but that is still within the range of possible exposures, referred to as the RME (USEPA, 1989). According to the Guidance on Risk Characterization for Risk Managers and Risk Assessors (USEPA, 1992), risk assessors should approach the estimation of the RME by identifying the most sensitive exposure parameters. The sensitivity of a parameter generally refers to its impact on the exposure estimates, which correlates with the degree of variability of the parameter values. Parameters with a high degree of variability in the distribution of parameter values are likely to have a greater impact on the range of risk estimates than those with low variability. For one or a few of the sensitive parameters, the maximum or near-maximum values should be used, with central tendency or average values used for all other parameters. The high-end estimates are based, in some cases, on statistically based criteria (95th or 90th percentiles), and in others, on best professional judgment. In general, exposure duration, exposure frequency, and contact rate are likely to be the most sensitive parameters in an exposure assessment (USEPA, 1989).

2.3.1 Conceptual Site Model

2.3.1.1 Evaluation of Exposure Pathways and Identification of Receptors

A conceptual site model (CSM) is used to qualitatively define the type of potential exposures to contaminants at or migrating from a site (i.e., to systematically evaluate the effect of chemicals in relevant media on potential receptors). The CSM describes onsite release points, affected physical media, types of contaminant transport and fate mechanisms that may be involved at the site, each group of potentially exposed populations or receptors, and how each receptor group may contact site-related contamination. The CSM is used to summarize existing site characterization data, including assumptions about land, groundwater and surface water use, and to complete a qualitative exposure pathway assessment. A CSM diagram has been developed for Parcel 57 and is presented in **Figure H.2.1**.

2.3.1.2 Evaluation of Exposure Pathways and Identification of Receptors

An exposure pathway evaluation describes how a receptor could be exposed to COPCs at, or migrating from, a site. A potentially complete exposure pathway consists of four necessary elements:

- A source and mechanism of chemical release;
- An environmental transport medium;
- A point of potential contact with a receptor; and
- A feasible route of exposure at the exposure point.

An exposure pathway evaluation describes how a receptor could be exposed to COPCs at, or migrating from, a site. A potentially complete exposure pathway consists of four necessary elements:

- A source and mechanism of chemical release;
- An environmental transport medium;
- A point of potential contact with a receptor; and
- A feasible route of exposure at the exposure point.

The potentially complete exposure pathways and receptors at Parcel 57 are identified in this section. The site-specific CSM (**Figure H.2.1**) identifies the exposure pathways and receptors that are present at specific sites. Consistent with Risk Assessment Guidance for Superfund (RAGS) (USEPA, 1989), current and future land-use scenarios were considered for the site.

The surface water and sediment exposure pathways are incomplete for all human receptors because there is no surface water or sediment present within Parcel 57. The ingestion of biota pathways are incomplete for all human receptors because there is no source of biota for human ingestion.

Volatile compounds in groundwater may migrate upwards and be discharged to ambient (i.e., outdoor) air where receptors at the site may be exposed to them via inhalation. Additionally, inhalation of vapors migrating from groundwater to indoor air is evaluated. These pathways are incomplete because there are no volatile COPCs in groundwater. Volatile compounds are operationally defined as those COPCs with a Henry's Law constant greater than or equal to 1×10^{-5} atm-m^3 per mole or a vapor pressure greater than or equal to 1 mm Hg (USEPA, 2017b).

The site-specific CSM for potential human exposures is depicted in **Figure H.2.1**, and is formulated according to applicable guidance, with the use of professional judgment and site-specific information on land use, water use, contaminant sources, release mechanisms, routes of migration, potential exposure points, potential routes of exposure, and potential receptor groups associated with the site. In accordance with the site-specific CSM, risk was quantitatively or qualitatively evaluated for the following potential human exposure scenarios:

- **Current/Future receptors under the unlimited use and unrestricted exposure (UU/UE) scenario**: There is currently no residential use at Parcel 57, but the site zoning includes residential use. Therefore, in order to provide a complete evaluation of the site in the risk assessment, Parcel 57 has been evaluated for UU/UE, in the absence of institutional controls, including any restrictions on the use of groundwater. Evaluation of the UU/UE scenario allows risk management decisions to be made regarding restrictions on future use of the property. To quantify exposure and risk under the UU/UE scenario (hereafter UU/UE receptors), the most conservative exposures are those that are consistent with a residential exposure scenario (i.e., an exposure scenario that considers long-term exposure of both children and adults to potentially contaminated environmental media). For UU/UE receptors the HHRA evaluates exposure over a 6-year span as a child and a 20-year span as an adult.
    - Potential exposure of UU/UE receptors to COPCs in surface soil (0 to 2 feet bgs) and subsurface soil (2 to 15 ft bgs) by incidental ingestion, dermal contact, and inhalation of ambient dust and vapors in ambient air is evaluated.
    - Although groundwater at the site currently is not used as a potable water source and it is anticipated that groundwater use will be restricted following property transfer, groundwater as a potable water source for UU/UE receptors is evaluated. Although alternative potable water supplies (i.e., municipal water

supplies) are currently used at the site, and will continue to be used at the site, New Jersey Department of Environmental Protection (NJDEP) considers all groundwater as a potential potable water supply. Therefore, potential exposure of current and future UU/UE receptors to potable groundwater by ingestion, dermal contact, and inhalation of volatiles emitted from potable uses of groundwater is evaluated. Evaluation of these pathways allows for a determination regarding the need for future groundwater restrictions.

- **Current/Future Outdoor Workers (e.g., landscaping personnel, maintenance workers)**: This scenario represents those workers that are present within the area. Outdoor workers are expected to perform any necessary maintenance or landscaping activities resulting in long-term exposure to potentially contaminated media (e.g., exposure duration 25 years), several days of the week (e.g., exposure frequency 225 days/year).
    - Potential exposure of outdoor workers to COPCs in surface soil (0 to 2 feet bgs) by incidental ingestion, dermal contact, and inhalation of ambient dust and vapors in ambient air is evaluated. Outdoor workers are not expected to encounter soil greater than 2 feet bgs, therefore, exposure to subsurface soil is not evaluated for outdoor workers at Parcel 57.
    - Groundwater at the site is currently not used as a potable water source and current/future outdoor workers are not expected to be exposed to groundwater during routine activities; therefore, exposure to groundwater is an incomplete pathway and will not be evaluated for outdoor workers.
- **Current / Future Recreational Users:** This scenario represents adolescent and adult receptors that may use only those sites designated for passive open space for recreational purposes.
    - Potential exposure of current/future recreational users to COPCs in surface soil (0 to 2 feet bgs) by incidental ingestion, dermal contact, and inhalation of ambient dust and vapors in ambient air, in part as an adolescent (aged 6-<16 years) and in part as an adult, is evaluated. Recreational users are not expected to encounter subsurface soil (2 to 15 feet bgs). Therefore, exposure to subsurface soil is an incomplete pathway.
    - Groundwater at the site is currently not used as a potable water source and current/future recreational users are not expected to be exposed to groundwater during recreational visits; therefore, exposure to groundwater is an incomplete pathway.
- **Current/Future Utility Workers:** This scenario is expected to represent utility workers that would typically be involved in a single short-term excavation project at a given location, such as would be expected to be associated with repair or installation of utility lines. It is not expected that the same crew would return to the same location to conduct additional repair, installation, or maintenance of underground utility lines.
    - Potential exposure of utility workers to soil (0 to 15 feet bgs) through incidental ingestion, dermal contact, and inhalation of ambient dust and vapors in ambient air is evaluated.
    - The depth to groundwater in the Parcel 57 area is approximately five to eleven feet bgs. Utility workers may be exposed to contaminants present in groundwater through incidental ingestion, dermal contact, and inhalation of

volatile contaminants. Exposure of utility workers exposed to COPCs through incidental ingestion and dermal contact is quantitatively evaluated. Volatile compounds in soil gas and/or groundwater may migrate upwards and be discharged to ambient (i.e., outdoor) air where utility workers at the site may be exposed to them via inhalation. While utility workers may be exposed to volatile compounds present in groundwater, there is no validated model available to quantify that exposure. Therefore, this exposure pathway is qualitatively evaluated.

The exposure scenarios selected for evaluation are anticipated to account for the range of reasonably anticipated exposures under current and future conditions at the site. The scenarios selected are sufficiently conservative to adequately address other less common scenarios for soil and groundwater. Specifically, the UU/UE receptor is protective of school, medical, and administrative users (i.e., institutional users), and the outdoor worker is protective of the indoor worker.

A summary of the relevant receptors and exposure scenarios is provided in **Table H.2.1**.

The exposure assumptions used for estimating chemical intake are presented in **Table H.2.2** for soil and **Table H.2.3** for groundwater.

2.3.1.3 Exposure Area

An exposure area is the area over which sampling data are aggregated for estimation of risk. The size and location of the exposure area is commensurate with the assumed activity patterns of each specific receptor. Exposure areas for different receptors may overlap, that is, the UU/UE receptors would be expected to be exposed to an area of less than a half acre in size, while outdoor workers would be expected to be exposed to a larger area. The exposure areas are defined considering the results of the source area investigation (e.g., the center point of the most contaminated areas) and activity patterns of the potential receptors being evaluated. Locations of the highest detected concentrations within Parcel 57 have been evaluated spatially to determine best placement of exposure area boundaries for the RA, to ensure that the highest detected concentrations are evaluated in the RA.

Figure H.2.2 shows the soil exposure areas for Parcel 57. The exposure areas are the areas at the site with the highest concentrations of COPCs that would be most likely to pose an unacceptable risk to potential receptors. For groundwater, the exposure area is the entire site. However, exposure is expected to be limited to a single sample location, as exposure to groundwater would be expected to occur at a single point, either through installation of a well, or excavation by a utility worker. Each groundwater well location is considered a separate exposure point, because it is assumed each well is an individual potential source of drinking water.

2.3.2 Estimation of Exposure Point Concentrations

EPCs are the concentrations of chemicals in a given medium to which a receptor may be exposed at a specific location known as the "exposure point." EPCs are estimated using a combination of available analytical data and fate and transport modeling data to represent the RME that is expected to occur at the site. EPCs for soil are the 95 percent upper confidence limit (95% UCL) of each analyte by applicable depth interval. If there was an insufficient sample size to calculate a 95% UCL, the maximum detected concentration was used as the EPC. The EPCs for groundwater are the maximum detected concentration from each well, from samples collected from February 2011 through May 2016.

The data tables present results for all samples, including primary and duplicate samples and are included in the RI report. The “best value” sample result of all primary and duplicate results were used to determine the EPC. If both values represent detected concentrations, then the highest detected concentration (i.e., the most conservative) was retained. If one value represents a detected concentration

and one value is qualified as not detected, then the detected value was retained. If both values are qualified as not detected, the highest value was retained.

Polycyclic aromatic hydrocarbons (PAH) found in environmental samples are almost always present in complex mixtures. Therefore, a consideration of the risks associated with exposure to the entire suite of carcinogenic PAHs was considered. BaP is the most researched carcinogenic PAH, and the carcinogenicity of other PAHs is determined relative to BaP. A Relative Potency Factor (RPF) approach was used to calculate a BaP-equivalent concentration (USEPA, 1993b). A BaP-equivalent concentration was calculated for the carcinogenic PAHs by multiplying the individual results for the carcinogenic PAH by the RPF for each sample, and summing the values. The 95% UCL BaP-equivalent concentration was selected for use as the EPC. The RPFs for each carcinogenic PAH are shown in **Table H.2.4**. If there was an insufficient sample size to calculate a 95% UCL, the maximum detected concentration was used for the EPC. BaP-equivalent concentrations were calculated for surface soil, combined surface and subsurface soil.

EPCs for risk estimation were calculated for each receptor type as follows:

- The soil EPCs were the 95%UCL on the mean. If there was an insufficient sample size to calculate a 95% UCL, the maximum detected concentration was used for the EPC. Soil EPCs for the UU/UE and utility worker scenarios were calculated by aggregating analytical data collected from the exposure area for combined surface and subsurface soil (0-≤15 feet bgs). Soil EPCs for the outdoor worker and recreational user scenarios were estimated from the analytical data collected from the exposure area for surface soil (0-≤2 feet bgs). Soil EPCs are shown in **Tables H.2.5 and H.2.6.**
- In accordance with the approved final risk assessment work plan for non-landfill sites (Parsons, 2015), the groundwater EPCs were the maximum detected result of each analyte from the samples collected from the three sampling events conducted from the time period of February 2011 through May 2016 from all wells. In addition, the risk for each well was estimated using the maximum detected concentration from each well. Groundwater EPCs for all wells combined and for individual wells are shown in **Table H.2.7.**

2.3.3 Estimation of Human Intake

Human intake, expressed as milligrams of chemical per kilogram of body weight per day (mg/kg-day), is obtained by multiplying the EPC by exposure factors specific to an exposure scenario. The resultant intake is compared to a carcinogenic slope factor or noncarcinogenic reference dose to derive the carcinogenic risks and noncarcinogenic hazards associated with potential exposures from the site.

The following general equation (USEPA, 1989) is used to quantify the intake of COPCs by potential receptors:

$$Intake = \frac{(C)(CR)\ (EF)(ED)}{(BW)(AT)}$$

Where:
- C = Chemical concentration in medium (mg/kg)
- CR = Contact rate (amount/unit time)
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years)
- BW = Body weight (kg)
- AT = Averaging time (days), for noncarcinogens, equal to ED x 365 day/year; for carcinogens, equal to 70 year assumed lifespan x 365 days/year)

In accordance with USEPA guidance (1989), human intake for carcinogens is calculated differently from those for noncarcinogens. For carcinogens, human intake is averaged over an assumed lifetime of 70 years, because cancer is considered to be a non-threshold phenomenon, and multiple individual chemical exposures which could result in the development of cancer are accrued over a lifetime. The probability of developing cancer is believed to be proportional to the duration and intensity of exposure. That is to say, the probability of developing cancer is proportional to the dose of chemical absorbed into the body, the frequency of exposure, and the duration of exposure.

For cancer assessments that require evaluation of multiple age groups simultaneously, such as UU/UE receptors and recreational users, age-adjusted factors are used to account for the periods of an individual's life spent as a child or adolescent and as an adult. For UU/UE receptors, inputs consistent with residential exposure were used to calculate intakes for carcinogens, and it is assumed that exposure would occur in part as a child (aged 0-<6 years) and the remainder as an adult (the subsequent 20 years). For recreational users, it is assumed that exposure would occur in part as an adolescent (aged 6-<16 years) and in part as an adult (aged 16-<30 years). The age-adjusted factor ($Factor_{adj}$) encompasses the contact rate, exposure duration, and body weight in all cancer assessments for which a portion of the exposure would be expected to occur as a child or adolescent (subscripted "adl") and a portion as an adult, as these are the exposure parameters that are expected to differ between children, adolescents, and adults. This factor is calculated as follows:

$$Factor_{adj} = \left[\frac{(ED_{adl\ or\ child})\ (CR_{adl\ or\ child})}{(BW_{adl\ or\ child})}\right] + \left[\frac{(ED_{adult})\ (CR_{adult})}{(BW_{adult})}\right]$$

Where:

	$ED_{adl\ or\ child}$	=	Adolescent or child exposure duration (years)
	$CR_{adl\ or\ child}$	=	Adolescent or child contact rate (amount/unit time)
	ED_{adult}	=	Total exposure duration of both adult and child (years)
	CR_{adult}	=	Adult contact rate (amount/unit time)
	$BW_{adl\ or\ child}$	=	Adolescent or child body weight (kg)
	BW_{adult}	=	Adult body weight (kg)

Outdoor workers and utility workers are included only as adult receptors. Therefore, an age-adjusted factor is not used for these receptors to estimate carcinogenic intake.

For noncarcinogens, the intake is averaged only over the duration of exposure. This reflects the assumption that noncarcinogenic effects have a toxicity threshold. Adverse health effects could result if the toxicity threshold were exceeded for a period of time corresponding to the exposure duration. Conversely, intake of a chemical below the toxicity threshold for a period of time corresponding to the exposure duration would not be expected to result in adverse health effects in the receptor. Therefore, intake is calculated separately for different age groups for noncarcinogens.

Appropriate exposure factors were used to calculate pathway-specific intake factors for all complete pathways at the site. When appropriate, site-specific information was used to develop reasonable yet conservative exposure factors. When neither site-specific information nor default values were available, best professional judgment was used to select appropriate exposure parameters. The equations for calculating both carcinogenic and noncarcinogenic intake of non-mutagenic COPCs are provided in the following subsections. The calculation of human intake of mutagenic COPCs is discussed below in Subsection 2.3.3.8.

2.2.5.1 Intake Equations for Soil

Soil Ingestion

The following equations (USEPA, 1989) will be used to calculate the intake (expressed as mg/kg-day) associated with the incidental ingestion of COPCs in soil. The exposure parameter values, definition and units, and source of the value for the inputs as described in the equations below are shown for each receptor in **Table H.2.2**.

Intakes from incidental ingestion of noncarcinogenic COPCs in soil, as applicable, were calculated for the UU/UE receptors (adult and child separately), outdoor workers, and utility workers, and recreational users (adult and adolescent separately) as:

$$Ingestion = \frac{(C_S)\ (IRS)\ (EF)\ (ED)\ (CF_S)(FI)}{(AT)\ (BW)}$$

Where:
- C_S = Contaminant concentration in soil (mg/kg)
- IRS = Ingestion rate soil (mg/day) - for adult, adolescent, or child receptors, as applicable
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years) - for adult, adolescent, or child receptors, as applicable
- CF_S = Conversion factor for soil (1E-06 kg/mg)
- FI = Fraction soil ingested from source (unitless)
- AT = Averaging time (days) - for noncarcinogens, equal to ED x 365 days/year
- BW = Body weight (kg) - for adult, adolescent, or child receptors, as applicable

For scenarios that require evaluation of multiple age groups simultaneously, such as for UU/UE receptors and recreational users, the carcinogenic age-adjusted intake from incidental ingestion is calculated as:

$$Ingestion_{age-adj} = \frac{(C_s)\ \left(IFS_{adj}\right)\ (EF)\ (CF_s)\ (FI)}{(AT)}$$

Where:

$$IFS_{adj} = \left(\frac{(ED_{adl\ or\ child})(IRS_{adl\ or\ child})}{(BW_{adl\ or\ child})}\right) + \left(\frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}\right)$$

Where:
- C_s = Contaminant concentration in soil (mg/kg)
- IFS_{adj} = Age-adjusted soil ingestion factor (mg-year/kg-day)
- IRS_{adult} = Ingestion rate soil (mg /day) - adult
- IRS_{adl} = Ingestion rate soil (mg /day) - adolescent
- IRS_{child} = Ingestion rate soil (mg /day) - child
- EF = Exposure frequency (days/year)
- ED_{adult} = Exposure duration (years) - adult

ED_{adl} = Exposure duration (years) - adolescent
ED_{child} = Exposure duration (years) - child
CF_s = Conversion factor for soil (1E-06 kg/mg)
FI = Fraction soil ingested from source (unitless)
AT = Averaging time (days) - for carcinogens, equal to70-year lifetime x 365 days/year
BW_{adult} = Body weight (kg) - adult
BW_{adl} = Body weight (kg) - adolescent
BW_{child} = Body weight (kg) - child

Dermal Contact with Soil

The following equations (USEPA, 2004a) were used to calculate the dermal absorbed dose (DAD) (expressed as mg/kg-day) from dermal contact with COPCs in soil. The exposure parameter values, definition and units, and source of the value for the inputs as described in the equations below are shown for each receptor in **Table H.2.2**.

Intakes from dermal contact of noncarcinogenic COPCs in soil, as applicable, were calculated for UU/UE receptors (adult and child separately), outdoor workers, utility workers, and recreational users (adult and adolescent separately) as:

$$DAD = \frac{(DA_{event})\,(EF)\,(ED)\,(EV)\,(SA)}{(AT)\,(BW)}$$

Where the absorbed does per event (DA_{event}), in milligrams per square centimeter per event (mg/cm^2-event), will be estimated as follows (USEPA, 2004a):

$$DA_{event} = (C_s)\,(CF_s)\,(AF)\,(ABS_d)$$

Where:
DA_{event} = Absorbed dose per event (mg/ cm^2-event) – for adult, adolescent, or child receptors, as applicable
EF = Exposure frequency (days/year)
ED = Exposure duration (years) – for adult, adolescent, or child receptors, as applicable
EV = Event frequency (events/day)
SA = Exposed skin surface area available for contact (cm^2) – for adult, adolescent, or child receptors, as applicable
AT = Averaging time (days) - for noncarcinogens, equal to ED x 365 days/year
BW = Body weight (kg) – for adult, adolescent, or child receptors, as applicable
Cs = Contaminant concentration in soil (mg/kg)
CFs = Conversion factor for soil (1E-06 kg/mg)
AF = Adherence factor of soil to skin (mg/cm^2-event) – for adult, adolescent, or child receptors, as applicable
ABS_d = Dermal absorption fraction (unitless)

For scenarios that require evaluation of multiple age groups simultaneously, such as UU/UE receptors and recreational users, the carcinogenic age-adjusted intake from dermal contact will be calculated as:

$$DAD_{age-adj} = \frac{(C_s)\left(SFS_{adj}\right)(ABS_d)(EF)(EV)(CF_s)}{(AT)}$$

Where:

$$SFS_{adj} = \left(\frac{(ED_{adl\ or\ child})(AF_{adl\ or\ child})(SA_{adl\ or\ child})}{(BW_{adl\ or\ child})}\right) + \left(\frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}\right)$$

Where:

Cs	=	Contaminant concentration in soil (mg/kg)
SFS_{adj}	=	Age-adjusted dermal exposure factor (mg-year/kg-day)
ABS_d	=	Dermal absorption fraction (unitless)
EF	=	Exposure frequency (days/year)
EV	=	Event frequency (events/day)
CFs	=	Conversion factor for soil (1E-06 kg/mg)
AT	=	Averaging time (days) - for carcinogens, equal to70-year lifetime x 365 days/year
ED_{adult}	=	Exposure duration (years) - adult
ED_{adl}	=	Exposure duration (years) - adolescent
ED_{child}	=	Exposure duration (years) - child
AF_{adult}	=	Adherence factor of soil to skin (mg/cm^2-event) - adult
AF_{adl}	=	Adherence factor of soil to skin (mg/cm^2-event) - adolescent
AF_{child}	=	Adherence factor of soil to skin (mg/cm^2-event) - child
SA_{adult}	=	Exposed skin surface area available for contact (cm^2) – adult
SA_{adl}	=	Exposed skin surface area available for contact (cm^2) - adolescent
SA_{child}	=	Exposed skin surface area available for contact (cm^2) - child
BW_{adult}	=	Body weight (kg) - adult
BW_{adl}	=	Body weight (kg) - adolescent
BW_{child}	=	Body weight (kg) - child

Inhalation of Particulates and Vapors from Soil

The following equations (USEPA, 2009) were used to calculate the exposure concentration in air (EC[air]) (expressed as micrograms per cubic meter [$\mu g/m^3$]) associated with the inhalation of COPCs in soil. The exposure parameter values, definition and units, and source of the value for the inputs as described in the equations below are shown for each receptor in **Table H.2.2**.

The EC(air) from soil particulates or vapors emitted from soil into ambient air were calculated for UU/UE receptors (adult and child separately for noncarcinogenic COPCs), utility workers, outdoor workers, and recreational users (adult and adolescent separately for noncarcinogenic COPCs).

The EC(air) of soil particulates and vapors emitted from soil are calculated for noncarcinogenic and carcinogenic compounds as:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED)}{(AT)}$$

For exposure scenarios where a receptor would be exposed to both ambient dust and vapors in air, the contaminant concentration in air (C_a), expressed in μ/m^3, is estimated using the following equation derived from USEPA RSL User's Guide (2017c):

$$C_a = (C_s)\left(1000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF} + \frac{1}{VF}\right)$$

Where:
- C_a = Contamination concentration in air (μ/m^3)
- ET = Exposure time (hours/day)
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years); calculated as 6 years as child plus 20 years as adult (UU/UE exposure receptors) and 10 years as adolescent plus 14 years as adult (recreational user)
- AT = Averaging time (days) - for noncarcinogens, equal to ED x 365 days/year; for carcinogens, equal to 70-year lifetime x 365 days/year
- C_S = Chemical concentration in soil (mg/kg)
- PEF = Particulate emission factor (m^3/kg)
- VF = Chemical-specific volatilization factor (m^3/kg)

For COPCs that are not volatile, there is no VF. Thus, there is no contribution to the EC(air) from volatilization, and the EC(air) is based solely on resuspension of soil particulates such as at Parcel 57. For exposure scenarios where a receptor would be exposed to ambient dust, but not vapors, (e.g., inorganic compounds) in air, the contaminant concentration in air (C_a), expressed in $\mu g/m^3$, was estimated using the following equation derived from USEPA RSL User's Guide (2017c):

$$C_a = (C_s)\left(1000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)$$

Where:
- C_a = Contamination concentration in air ($\mu g/m^3$)
- C_S = Chemical concentration in soil (mg/kg)
- PEF = Particulate emission factor (m^3/kg)

The air concentrations of COPCs were modeled to determine the inhalation exposure concentration. The particulate emission factor (PEF) relates the concentration of COPCs in soil with the concentration of dust particles in the air. This PEF relates to dust generated from open sources, which is termed "fugitive" because it is not discharged into the atmosphere in a confined flow stream. The volatilization factor (VF) is used to define the relationship between the concentration of the COPCs in soil and the flux of the volatilized COPCs to air. Dispersion models are used to determine the dispersion of COPCs in the atmosphere, reduced to a single site-specific dispersion model (Q/C) term which represents the inverse of the mean concentration at the center of the square source (expressed in gram per square meter per second [g/m^2-s] per kg/m^3), based on regional climatic zones, source area, and nearest city. For FTMM, the Q/C value is based on Zone VIII, Philadelphia, Pennsylvania, and a 0.5 acre source area. The default exposure parameter values for the inputs as described in the PEF and VF equations below are shown in **Table H.2.8**.

The PEF, in m^3/kg, is estimated using the following equation (USEPA, 2002; 2017c) see **Table H.2.9**:

$$PEF = \left({}^{Q}/_{C}\right)\left(\frac{3{,}600\ {}^{seconds}/_{hour}}{(0.036)\,(1-V)\left(\left({}^{U_m}/_{U_t}\right)^3\right)\,[F(x)]}\right)$$

Where:
- Q/C = Inverse of mean concentration at center of square source area (g/m^2-s per kg/m^3)
- V = Fraction of vegetative cover (unitless)
- U_m = Mean annual wind speed (meter[s] per second [m/s])
- U_t = Equivalent threshold value of wind speed at 7 m (m/s)
- F(x) = Function dependent on U_m/U_t derived using Cowherd et al. (1985) (unitless)

The VF is estimated using the following equation (USEPA, 2002, 2017c) see **Table H.2.10**.

$$VF = \frac{\left({}^{Q}/_{C}\right)\left((3.14)\,(D_A)\,(T)\right)^{1/2}\left(10^{-4}\ {}^{m^2}/_{cm^2}\right)}{\left((2)\,(\rho_b)\,(D_A)\right)}$$

Where:

$$D_A = \frac{\left[\left(\theta_a^{10/3}\right)\,(D_i)\,(H') + \left(\theta_w^{10/3}\right)\,(D_w)\right]/n^2}{\left((\rho_b)\,(K_d)\right) + \theta_w + \left((\theta_a)\,(H')\right)}$$

Where:
- VF = Chemical-specific volatilization factor (m^3/kg)
- Q/C = Inverse of mean concentration at center of square source area (g/m^2-s per kg/m^3)
- D_A = Apparent diffusivity (cm^2/s)
- T = Exposure interval(s)
- ρ_b = Dry soil bulk density (g/cm^3)
- θ_a = Air-filled soil porosity (L_{air}/L_{soil}) = n- θ_w
- D_i = Diffusivity in air (cm^2/s)
- H' = Henry's law constant (unitless)
- θ_w = Water-filled soil porosity (L_{water}/L_{soil})
- D_w = Diffusivity in water (cm^2/s)
- n = Total soil porosity (L_{pore}/L_{soil}), calculated as 1-(ρ_b / ρ_s)
- K_d = Soil-water partition coefficient (cm^3/g) (calculated as K_{OC} X f_{OC})
- K_{OC} = Soil organic carbon-water partition coefficient (cm^3/g)
- f_{OC} = Organic carbon content of soil (g/g)
- ρ_s = Soil particle density (g/cm^3)

In addition, soil saturation must be considered when calculating the VF (USEPA, 1996). Soil saturation corresponds to the COPC concentration in soil at which the adsorptive limits of the soil particles, the

solubility limits of the soil pore water, and saturation of soil pore air have been reached. Above this concentration, the COPC in soil may be present in free phase. Chemical-specific soil saturation (C_{sat}) concentrations must be compared with the concentration of each volatile soil COPC because a basic principle of the VF calculation is not applicable when free-phase contaminants are present. Therefore, the VF is applicable only if the soil COPC concentration is equal to or less than the soil saturation concentration. Soil saturation concentrations (**Table H.2.11**) were obtained from the USEPA RSL Chemical-specific Parameter Tables (2017d).

If the soil COPC concentration is greater than the soil saturation concentration, the following equation is used to calculate the contaminant concentration in air, C_a ($\mu g/m^3$):

$$C_a = \left[(C_S) \left(\frac{1{,}000\mu g}{mg}\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat}) \left(\frac{1{,}000\mu g}{mg}\right) \left(\frac{1}{VF}\right)\right]$$

The soil saturation concentration is not calculated for chemicals that are solid at room temperature (e.g., naphthalene). If the soil COPC concentration is less than or equal to the soil saturation concentration, or if the volatile is solid at room temperature, C_a would be calculated the same as for a receptor exposed to both ambient dust and vapors in air.

Where:
- C_S = Chemical concentration in soil (mg/kg)
- C_{sat} = Soil saturation concentration (mg/kg)
- PEF = Particulate emission factor (m^3/kg)
- VF = Chemical-specific volatilization factor (m^3/kg)

2.2.5.2 Intake Equations for Water

Ingestion of Groundwater

The following equations (USEPA, 1989) will be used to calculate the intake (expressed as mg/kg-day) associated with the ingestion of carcinogenic and noncarcinogenic contaminants in water for the utility worker exposed to groundwater in a trench and for UU/UE receptors exposed to potable groundwater. The evaluation of UU/UE receptors will include conservative inputs consistent with a resident using groundwater as a potable water source. The exposure parameter values, definition and units, and source of the value for the inputs as described in the equations below are shown for each receptor in **Table H.2.3.**

Intakes from ingestion of noncarcinogenic COPCs in groundwater are calculated as:

$$Ingestion = \frac{(C_W)\ (IRW)\ (EF)\ (ED)}{(AT)\ (BW)}$$

Where:
- C_W = Contaminant concentration in water (mg/L)
- IRW = Ingestion rate water (L/day) - adult and child receptors, as applicable
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years) - adult and child receptors, as applicable
- AT = Averaging time (days) - for noncarcinogens, equal to ED x 365 days/year
- BW = Body weight (kg) - adult and child receptors, as applicable

For scenarios that require evaluation of multiple age groups simultaneously, such as UU/UE receptors, the carcinogenic age-adjusted intake from ingestion is calculated as:

$$Ingestion_{age-adj} = \frac{(C_w)\left(IFW_{adj}\right)(EF)}{(AT)}$$

Where:

$$IFW_{adj} = \left(\frac{(ED_{child})\,(IRW_{child})}{(BW_{child})}\right) + \left(\frac{(ED_{adult})\,(IRW_{adult})}{(BW_{adult})}\right)$$

Where:
- C_W = Contaminant concentration in water (mg/L)
- IRW_{adult} = Ingestion rate water (L/day) – adult
- IRW_{child} = Ingestion rate water (L/day) – child
- IFW_{adj} = Age-adjusted water ingestion factor [(L-year)/(kg-day)]
- EF = Exposure frequency (days/year)
- ED_{adult} = Exposure duration (years) - adult
- ED_{child} = Exposure duration (years) - child
- AT = Averaging time (days) - for carcinogens, equal to 70-year lifetime x 365 days/year
- BW_{adult} = Body weight (kg) – adult
- BW_{child} = Body weight (kg) – child

Dermal Contact with Groundwater

The following equations (USEPA, 2004a) were used to calculate the DAD (expressed as mg/kg per day) associated with the dermal contact of COPCs in groundwater. The exposure parameter values, definition and units, and source of the value for the inputs as described in the equations below are shown for each receptor in **Table H.2.3** and for each COPC in **Table H.2.12**.

The DAD of noncarcinogenic COPCs is calculated for UU/UE receptors (adults and children, separately) and utility workers:

$$DAD = \frac{(DA_{event})\,(EF)\,(ED)\,(EV)\,(SA)}{(AT)\,(BW)}$$

Where:
- DA_{event} = Absorbed dose per event (mg/cm^2-event)
- EF = Exposure frequency (days/year)
- EV = Event frequency (events/day)
- ED = Exposure duration (years) – adult or child, as applicable
- SA = Exposed skin surface area available for contact (cm^2) – adult or child, as applicable
- AT = Averaging time (days) - for noncarcinogens, equal to ED x 365 days/year
- BW = Body weight (kg) – adult or child, as applicable

For scenarios that require evaluation of multiple age groups simultaneously, such as the UU/UE scenario, the carcinogenic age-adjusted DAD is calculated as:

$$DAD_{age-adj} = \frac{(DA_{event})\ (EV)\ (EF)\ (SFW_{adj})}{AT}$$

Where:

$$SFW_{adj} = \left[\frac{(ED_{child})\ (SA_{child})}{(BW_{child})}\right] + \left[\frac{(ED_{adult})\ (SA_{adult})}{(BW_{adult})}\right]$$

Where the DA_{event} for organic compounds, in mg/cm^2-event, is estimated as follows (USEPA, 2004a):

$If\ t_{event} \leq t^*, then$

$$DA_{event} = (2)\ (FA)\ (K_p)\ (C_w)\sqrt{\frac{((6)\ (\tau_{event})\ (t_{event}))}{\pi}}$$

$If\ t_{event} > t^*, then$

$$DA_{event} = (FA)\ (K_p)\ (C_w)\left[\left(\frac{t_{event}}{(1+B)}\right) + ((2)\ (\tau_{event}))\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

And where the DA_{event} for inorganic compounds, in mg/cm^2-event, is estimated as follows (USEPA, 2004a):

$$DA_{event} = (K_p)\ (C_w)\ (t_{event})$$

Where:

	DA_{event}	=	Absorbed dose per event (mg/cm^2-event)
	EV	=	Event frequency (events/day)
	EF	=	Exposure frequency (days/year)
	SFW_{adj}	=	Age-adjusted dermal exposure factor (mg-year/kg-day)
	AT	=	Averaging time (days) - for carcinogens, equal to 70-year lifetime x 365 days/year
	ED_{adult}	=	Exposure duration (years) - adult
	ED_{child}	=	Exposure duration (years) - child
	SA_{adult}	=	Skin surface area available for contact (cm^2) - adult
	SA_{child}	=	Skin surface area available for contact (cm^2) - child
	BW_{adult}	=	Body weight (kg) - adult
	BW_{child}	=	Body weight (kg) - child
	FA	=	Fraction absorbed (dimensionless)
	K_p	=	Dermal permeability coefficient of compound in water (cm/hour [hr])
	C_w	=	Chemical concentration in water (mg/cm^3)
	τ_{event}	=	Lag time per event (hr/event)
	t_{event}	=	Event duration (hr/event)
	t*	=	Time to reach steady-state (hr) (calculated as 2.4 τ_{event})

B = Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless)

Calculation of Intake for Mutagenic COPCs

If a chemical has been determined to cause cancer by a mutagenic mode of action (MOA), USEPA has noted that it is possible that exposures to that chemical in early life may result in higher lifetime cancer risks than an adult exposure of comparable duration (USEPA, 2007). Therefore, if chemical-specific data on susceptibility from early life exposures are available and have been used to develop cancer slope factors (SFs) or inhalation unit risks (IURs) that specifically address any potential for differential potency in early life stages, the derived SFs/IURs were used in lieu of Age Dependent Adjustment Factors (ADAFs) (discussed below). For example, the Integrated Risk Information System (IRIS) assessment of vinyl chloride provides two sets of SFs/IURs, one that accounts for exposure occurring during early life and one that accounts for exposure occurring later in life.

In assessing the risk for which a mutagenic MOA has been identified by USEPA, default ADAFs were applied for those chemical lacking chemical-specific data on susceptibility from early life exposures. The *Supplemental Guidance for Assessing Cancer Susceptibility from Early Life Exposure to Carcinogens* (USEPA, 2005a) recommends the following default ADAFs:

- 10-fold adjustment for exposures during the first two years of life
- 3-fold adjustment for exposures from ages 2 to <16 years of age
- No adjustment for exposures after turning 16 years of age

These ADAFs are used to prorate the toxicity factors for the respective age ranges, to account for more or less sensitivity during that life stage. For example, there is assumed by default to be 10-fold greater sensitivity over the first two years of life than for an equivalent level of exposure after turning 16 years of age. Consideration of early life stage exposure was limited to the UU/UE receptor and recreational user scenarios. Because the adolescent recreational user is 6 to <16 years of age, only the three-fold adjustment is used in the calculations for intake of mutagenic COPCs.

Table H.2.9 identifies mutagens present in soil and groundwater. The following mutagenic COPCs were identified:

- Surface Soil: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene
- Combined Surface and Subsurface Soil: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene
- Groundwater: None

Carcinogenic PAHs were evaluated using the cancer slope factor for BaP, the most thoroughly studied of the carcinogenic PAHs. The evaluation is conducted using a BaP-equivalent concentration that considers an aggregate concentration of seven carcinogenic PAHs as described in Subsection 2.3.2.

For BaP, the following equations were used:

Incidental Ingestion of Soil. The following equation (USEPA, 1989; 2005a) is used to calculate the intake in mg/kg-day for mutagenic COPCs :

For UU/UE receptors:

$$Intake = \frac{C_s \times \left(\begin{array}{l} \frac{(ED_{0-2} \times IRS_c) \times 10}{BW_c} + \frac{(ED_{2-6} \times IRS_c) \times 3}{BW_c} + \\ \frac{(ED_{6-16} \times IRS_a) \times 3}{BW_a} + \frac{(ED_{16-30} \times IRS_a) \times 1}{BW_a} \end{array} \right) \times EF \times 10^{-6} kg/mg}{AT}$$

And for recreational users:

$$Intake = \frac{C_s \times \left(\frac{(ED_{6-16} \times IRS_{adl}) \times 3}{BW_{adl}} + \frac{(ED_{16-30} \times IRS_a) \times 1}{BW_a} \right) \times EF \times 10^{-6} kg/mg}{AT}$$

where:

C_s = chemical concentration in soil (mg/kg)
$ED_{0\text{-}2}$ = exposure duration, 0 to 2 years of age (years)
$ED_{2\text{-}6}$ = exposure duration, 2 to 6 years of age (years)
$ED_{6\text{-}16}$ = exposure duration, 6 to 16 years of age (years)
$ED_{16\text{-}30}$ = exposure duration, 16 to 30 years of age (years)
IRS_c = child soil ingestion rate (mg/day)
IRS_{adl} = adolescent soil ingestion rate (mg/day)
IRS_a = adult soil ingestion rate (mg/day)
BW_c = child body weight (kg)
BW_{adl} = adolescent body weight (kg)
BW_a = adult body weight (kg)
EF = exposure frequency (days/year)
AT = averaging time (days)

Dermal Contact with Soil. The following equations (USEPA, 2004a; 2005a) are used to calculate the intake from dermal contact with mutagenic COPCs in soil:

For UU/UE receptors:

$$DAD = \frac{C_s \times \left(\begin{array}{l} \frac{(ED_{0-2} \times AF_c \times SA_c) \times 10}{BW_c} + \frac{(ED_{2-6} \times AF_c \times SA_c) \times 3}{BW_c} + \\ \frac{(ED_{6-16} \times AF_a \times SA_a) \times 3}{BW_a} + \frac{(ED_{16-30} \times AF_a \times SA_a) \times 1}{BW_a} \end{array} \right) \times ABS \times EF \times 10^{-6} kg/mg}{AT}$$

And for recreational users:

$$DAD = \frac{C_s \times \left(\frac{(ED_{6-16} \times AF_{adl} \times SA_{adl}) \times 3}{BW_{adl}} + \frac{(ED_{16-30} \times AF_a \times SA_a) \times 1}{BW_a} \right) \times ABS \times EF \times 10^{-6} kg/mg}{AT}$$

where:

DAD = dermally absorbed dose (mg/kg-day)
C_s = chemical concentration in soil (mg/kg)
$ED_{0\text{-}2}$ = exposure duration, 0 to 2 years of age (years)
$ED_{2\text{-}6}$ = exposure duration, 2 to 6 years of age (years)

$ED_{6\text{-}16}$ = exposure duration, 6 to 16 years of age (years)
$ED_{16\text{-}30}$ = exposure duration, 16 to 30 years of age (years)
AF_c = child soil-to-skin adherence factor (mg/cm^2-day)
AF_{adl} = adolescent soil-to-skin adherence factor (mg/cm^2-day)
AF_a = adult soil-to-skin adherence factor (mg/cm^2-day)
SA_c = child exposed skin surface area (cm^2)
SA_{adl} = adolescent exposed skin surface area (cm^2)
SA_a = adult exposed skin surface area (cm^2)
BW_c = child body weight (kg)
BW_{adl} = adolescent body weight (kg)
BW_a = adult body weight (kg)
ABS = absorption fraction (unitless)
EF = exposure frequency (days/year)

Inhalation of Fugitive Dusts or Vapors. The following equations (USEPA, 2005a; 2009) are used to calculate the exposure concentrations of other mutagenic COPCs associated with inhalation of fugitive dust or vapor emissions from soil for UU/UE receptors:

$$EC(air) = \frac{C_a \times ET \times EF \times [(ED_{0-2} \times 10) + (ED_{2-6} \times 3) + (ED_{6-16} \times 3) + (ED_{16-30} \times 1)]}{AT}$$

where:

$$C_a = \mathrm{C_s} \times 1{,}000 \mu g/mg \times \left[\frac{1}{\mathrm{VF}} + \frac{1}{\mathrm{PEF}}\right]$$

where:

EC(air) = exposure concentration, air (µg/m^3)
C_a = contaminant concentration in air (µg/m^3)
C_s = COPC concentration in soil (mg/kg)
ET = exposure time as a fraction of the day spent at the site (unitless)
EF = exposure frequency (days/year)
$ED_{0\text{-}2}$ = exposure duration, 0 to 2 years of age (years)
$ED_{2\text{-}6}$ = exposure duration, 2 to 6 years of age (years)
$ED_{6\text{-}16}$ = exposure duration, 6 to 16 years of age (years)
$ED_{16\text{-}30}$ = exposure duration, 16 to 30 years of age (years)
AT = averaging time (days)
VF = chemical-specific volatilization factor (m^3/kg)
PEF = particulate emission factor (m^3/kg)

The exposure assumptions used to estimate exposures as listed in the equations above are presented in **Tables H.2.2 and H.2.3**.

2.4 Toxicity Assessment

The most recently available toxicity data were used to calculate carcinogenic risk and noncarcinogenic hazard. The toxicity criteria (SF, IUR, reference doses [RfD]), and reference concentrations [RfC]) were selected using the hierarchy below, in accordance with USEPA guidance (USEPA, 2017c):

1. USEPA Integrated Risk Information System (IRIS) on-line database (USEPA, 2017e)
2. USEPA's Provisional Peer Reviewed Toxicity Values (PPRTVs) (USEPA, 2017f)
3. Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRL) (ATSDR, 2017)
4. California Office of Environmental Health Hazard Assessment's (OEHHA) Toxicity Criteria Database (OEHHA, 2017)
5. USEPA's PPRTV screening toxicity values in appendices to certain PPRTV assessments (USEPA, 2017f)
6. USEPA's Health Effects Assessment Tables (HEAST) (USEPA, 1997)

Because this hierarchy is consistent with USEPA guidance and the hierarchy USEPA uses to calculate RSLs, the RSL tables (USEPA, 2017a) are used to select the toxicity criteria for this risk assessment (**Table H.2.9**). The toxicity criteria referenced are based on the most current published values.

USEPA has not developed toxicity values specific to the dermal absorption pathway. However, dermal toxicity values have been derived from the oral toxicity values as described in USEPA's most recent dermal risk assessment guidance (USEPA, 2004a).

Toxicity values provided by USEPA reflect administered-dose values, that is, they represent concentrations that will be protective following ingestion or inhalation. The dermal route of exposure, however, evaluates the toxicity of concentrations of chemicals in the blood (absorbed). Therefore, the absorbed-dose concentrations identified for dermal exposure must be compared to absorbed-dose toxicity values. The absorbed-dose toxicity values are derived by applying oral absorption factors (OAFs) to administered-dose toxicity values. The OAFs used in the human health RA will be obtained from the USEPA RSL tables (USEPA, 2017a), where they are referred to as GIABS (gastrointestinal absorption factors).

2.5 Risk Characterization

The final step in the risk assessment process is risk characterization. The purpose of the risk characterization step is to 1) review the results from the exposure and toxicity assessments; 2) quantitatively estimate the potential for carcinogenic (i.e., risk) and noncarcinogenic (i.e., hazard) effects; and 3) assess and discuss uncertainties associated with each of the aforementioned steps. To characterize potential noncarcinogenic effects, estimated exposure concentrations of COPCs were compared with their respective toxicity values. To characterize potential carcinogenic effects, the incremental probability of an individual developing cancer over a lifetime was calculated from estimated exposure concentrations and chemical-specific dose/response information (i.e., carcinogenic toxicity factors).

For each COPC having available toxicity values, a carcinogenic risk (for carcinogens) and hazard quotient (HQ) estimate (for noncarcinogens) was calculated as described below. Each COPC was included in the cumulative risk calculations. The carcinogenic and noncarcinogenic results and risk summaries by pathway and receptor for current and future receptors exposed to site media are presented.

2.5.1 Noncancer Hazard Estimation

Potential health hazards associated with exposure to noncarcinogenic compounds were evaluated by calculating a HQ. The potential HQ is calculated as the ratio of the intake (via ingestion) or DAD (via dermal contact) to the oral reference dose (RfD_o) or dermal reference dose (RfD_d), respectively, as follows (USEPA, 1989):

$$HQ = Intake / RfD_o \quad (30)$$

$$HQ = DAD / RfD_d \quad (31)$$

where:

HQ = Noncancer hazard quotient (unitless)
Intake = Chronic daily ingestion averaged over the exposure duration (mg/kg-day)
RfD_o = Oral reference dose (mg/kg-day)
DAD = Dermally absorbed dose (mg/kg-day)
RfD_d = Dermal reference dose (mg/kg-day)

For noncancer effects by inhalation exposure, the following equation is used (USEPA, 2009):

$$HQ_{inh} = {EC\ (air)}\Big/{(RfC\ x\ 1{,}000\frac{\mu g}{mg})} \quad (32)$$

where:

HQ_{inh} = Noncancer hazard quotient from inhalation (unitless)
EC (air) = Exposure concentration in air ($\mu g/m^3$)
RfC = Noncancer reference concentration (mg/m^3)

The noncancer effects from the inhalation of volatiles emitted to indoor air from groundwater via vapor intrusion were estimated using the spreadsheets provided by USEPA (2004b).

The noncarcinogenic HQ assumes that there is a level of exposure (i.e., a threshold represented by the RfD or RfC) below which it is unlikely for even sensitive populations to experience adverse health effects (USEPA, 1989). If the EPC exceeds this threshold, there may be concern for potential noncarcinogenic effects. In other words, if the estimated daily intake for any single COPC is greater than its RfD or RfC, the HQ will exceed 1. An HQ that exceeds 1 indicates that there is a potential for adverse health effects associated with exposure to that COPC.

The supporting calculations are provided on the hazard calculation spreadsheets provided at the end of this report.

2.5.2 Cancer Risk Estimation

Individual cancer risk is calculated as the product of exposure (intake for ingestion and DAD for dermal contact) to a constituent (in mg/kg-day) and the SF (SF_o for ingestion and SF_d for dermal contact) for that constituent (in $(mg/kg\text{-}day)^{-1}$, as follows (USEPA, 1989):

$$Risk = Intake\ x\ SF_o$$

$$Risk = DAD\ x\ SF_d$$

where:

Risk = Excess lifetime cancer risk (unitless probability)
Intake = Chronic daily ingestion averaged over a lifetime (mg/kg-day)
SF_o = Oral cancer slope factor $(mg/kg\text{-}day)^{-1}$
DAD = Dermally absorbed dose (mg/kg-day)
SF_d = Dermal cancer slope factor $(mg/kg\text{-}day)^{-1}$

Inhalation risk is calculated by multiplying the exposure concentration by the IUR. Inhalation risk is estimated by using the following formula (USEPA, 2009):

$$Risk_{inh} = EC(air) \times IUR$$

where:

$Risk_{inh}$ = Excess lifetime cancer risk from inhalation (unitless probability)
EC(air) = Exposure concentration in air ($\mu g/m^3$)
IUR = Inhalation unit risk $(\mu g/m^3)^{-1}$

The risks from the inhalation of volatiles emitted to indoor air from groundwater via vapor intrusion were estimated using the spreadsheets provided by USEPA (2004b).

Each SF is accompanied by a weight-of-evidence classification, which considers the available data for a chemical in order to evaluate the likelihood that the chemical is a potential human carcinogen. The evidence is characterized separately for studies in humans and studies in laboratory animals as sufficient, limited, inadequate, no data, or evidence of noncarcinogenicity. For the purposes of this evaluation, the potential for unacceptable human health risk is identified when the multi-constituent aggregate risk for the direct-contact pathways exceeds an excess lifetime cancer risk (ELCR) of 1 x 10^{-4}. The supporting calculations are provided on the risk calculation spreadsheets provided at the end of this report.

2.5.3 Cumulative Risk and Hazard Index Estimation

Each COPC was included in the cumulative risk and hazard index (HI) calculations.

A HI is calculated to assess the potential for noncarcinogenic effects posed by more than one constituent. The HI approach assumes that simultaneous sub-threshold exposures to several constituents across all media and pathways of exposure could result in an adverse health effect. It also assumes that the magnitude of the adverse effect will be proportional to the sum of the ratios of the sub-threshold exposures to the acceptable exposure (the RfD or RfC). The HI is equal to the sum of the HQs, and is calculated as follows (USEPA, 1989):

$$HI = \sum HQ_i$$

where: HI = Hazard index (unitless)
HQ_i = Hazard quotient for the i^{th} constituent (unitless)

For the purposes of this evaluation, the potential for unacceptable human health risk is identified when the multi-constituent aggregate risk for the direct-contact pathways exceeds a noncancer HI of 1 (USEPA, 1989).

The following equation is used to calculate the cumulative noncarcinogenic hazard across multiple exposure pathways (USEPA, 1989):

$$Cumulative\ HI = HI_T(inhalation) + HI_T(dermal) + HI_T(ingestion)$$

Cancer risk from exposure to multiple carcinogens and multiple pathways is assumed to be additive, based on the *Guidelines for Carcinogen Risk Assessment* (USEPA, 2005b). The following equation will be used to calculate the total risk from exposure to multiple substances (USEPA, 1989):

$$Risk_T = \sum Risk_i$$

where: $Risk_T$ = Total Risk for multiple constituents per exposure pathway (unitless)
$Risk_i$ = Risk for the i^{th} constituent (unitless)

The following equation is used to calculate the cumulative carcinogenic risk across multiple exposure pathways (USEPA, 1989):

$$Cumulative\ Cancer\ Risk = Risk_T(inhalation) + Risk_T(dermal) + Risk_T(ingestion)$$

2.5.4 Risk Characterization Results

The primary objective of this HHRA was to quantitatively characterize the human health risk associated with current and reasonably expected future exposure to contaminated media at Parcel 57. As discussed in Section 2.3.1, all potentially complete exposure scenarios and pathways were either directly or indirectly evaluated. In the latter case, exposures of relatively lesser magnitude were addressed through the evaluation of more protective exposure scenarios (e.g., the ingestion of groundwater as a source of drinking water is protective of incidental ingestion). The exposure pathways were outlined in Section 2.3.1 and were also shown on the CSM diagram (**Figure H.2.1**). Site-specific carcinogenic risks and noncarcinogenic hazards were estimated for receptors, exposure pathways, and COPCs per the methods described previously in this report. The results of the risk characterization are presented in this section.

2.5.4.1 Surface Soil Risk Characterization

To determine the risk/hazard associated with exposure to contaminants in surface soil at Parcel 57, surface soil samples (0 to 2 feet bgs) were evaluated. As described in the RI report, the following COPCs were identified in surface soil: benzo(a)anthracene, benzo(a)pyrene (BaP), benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic, cobalt, and vanadium. Since BaP was identified as a COPC, all seven carcinogenic PAHs were retained for consideration in the risk assessment. The EPC for the BaP-equivalent is described in Subsection 2.3.2 of this report and the EPC for the BaP-equivalent calculation is shown in **Table H.2.5**. Because BaP is the most studied of the carcinogenic PAHs, the BaP-equivalent was evaluated using the SF associated with BaP. The pathway specific, receptor specific, and cumulative risks/hazards for each exposure area are summarized in **Tables H.2.13** through **H.2.64**.

2.5.4.1.1 Carcinogenic Risk

UU/UE Receptors

The cumulative carcinogenic risk for UU/UE receptors for exposure areas 1 through 5 are respectively estimated to be 1×10^{-4} (exposure area 1, **Table H.2.19**), 1×10^{-4} (exposure area 2, **Table H.2.28**), 2×10^{-5} (exposure area 3, **Table H.2.35**), 3×10^{-5} (exposure area 4, **Table H.2.42**), and 8×10^{-5} (exposure area 5, **Table H.2.49**), which are all less than or equal to the carcinogenic cumulative risk goal of 1×10^{-4}. The risk estimate includes evaluation of exposure to contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors.

Utility Workers

The cumulative carcinogenic risk for future utility workers is estimated to be 9×10^{-8} (**Table H.2.53**), which is less than the carcinogenic cumulative risk goal of 1×10^{-4}. The risk estimate includes evaluation of exposure to contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors during construction and excavation activities.

Outdoor Workers

The cumulative carcinogenic risk for utility workers is estimated to be 6×10^{-6} (**Table H.2.57**), which is less than the carcinogenic cumulative risk goal of 1×10^{-4}. The risk estimate includes evaluation of exposure to contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors during maintenance or landscaping activities.

Recreational Users

The cumulative carcinogenic risk for recreational users is estimated to be 2×10^{-6} (**Table H.2.64**), which is less than the carcinogenic cumulative risk goal of 1×10^{-4}. The risk estimate includes evaluation of exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation of particulates and vapors during recreational activities.

2.5.4.1.2 Noncarcinogenic Hazard

UU/UE Receptors

The HIs for both child and adult UU/UE receptors are as follows. exposure area 1: child (2) and adult (0.3) (**Table H.2.19**), exposure area 2: child (1) and adult (0.3) (**Table H.2.28**), exposure area 3: child (0.9) and adult (0.1) (**Table H.2.35**), exposure area 4: child (0.9) and adult (0.1) (**Table H.2.42**), exposure area 5: child (1) and adult (0.2) (**Table H.2.49**). The HIs are less than or equal to 1 for all exposure areas, except for the child receptor in exposure area 1. The HI for the UU/UE child receptor in exposure area 1 is 2 which is greater than 1 (**Table H.2.19**). The individual HQs are all less than 1. Since the total HI was greater than 1, the hazards were evaluated by target organ (USEPA, 1989). The critical toxic effects and target organs are listed in **Table H.2.20** for each of the COPCs. As shown in **Table H.2.21**, segregated HIs were less than or equal to 1 for the target organs. The HI includes evaluation of exposure to contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors.

Utility Workers

The HI for utility workers (0.02) is less than 1 (**Table H.2.53**). The HI includes evaluation of exposure to contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors during construction and excavation activities.

Outdoor Workers

The HI for outdoor workers (0.08) is less than 1 (**Table H.2.57**). The HI includes evaluation of exposure to contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors during maintenance or landscaping activities.

Recreational Users

The HI for both adolescent (0.02) and adult (0.008) recreational users is less than 1 (**Table H.2.64**). The HI includes evaluation of exposure to contaminants in surface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors during recreational activities.

2.5.4.2 Combined Surface and Subsurface Soil Risk Characterization

To determine the risk/hazard associated with exposure to contaminants in combined surface and subsurface soil at Parcel 57, surface and subsurface soil samples (0 to 15 feet bgs) were evaluated. As described in the RI report, the following COPCs were identified in the combined surface and subsurface soil: benzo(a)anthracene, benzo(a)pyrene (BaP), benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic, cobalt, and vanadium. Since BaP was identified as a COPC, all seven carcinogenic PAHs were retained for consideration in the risk

assessment. The EPC for the BaP-equivalent is described in Subsection 2.3.2 of this report and the EPC for the BaP-equivalent calculation is shown in **Table H.2.5**. Because BaP is the most studied of the carcinogenic PAHs, the BaP-equivalent was evaluated using the SF associated with BaP. The pathway specific, receptor specific, and cumulative risks/hazards are summarized in **Tables H.2.65** through **H.2.103**.

2.5.4.2.1 Carcinogenic Risk

UU/UE Receptors

The cumulative carcinogenic risk for UU/UE receptors for exposure areas 1 through 5 are estimated to be 8×10^{-5} (exposure area 1, **Table H.2.71**), 7×10^{-5} (exposure area 2, **Table H.2.78**), 3×10^{-5} (exposure area 3, **Table H.2.85**), 4×10^{-5} (exposure area 4, **Table H.2.92**), and 8×10^{-5} (exposure area 5, **Table H.2.99**), which are all less than the carcinogenic cumulative risk goal of 1×10^{-4}. The risk includes evaluation of exposure to contaminants in combined surface and subsurface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors, as the UU/UE receptor is expected to be exposed to surface soil as well as subsurface soil that has been brought to the surface as a result of excavation activities.

Utility Workers

The cumulative carcinogenic risk for utility workers is estimated to be 5×10^{-8} (**Table H.2.103**), which is less than the carcinogenic cumulative risk goal of 1×10^{-4}. The risk includes evaluation of exposure to contaminants in combined surface and subsurface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors during construction and excavation activities.

2.5.4.2.2 Noncarcinogenic Hazard

UU/UE Receptors

The HIs for both child and adult UU/UE receptors are less than or equal to 1 for all exposure areas. Exposure area 1: child (1) and adult (0.2) (**Table H.2.71**), exposure area 2: child (0.9) and adult (0.2) (**Table H.2.78**), exposure area 3: child (0.8) and adult (0.1) (**Table H.2.85**), exposure area 4: child (1) and adult (0.1) (**Table H.2.92**), exposure area 5: child (1) and adult (0.2) (**Table H.2.99**). The HIs include evaluation of exposure to contaminants in combined surface and subsurface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors, as the UU/UE receptor is expected to be exposed to surface soil as well as subsurface soil that has been brought to the surface as a result of excavation activities.

Utility Workers

The HI for utility workers (0.03) is less than 1 (**Table H.2.103**). The HI includes evaluation of hazards associated with exposure to contaminants in combined surface and subsurface soil via incidental ingestion, dermal contact, and inhalation of particulates and vapors during construction and excavation activities.

2.5.4.3 Groundwater Risk Characterization

To determine the risk/hazard associated with exposure to contaminants in groundwater at Parcel 57, groundwater samples collected from the three sampling events conducted from February 2011 to May 2016 were evaluated. As described in the RI report, the following COPCs were identified in groundwater: aluminum, cadmium, nickel and zinc. In accordance with the approved risk assessment work plan (Parsons, 2015), risks were first calculated using the maximum detected concentration from any well within the exposure area from samples included in the risk assessment data set to show the

upper end of risk at the site. Since exposure to groundwater is likely to occur at a specific point, a more realistic EPC would be reflected by samples collected from an individual well. Therefore, the calculated risks for groundwater were also evaluated for each individual well.

The pathway specific and cumulative risks/hazards from groundwater based on the maximum detected concentration from all wells within the exposure area for the samples collected from the February 2011 to May 2016 sampling events are summarized in **Tables H.2.103** through **H.2.111**.

2.5.4.3.1 Carcinogenic Risk

UU/UE Receptor

The cumulative carcinogenic risk for UU/UE receptors was not calculated because none of the COPCs in groundwater are carcinogenic (**Table H.2.106**).

Utility Worker

The cumulative carcinogenic risk for UU/UE receptors was not calculated because none of the COPCs in groundwater are carcinogenic (**Table H.2.111**).

2.5.4.3.2 Noncarcinogenic Hazard

UU/UE Receptor

The cumulative noncarcinogenic HI for UU/UE receptors using the maximum detected concentration of each COPC, regardless of the well it was detected in, is estimated to be 5 for the child receptor (HI_{child}) and 3 for the adult receptor (HI_{adult}) (**Table H.2.106**). The main contributors to these hazard estimates are ingestion of cadmium and nickel (HI_{child} = 2 for both, and HI_{adult} = 1 for both).

Evaluation of the hazard for each individual well (presented in **Tables H.2.112** through **H.2.123**) demonstrates that the noncarcinogenic hazard is associated with well PAR-57-MW02 (HI_{child} = 5, and HI_{adult} =3). PAR-57-MW02 is the only well with a calculated hazard to the UU/UE receptor that exceeds the noncarcinogenic cumulative hazard goal of 1. The hazard evaluation for this well is identical to the hazard evaluation using the maximum detected concentration of each COPC because all of the maximum concentrations come from one sample at well PAR-57-MW02.

For HI_{adult}, the individual HQs are all less than or equal to 1. Since the total HI was greater than 1, the hazards were evaluated by target organ (USEPA, 1989). The critical toxic effects and target organs are listed in **Table H.2.107** for each of the COPCs. As shown in **Table H.2.108**, segregated HIs were less than or equal to 1 for the target organs.

For HI_{child}, the hazards were also evaluated by target organ (USEPA, 1989). The critical toxic effects and target organs are listed in **Table H.2.107** for each of the COPCs. As shown in **Table H.2.108**, segregated HIs were less than or equal to 1 for the four target organs/systems: blood, central nervous system, immune system, and respiratory system. However, the segregated HI for body weight/whole body effects was 2, driven by exposure to nickel and for urinary effects was 2, driven by exposure to cadmium. For the target organs and systems with HIs greater than the benchmark level of concern of 1, noncarcinogenic effects are theoretically possible. However, as discussed in the uncertainties section below, the results from this one sample are not representative of true site conditions and the hazard for this well is overestimated.

Utility Worker

The HI for utility workers (0.01) is less than 1 (**Table H.2.111**). The hazard estimate includes evaluation of exposure to contaminants in shallow groundwater encountered during construction and excavation activities via incidental ingestion and dermal contact.

2.5.5 Risk Assessment Uncertainties

All human health risk assessments involve use of assumptions, professional judgments, and imperfect data to varying degrees, which result in uncertainty in the final estimates of risk. Risk assessment in general is often based on conservative assumptions and scenarios. Uncertainty can be introduced into a health risk assessment at every step of the process outlined in this document. Uncertainties are present in a risk assessment because it requires integration of the following:

- Release of constituents into the environment, and the areal and vertical distribution of these materials in soil and groundwater;
- Fate and transport of constituents in a variety of different and variable environments by processes that are often poorly understood or too complex to quantify accurately;
- Potential for adverse health effects in humans based on extrapolations from animal studies; and
- Probability of adverse effects in a human population that is highly variable with respect to genetics, age, activity level, and lifestyle.

This section qualitatively describes the inherent and site-specific uncertainties of the assessments process.

2.5.5.1 Uncertainty in Data Collection and Evaluation

The analysis of uncertainties focuses on determining whether the available data are representative of contaminant concentrations and site conditions, and whether features of sampling, analyses, or statistical treatment of the data result in an over- or underestimation of potential risk.

The use of the maximum detected concentration introduces uncertainty into the risk assessment, since the use of one analytical result likely does not accurately represent the concentration of the constituent that a receptor would be exposed throughout the exposure duration. In cases where the analyte is infrequently detected, the use of the maximum concentration will likely overestimate the actual EPC, resulting in an overestimate of the risk. In cases with few total samples, the use of the maximum detected concentration can either over- or underestimate the EPC depending on the distribution of the actual concentrations in the medium of concern. In the case of well PAR-57-MW02, the site-wide maximum concentrations all come from one sample event, at one sample depth, in this one well. The results from this unfiltered sample are not consistent with the observations from other sample events, at the same depth in the same well, nor are they consistent with results obtained from the same sample event in the same well at a different depth. This inconsistency indicates that the concentrations used in the risk calculations may not be representative of true site conditions and likely overestimate the potential risk.

The soil EPCs were the 95%UCL on the mean. If there was an insufficient sample size to calculate a 95% UCL, the maximum detected concentration was used for the EPC. USEPA has researched how to determine the appropriate method for calculating a 95%UCL based on the data distribution, data set size, skewness, and percentage of non-detect observations. USEPA's ProUCL version 5.1 will calculate UCLs for datasets with small sample sizes. In some cases the samples sizes were small, and not all UCLs calculated or suggested by ProUCL are appropriate for use in the risk calculations. Parametric and non-parametric methods (i.e., Chebyshev (Mean, Sd), KM (Percentile Bootstrap), KM (Chebyshev), Adjusted Gamma KM, and Approximate Gamma KM,) were used to determine the 95% UCL for the

analytes with six or more samples. For analytes with six samples or less or if ProUCL generated a warning with regards to unreliable statistics, the maximum detected concentration was used as the exposure point concentration. The ProUCL output included in **Attachment H.1** states, "Suggestions regarding the selection of a 95% UCL are provided to help the user select the most appropriate 95% UCL." ProUCL generates UCLs using all available methods for each data set, regardless of the appropriateness of the method. The results listed under "Suggested UCLs to Use" are the results recommended by ProUCL based on data size, data distribution, and skewness of the data set, as well as the results of simulation studies. Where more than one result was listed in the ProUCL output in "Suggested UCLs to Use", the most conservative (highest) of the recommended "Suggested UCLs to Use" was selected for use as the EPC. This is a default selection made without regard to scientific validity. The use of the most conservative UCL may overestimate the EPC and, therefore, the risk. In addition, the 95% UCL for each EPC includes data over time, and may overestimate the risk if the concentration of constituents in soil is naturally attenuating. The 95% UCL for each well may underestimate risk if the number of detected concentrations is less than six.

Chemicals that were never detected in any samples were eliminated from the risk assessment. It is possible that some chemicals that were eliminated from consideration in the risk assessment may have actually been present in samples at concentrations lower than the sample quantitation limit. If chemicals that were eliminated from the risk assessment were actually present in the environmental medium, the cumulative risk could be underestimated. Detection limits greater than human health screening criteria have the potential to underestimate the risk associated with exposure to COPCs.

However, the sampling plan attempted to reduce this uncertainty through the use of a consistent analytical approach as well as a biased sampling approach. Since samples were collected from areas most likely to be contaminated based on the understanding of past site activities, it is unlikely that chemicals were present at health-significant levels and not detected in at least one sample.

Similarly, chemicals that were detected at concentrations less than the selected screening criteria were eliminated from the risk assessment. It is possible that some of these chemicals may have been present at greater concentrations in areas that were not sampled, thus underestimated the potential exposure concentrations. However, the sampling plan attempted to reduce this uncertainty through the use of a consistent analytical approach as well as a biased sampling approach. Since samples were collected from areas identified in the conceptual site model as areas most likely to be contaminated based on the understanding of past site activities, it is unlikely that any chemicals were present at health-significant levels and not detected.

It should be noted that only residential screening values were used in determining COPCs for this risk assessment, although a number of site receptors evaluated (e.g., onsite worker, construction worker) do not conform to a conventional residential site use pattern. Developing one COPC list for all receptors based on residential screening values is very conservative; it ensures that every site chemical that could possibly contribute to risk or hazard is considered.

Steady-state conditions (i.e., the observed concentrations remain the same in the environmental media for the foreseeable future) were assumed for evaluation of potential future exposures. The assumption of steady-state conditions may tend to overestimate long-term exposure and health risk because contaminant concentrations may decline over time due to natural dissipation processes (e.g., biological and chemical degradation) or dilution through transport processes. In some cases, depending on the contaminant and or the release mechanisms involved, steady-state assumptions could potentially underestimate risk (e.g., breakdown products that are more toxic than the parent compound or a continuous source contributing to contamination in another medium).

Additionally, using the maximum concentrations detected at well PAR-57-MW02 in the risk calculations assumes that those concentrations remain the same throughout the exposure time of the receptor. However, based on other sampling events from the same well, those maximun concentrations are not consistently present over time as the risk calculations assume, which results in an overestimated risk.

2.5.5.2 Uncertainty in Exposure Assessment

The risk assessment estimates are conditional on actual and potential exposure pathways identified at the site. If exposure does not occur, no risks are present. Furthermore, the risk assessment process does not factor in the probability of exposure occurring.

Current land uses and characterization of the site's current physical setting provided the basis for predicting future land use at and in the vicinity of the site. The assumption of steady-state conditions was also used in predicting future contaminant concentrations. As discussed in Section 2.5.7.1, this assumption would tend to overestimate potential future exposure levels because concentrations of chemicals may decline with time.

There is also some concern as to how well an exposure scenario approximates the actual conditions that a receptor may be exposed to at a given site. Potential human exposures could deviate from those used in the risk assessment through differences in exposure frequency, contact rates, exposure durations, body weight, and life span. Each of these factors has a degree of uncertainty associated with it that could over- or underestimate risk.

Evaluation of risk for the UU/UE receptor includes calculation of the risk to children. Other sensitive subpopulations such as elderly people, pregnant or nursing women, and people with chronic illnesses were not specifically evaluated in this risk assessment. These subpopulations may be more sensitive to certain chemical exposures. However, USEPA generally considers sensitive subpopulations when developing toxicity factors. Whenever possible, exposure assumptions were made to protect sensitive subpopulations (e.g., the mutagenic mode of action evaluation). Additionally, there are no day care or school facilities, healthcare facilities, nursing homes, retirement communities, or residential areas with children onsite currently.

2.5.5.3 Uncertainty in Toxicity Assessment

Some uncertainty is also inherent in the toxicity values used in the risk assessment. Carcinogenic SFs and route-specific values were derived only for compounds that have been shown to cause an increased incidence of tumors in either human or animal studies. This dose-response curve is then assumed to be linear at low doses (e.g., those found in situations of environmental contamination) and is used to predict tumor incidence at low exposure levels. When an animal study is used, the final SF is adjusted to account for extrapolation of animal data to humans. If the studies used to derive the SF were conducted for less than the life span of the test organism, the final SF had also been adjusted to reflect risk associated with lifetime exposure.

The SF is generally an upper 95th percentile confidence limit of the probability of a response based on experimental animal data in the multistage model. This means that the site-specific chemical risk is not likely to exceed the risk estimate derived through the model and is likely to be less than the predicted risk.

The chronic RfD for a compound is based on studies where either human or animal populations were exposed to a given compound by a given route of exposure for a major portion of the life span (as a USEPA guideline, seven years to a lifetime; USEPA, 1989). RfDs are derived by determining dose-specific effect levels from available quantitative studies and applying uncertainty factors to the most appropriate effect level to determine an RfD for humans. Uncertainty factors are generally applied as

multiples of 10 to represent specific areas of uncertainty in the data. Typically, an uncertainty factor of 100 to 1,000 is used in the professional judgment of uncertainties. General uncertainties in the derivation of RfDs may be associated with factors such as (1) variations in the general population (to protect sensitive receptors), (2) extrapolation of animal data to humans, (3) use of a subchronic study versus a chronic study to determine the no-observed-adverse-effect level (NOAEL), or (4) use of a lowest-observed-adverse-effect level (LOAEL) versus a NOAEL. Both the uncertainty and modifying factors are conservative in nature and tend to overestimate risk.

Although the most current toxicity values assigned by USEPA are used in the risk assessment, these values may not be available for all compounds. The toxicity classification of a chemical may be under review or not available. If data are lacking, the chemical may not be accounted for in the estimates of potential risk. The use of a surrogate may either over or underestimate the risk associated with exposure to this chemical, as the toxicity between the compound and its surrogate may vary.

2.5.5.4 Uncertainty in Estimating Chemical Risk

The expression of the potential risk associated with contaminants detected at the site is a result of the combined steps of data evaluation, exposure assessment, and toxicity assessment. This combination can magnify the uncertainties present in these steps of the risk assessment process.

The groundwater onsite is not currently used as a drinking water resource. There are no current residents onsite. The estimate for non-carcinogenic hazard to child UU/UE receptors exceeds the noncarcinogenic cumulative hazard goal of 1. Therefore, there may be an unacceptable hazard to human health if unfiltered groundwater was to be used in the future as a drinking water resource.

In assessing the risk for which a mutagenic MOA has been identified by USEPA, default ADAFs were applied for those chemical lacking chemical-specific data on susceptibility from early life exposures. The *Supplemental Guidance for Assessing Cancer Susceptibility from Early Life Exposure to Carcinogens* (USEPA, 2005a) recommends the following default ADAFs:

- 10-fold adjustment for exposures during the first two years of life
- 3-fold adjustment for exposures from ages 2 to <16 years of age
- No adjustment for exposures after turning 16 years of age

These ADAFs are used to prorate the toxicity factors for the respective age ranges, to account for more or less sensitivity during that life stage. For example, there is assumed by default to be 10-fold greater sensitivity over the first two years of life than for an equivalent level of exposure after turning 16 years of age.

Other COPCs could theoretically function under a mutagenic MOA, and not be identified as such by USEPA. In these situations, the risk associated with early life exposures may be underestimated.

Additional uncertainties are incorporated into the risk assessment when exposures to several substances are summed. Exposure to multiple chemicals may result in interactions between the chemicals in ways that may not be predictable. The assumption is that exposure to multiple chemicals is additive, that is, the carcinogenic risk or hazard quotient for each chemical is simply added together to estimate the cumulative risk or hazard. However, in reality some constituents may produce a synergistic effect, where the risk associated with exposure to these chemicals is actually greater than the sum of the carcinogenic risk or HQs. In such a case, the risk assessment will underestimate the risk. In other cases, some chemicals may interact antagonistically, such that the risk associated with exposure to these chemicals is less than the sum of the carcinogenic risk or HQs. In these cases, the risk assessment will overestimate the risk associated with exposure to these chemicals.

The hazard estimates associated with the groundwater from well PAR-57-MW02 were based on the maximum detected concentrations, all of which were detected in one unfiltered sample. As discussed in Section 2.3, although a receptor could be exposed to the maximum detected concentration at any one time, it is unlikely a receptor will be exposed to the maximum detected concentration over the entirety of the exposure duration. Therefore, the hazard to a UU/UE child receptor is likely overestimated.

2.6 Conclusions

This HHRA was conducted to evaluate the potential for human health impacts as a result of potential exposures to chemicals in soil and groundwater at Parcel 57 at the former Fort Monmouth.

The cumulative carcinogenic risks and noncarcinogenic hazards estimated for the receptors at the site are as follows (**Tables H.2.124 and H.2.125**):

- UU/UE receptors exposed to surface soil, combined surface and subsurface soil, outdoor air, and potable groundwater: The cumulative carcinogenic risks in surface soil and combined surface and subsurface soil are less than or equal to the cumulative risk goal of 1×10^{-4} in every exposure area. The HIs for surface soil are less than or equal to 1 for all exposure areas, except for the child receptor in exposure area 1. The HI for the UU/UE child receptor in exposure area 1 is 2 which is greater than 1. The individual HQs are all less than 1. Since the total HI was greater than 1, the hazards were separated by target organ. The segregated HIs were less than or equal to 1 for the target organs. The HIs for combined surface and subsurface soil for both child and adult UU/UE receptors are less than or equal to 1 for all exposure areas.

  The cumulative carcinogenic risk for UU/UE receptors exposed to groundwater was not calculated because none of the COPCs in groundwater are carcinogenic. The cumulative noncarcinogenic HI for UU/UE receptors exposed to groundwater is estimated to be 5 for the child receptor (HI_{child}) and 3 for the adult receptor (HI_{adult}). The main contributors to these hazard estimates are ingestion of cadmium and nickel ($HI_{child} = 2$ for both, and $HI_{adult} = 1$ for both). All of the maximum concentrations come from one sample at well PAR-57-MW02.

  Since the total HI_{adult} of 3was greater than 1 for groundwater, the hazards were separated by target organ. For HI_{adult}, the individual HQs are all less than or equal to 1. The segregated HIs were less than or equal to 1 for the target organs.

  Similarly, since the HI_{child} was greater than 1 for groundwater, the hazards were separated by target organ. The segregated HIs were less than or equal to 1 for the four target organs/systems: blood, central nervous system, immune system, and respiratory system. However, the segregated HI for body weight/whole body was 2, driven by exposure to nickel and for urinary was 2, driven by exposure to cadmium. For the target organs and systems with HIs greater than the benchmark level of concern of 1, noncarcinogenic effects are theoretically possible. However, as discussed in the uncertainties section above, the results from this one sample are not representative of true site conditions, especially over time, and the hazard for this well is overestimated.

- Utility workers exposed to surface soil, combined surface and subsurface soil, and groundwater: The cumulative carcinogenic risk for surface soil of 9×10^{-8}, and for combined surface and subsurface soil of 1×10^{-7} are less than the cumulative risk goal of 1×10^{-4}. The HI for utility workers is less than 1 for surface soil (HI=0.02), combined surface and subsurface soil (HI=0.03), and for groundwater (HI = 0.01).

- Outdoor workers exposed to surface soil: The cumulative carcinogenic risk for soil of 6×10^{-6} is less than the cumulative risk goal of 1×10^{-4}. The HI for outdoor workers is less than 1 for soil (HI=0.08).
- Recreational users exposed to surface soil: The cumulative carcinogenic risk for soil of 2×10^{-6} is less than the cumulative risk goal of 1×10^{-4}. The recreational user HI_{adl} for soil is 0.02 and the HI_{adult} is 0.01, which are less than 1.

Uncertainties may result in overestimated risks/hazards. Most notably, onsite groundwater is not currently used as a potable drinking water source so the risk/hazard estimates herein may be overestimated. The estimated risks/hazards associated with potable groundwater would apply only if a well was installed for potable water. The maximum concentrations used from one sample are not are not representative of true site conditions, especially over time, and the hazard for this well is overestimated.

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SECTION 3
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TABLES

Table H.2.1
SUMMARY OF RECEPTORS AND EXPOSURE SCENARIOS
Parcel 57
Fort Monmouth, New Jersey

Media	Unrestricted Use/ Unrestricted Exposure	Outdoor Worker (Current/Future)	Utility Worker (Current/Future)	Recreational Child (Current/Future)	Recreational Adult (Current/Future)
Surface Soil	Quantified	Quantified	Quantified	Quantified	Quantified
Frequency of Exposure	Full time	Full time	One month project	Visit once a week	Visit once a week
Duration of Exposure	Long-Term	Long-Term	One project	Years from ages 6-<16	Adult Exposure
Subsurface Soil	Quantified	No Exposure	Quantified	No Exposure	No Exposure
Frequency of Exposure	Full time	Full time	One month project	Visit once a week	Visit once a week
Duration of Exposure	Long-Term	Long-Term	One project	Years from ages 6-<16	Adult Exposure
Groundwater	Quantified	No Exposure	Quantified	No Exposure	No Exposure
Days/Year	Full time	Full time	One month project	Visit once a week	Visit once a week
Years	Long-Term	Long-Term	One project	Years from ages 6-<16	Adult Exposure
Outdoor Air	Quantified	Quantified	Quantified	Quantified	Quantified
Frequency of Exposure	Full time	Full time	One month project	Visit once a week	Visit once a week
Duration of Exposure	Long-Term	Long-Term	One project	Years from ages 6-<16	Adult Exposure
Indoor Air	No exposure	No Exposure	No Exposure	No Exposure	No Exposure
Frequency of Exposure	Full time	Full time	One month project	Visit once a week	Visit once a week
Duration of Exposure	Long-Term	Long-Term	One project	Years from ages 6-<16	Adult Exposure

Table H.2.2 Soil Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptor	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rationale	Recreational User	Sources	Rationale
THQ	Target Hazard Quotient	unitless	1	USEPA, 2017c	USEPA RSL Users Guide, Table 1	1	USEPA, 2017c	USEPA RSL Users Guide, Table 1	1	USEPA, 2017c	USEPA RSL Users Guide, Table 1	1	USEPA, 2017c	USEPA RSL Users Guide, Table 1
AT_{nc}	Averaging Time – noncarcinogens	days	7,300 (adult) 2,190 (child)	USEPA, 1989	Exhibit 6-9; Period over which exposure is averaged; ED expressed in days (20 years adult x 365 days or 6 years child x 365 days)	9,125	USEPA, 1989	Exhibit 6-9; Period over which exposure is averaged; ED expressed in days (25 years x 365 days)	365	USEPA, 2014	Source references USEPA, 1989, page 6-23; ED expressed in days (1 year x 365 days)	5,110 (adult) 3,650 (adl)	USEPA, 1989	Exhibit 6-9; Period over which exposure is averaged; ED expressed in days (14 years adult x 365 days or 10 years adl x 365 days)
AT_c	Averaging Time – carcinogens	days	25,550	USEPA, 2014 as "lifetime"	70-year lifetime expressed in days (70 years x 365 days)	25,550	USEPA, 2014 as "lifetime"	70-year lifetime expressed in days (70 years x 365 days)	25,550	USEPA, 2014 as "lifetime"	70-year lifetime expressed in days (70 years x 365 days)	25,550	USEPA, 2014 as "lifetime"	70-year lifetime expressed in days (70 years x 365 days)
ED	Exposure Duration	years	20 (adult) 6 (child	USEPA, 2014	Adult: ED_r (26 years) – ED_{child} (6 years) where ED_r is derived from USEPA, 2011 Table 16-108; 90th percentile for current residence time. Child: Source references USEPA, 1991a, Pages 6 and 15	25	USEPA, 2014	Source references USEPA, 1991a, Page 15; RME scenario for industrial worker	1	USEPA, 2002	Exhibit 5-1; USEPA, default value for construction workers	14 (adult) 10 (adl)	Professional judgment	Adult: Represents the number of years returning to the same location as an adult, assumes 16 to <30 years of age Adl: Represents the number of years returning to the same location as an adolescent; assumes 6 to <16 years of age

Table H.2.2 (Continued) Soil Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptor	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rationale	Recreational User	Sources	Rationale
BW	Body Weight	kg	80 (adult) 15 (child)	USEPA, 2014	Adult: Source references USEPA, 2011, Table 8-3; weighted mean values for adults 21 to 78 Child: Source references USEPA, 2011, Table 8-1; weighted average of mean body weights (birth to <6 years	80	USEPA, 2014	Source references USEPA, 2011, Table 8-3; weighted mean values for adults 21 – 78	80	USEPA, 2014	Source references USEPA, 2011, Table 8-3; weighted mean values for adults 21 – 78	80 (adult) 44 (adl)	Adult: USEPA, 2014 Adl: USEPA, 2011	Adult: Source references USEPA, 2011, Table 8-3; weighted mean values for adults 21 to 78 years of age Adl: Table 8-3, mean of body weights for 6 to <11 and 11 to <16 years
EF	Exposure Frequency	days/year	350	USEPA, 2014	Source references USEPA, 1991 (pg. 15); Resident RME scenario	225	USEPA, 2014	Source references USEPA, 1991, page 15, outdoor worker RME scenario	30	Professional judgment	Assumes project of one month duration	50	Professional judgment	Assumes recreational user on site once per week every week of the year, except for 2 weeks vacation
IRS	Soil Ingestion Rate	mg/day	100 (adult) 200 (child)	USEPA, 2014	Adult: Source references USEPA, 1991a (pp. 6 and 15); for resident Child: Source references U.S. EPA 2011 (Table 5-1 "upper-bound values" accounting for both soil and dust ingestion	100	USEPA, 2014	Source references USEPA, 1991, page 15, same as adult resident	330	USEPA, 2017c	Source references USEPA, 2002, Exhibit 5-1, USEPA recommended value for construction worker	50 (adult) 100 (adl)	USEPA, 2011	Adult: Table 5-1, General Population Central Tendency, Adult soil and dust ingestion Adl: Table 5-1, General Population Central Tendency, soil and dust ingestion for 6 to <21 years of age
EV	Event Frequency	events/day	1	USEPA, 2004a	Exhibit 3-5, residential RME scenario	1	USEPA, 2004a	Exhibit 3-5, industrial RME scenario	1	USEPA, 2004a	Exhibit 3-5, industrial RME scenario	1	Professional judgment	Recreational users are expected to be onsite one event per day

Table H.2.2 (Continued) Soil Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptor	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rationale	Recreational User	Sources	Rationale
FI	Fraction Ingested	unitless	1	USEPA, 1989, page 6-39	Assumes that all of contaminated soil contacted is from the site	1	USEPA, 1989, page 6-39	Assumes that all of contaminated soil contacted is from the site	1	USEPA, 1989, page 6-39	Assumes that all of contaminated soil contacted is from the site	1	USEPA, 1989, page 6-39	Assumes that all of contaminated soil contacted is from the site
CF_s	Conversion Factor-soil	kg/mg	1E-06	USEPA, 1989	Exhibit 6-14	1E-06	USEPA, 1989	Exhibit 6-14	1E-06	USEPA, 1989	Exhibit 6-14	1E-06	USEPA, 1989	Exhibit 6-14
GIABS	Gastrointestinal Absorption Factor (also, OAF = Oral Absorption Factor)	unitless	Chemical-specific	USEPA, 2017g	Fraction of contaminant absorbed in gastrointestinal tract	Chemical-specific	USEPA, 2017g	Fraction of contaminant absorbed in gastrointestinal tract	Chemical-specific	USEPA, 2017g	Fraction of contaminant absorbed in gastrointestinal tract	Chemical-specific	USEPA, 2017g	Fraction of contaminant absorbed in gastrointestinal tract
SA	Exposed Skin Surface Area	cm^2	6,032 (adult) 2,690 (child)	USEPA, 2014	Adult: Source references USEPA, 2011, Tables 7-2 and 7-12; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, 21+ years. Child: Source references Tables 7-2 and 7-8; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, birth to < 6 years)	3,470	USEPA, 2014	Source references USEPA, 2011, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female adults); assumes wearing shoes and long pants	3,470	USEPA, 2014	Source references USEPA, 2011, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female adults); assumes wearing shoes and long pants	3,470 (adult) 2,160 (adl)	USEPA, 2014; USEPA, 2011	Adult: Source references USEPA, 2011, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female adults); assume wearing shoes and long pants Adl: Table 7-2, weighted average of mean values for head, hands, and arms (mean value for arm times 45% to account for forearm) (Age 6 to <16 years of age); assume wearing shoes and long pants

Table H.2.2 (Continued) Soil Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptor	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rationale	Recreational User	Sources	Rationale
AF	Adherence Factor	mg/cm^2	0.07 (adult) 0.2 (child)	USEPA, 2014	Adult and child: Source references USEPA, 2004 (Exhibit 3-5)	0.12 (1)	USEPA, 2014	Source references USEPA, 2011, Table 7-2, Table 7-20 and Section 7.2.2; arithmetic mean of weighted average of body part-specific (hands, forearms, and face) mean adherence factors for adult commercial/ industrial activities	0.20	USEPA, 2011	Table 7-2, Table 7-20 and Section 7.2.2; arithmetic mean of weighted average of body part-specific (hands, forearms, and face) mean adherence factors for adult utility worker number 1	0.09 (adult) 0.04 (adl) (1)	USEPA, 2011	Adult: Table 7-2, Table 7-20 and Section 7.2.2; arithmetic mean of weighted average of body part-specific (hands, forearms, and face) mean adherence factors for adult Gardener number 1 Adl: Table 7-2, Table 7-4, and Section 7.2.2; arithmetic mean of weighted average of body part-specific (hands, forearms, face, mean adherence factors for child playing outdoor sports
ABS_d	Dermal Absorption Factor	unitless	Chemical-specific	USEPA, 2017g	Fraction of contaminant absorbed dermally; USPEA RSL Summary Table -	Chemical-specific	USEPA, 2017g	Fraction of contaminant absorbed dermally; USPEA RSL Summary Table-	Chemical-specific	USEPA, 2017g	Fraction of contaminant absorbed dermally; USPEA RSL Summary Table -	Chemical-specific	USEPA, 2017g	Fraction of contaminant absorbed dermally; USPEA RSL Summary Table -
ET	Exposure Time	hour/day	24	USEPA, 2014	The whole day	8	USEPA, 2014	The work day	8	USEPA, 2014	The work day	2	Professional judgment	Assumes recreational users on site for two hours each event
VF	Volatilization Factor-soil	m^3/kg	Chemical Specific	USEPA, 2002, 2017c	Calculated using inputs in Table 4 of this document	Chemical Specific	USEPA, 2002, 2017c	Calculated using inputs in Table 4 of this document	Chemical Specific	USEPA, 2002, 2017c	Calculated using inputs in Table 4 of this document	Chemical specific	USEPA, 2002, 2017c	Calculated using inputs in Table 4 of this document

Table H.2.2 (Continued) Soil Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptor	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rationale	Recreational User	Sources	Rationale
PEF	Particulate Emission Factor	m^3/kg	3.23E-09	USEPA, 2002, 2017c	Calculated using inputs in Table 4 of this document	3.23E-09	USEPA, 2002, 2017c	Calculated using inputs in Table 4 of this document	3.23E-09	USEPA, 2002, 2017c	Calculated using inputs in Table 4 of this document	3.23E-09	USEPA, 2002, 2017c	Calculated using inputs in Table 4 of this document

(1) Adherence factor (AF) users calculated as USEPA, 2011, Section 7.2.2. The AF values for adults are from USEPA Table 7-20 and the Surface Areas (SA) are from USEPA Table 7-2. The AF values for adolescents are from USEPA Table 7-4, outdoor sports for children, and the Surface Areas (SA) are from USEPA Table 7-2. The weighted AF for each receptor is calculated as [$AF_{weighted} = (AF_{hands})(SA_{hands}) + (AF_{face})(SA_{head}) + (AF_{arms})(SA_{arms}) / (SA_{hands} + SA_{head} + SA_{arms})$]. Note that the SA_{arms} is multiplied by 45% to account for only the forearms.

Table H.2.3 Groundwater Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptors	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rational	Recreational User	Sources	Rationale
IRW	Groundwater or Surface Water Ingestion	L/day	2.5 (adult) 0.78 (child)	USEPA, 2017c	For UU/UE receptors, assumes groundwater is used as a potable water source Adult: source references USEPA, 2011, Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years) Child: source references USEPA, 2011, Tables 3-15 and 3-33; weighted average of 90th percentile consumer-only ingestion of drinking water (birth to <6 years)	0.02	USEPA, 2014d	Section 4.5; During wading activities, water ingestion of 10 ml/hour for adults, converted to L/day assuming the outdoor worker is in contact with surface water for 2 hours per day	0.02	USEPA, 2014d	Section 4.5; During wading activities, water ingestion of 10 ml/hour for adults, converted to L/day assuming the utility worker is in contact with groundwater in a trench for 2 hours per day	0.02 (adult) 0.02(adl)	USEPA, 2014d	Section 4-5; During wading activities, water ingestion of 10 ml/hour for adolescents and adults, converted to L/day assuming the recreational user is in contact with surface water for 2 hours per day
K_p	Permeability Constant	cm/hour	Chemical -specific	USEPA, 2017d	Dermal permeability coefficient of compound in water	Chemical-specific	USEPA, 2017d	Dermal permeability coefficient of compound in water	Chemical-specific	USEPA, 2017d	Dermal permeability coefficient of compound in water	Chemical-specific	USEPA, 2017d	Dermal permeability coefficient of compound in water

Table H.2.3 (Continued) Groundwater Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptors	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rational	Recreational User	Sources	Rationale
SA	Skin Surface Area	cm^2	20,900 (adult) 6,378 (child)	USEPA, 2017c	Assume potable water used for bathing Adult: source references USEPA, 2011, Table 7.10; weighted average of mean values for adults, male and female 21+. Child: source references USEPA, 2011, Table 7.10; weighted average of mean values for children <6 years	4,835	USEPA, 2011	Table 7-2; weighted average of mean values for hands, feet, and lower legs (mean value for legs times 40% to account for lower leg) (male and female, 21+years)	4,840	USEPA, 2011	Table 7-2; weighted average of mean values for hands, feet, and lower legs (mean value for legs times 40% to account for lower leg) (male and female, 21+years)	4,835 (adult) 3093 (adl)	USEPA, 2011	Adult: Table 7-2; weighted average of mean values for hands, feet, and lower legs (mean value for legs times 40% to account for lower leg) (male and female, 21+years). Adl: Table 7-2; weighted average of mean values for hands, feet, and lower legs (mean value for legs times 40% to account for lower leg) (6 to <16 years of age)
VF_{air}	Volatilization Factor	L/m^3	0.5	USEPA, 2017c	Source references USEPA, 1991b, page 20	0.5	USEPA, 2017c	Source references USEPA, 1991b, page 20	0.5	USEPA, 2017c	Source references USEPA, 1991b, page 20	0.5	USEPA, 2017c	Source references USEPA, 1991b, page 20
EV	Event Frequency	events/day	1	USEPA 2004 Exhibit 3-2	RME scenario for Showering/Bathing.	1	Professional judgment	Assumes an outdoor worker may come into contact with surface water during routine maintenance activities, for one event per day.	1	USEPA, 2002	Exhibit 1-2. Assumes a worker may come into contact with groundwater during excavation or trenching activities, for one event per day.	1	Professional judgment	Assumes a recreational user may come into contact with surface water during wading activities, for one event per day.

Table H.2.3 (Continued) Groundwater Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptors	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rational	Recreational User	Sources	Rationale
ET	Exposure time as a fraction of the day spent at the site	unitless	0.030 (adult) 0.023 (child)	USEPA, 2014	Adult: calculated as (0.71 ED/24 hours) Child; calucated as 0.54 ED / 24 hours).	0.083 (2 hours/day)	Professional judgment	Assumes an outdoor worker may come into contact with surface water during work activities, for one event per day, 2 hours per event.	0.083 (2 hours/day)	Professional judgment	Assumes an utility worker may come into contact with groundwater during work activities, for one event per day, 2 hours per event.	0.083 (2 hours/day)	Professional judgment	Assumes a recreational user may come into contact with surface water during wading activities, for one event per day, 2 hours per event.
t_{event}	Event Duration	hours/event	0.71 (adult) 0.54 (child)	USEPA, 2014	Adult: U.S. EPA 2011, Tables 16-30 and 16-31; weighted average of adult (21 to 78) 90th percentile of time spent bathing/ showering in a day, divided by mean number of baths/showers taken in a day. Child: U.S. EPA 2011, Table 16-28; weighted average of 90th percentile time spent bathing (birth to <6 years)	2	Professional judgment	Assumes an outdoor worker may come into contact with surface water during work activities, for one event per day, 2 hours per event.	2	Professional judgment	Assumes an utility worker may come into contact with groundwater during work activities, for one event per day, 2 hours per event.	2	Professional judgment	Assumes a recreational user may come into contact with surface water during wading activities, for one event per day, 2 hours per event.
EF	Exposure Frequency	days/year	350	USEPA, 2014	USEPA, 1991a (pg. 15)	225	USEPA, 2014	Source references USEPA, 1991aa, page 15, outdoor worker RME scenario	30	Professional judgment	Assumes project of one month duration	50	Professional judgment	Assumes recreational user on site once per week every week of the year, except for 2 weeks vacation

Table H.2.3 (Continued) Groundwater Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptors	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rational	Recreational User	Sources	Rationale
ED	Exposure Duration	year	20 (adult) 6 (child)	USEPA, 2014	Adult: Source references USEPA, 2011 Table 16-108; 90th percentile for current residence time. Child: Source references USEPA,1991a, Pages 6 and 15	25	USEPA, 2014	Source references USEPA, 1991a, Page 15; RME scenario for industrial worker	1	USEPA, 2002	Exhibit 5-1; USEPA, default value for construction workers	14 (adult) 10 (adl)	Professional judgment	Adult: Represents the number of years returning to the same location as an adult, age 16 to <30 years of age Adl: Represents the number of years returning to the same location as an adolescent; assumes adolescent recreational user 6 to <16 years of age
ED	Exposure Duration-for inhalation	year	26	USEPA, 2014	Source references USEPA, 2011a, Table 16-108; 90th percentile for current residence time.	--	--	--	--	--	--	23	Professional judgment	Combined 10 years as adolescent and 14 years as adult
BW	Body Weight	kg	80 (adult) 15 (child)	USEPA, 2014	Adult: Source references USEPA, 2011, Table 8-3; weighted mean values for adults 21 – 78 Child: Source references USEPA, 2011, Table 8-1; weighted average of mean body weights (birth to <6 years)	80	USEPA, 2014	Source references USEPA, 2011, Table 8-3; weighted mean values for adults 21 – 78	80	USEPA, 2014	Source references USEPA, 2011, Table 8-3; weighted mean values for adults 21 – 78	80 (adult) 44 (adl)	USEPA, 2014, USEPA, 2011	Adult: Source references USEPA, 2011, Table 8-3; weighted mean values for adults 21 – 78 Adl: Table 8-3, weighted mean value for adolescent age 6 to <16 years of age

Table H.2.3 (Continued) Groundwater Exposure Parameters

Abbreviation	Parameter	Units	UU/UE Receptors	Sources	Rationale	Outdoor Worker	Sources	Rationale	Utility Worker	Sources	Rational	Recreational User	Sources	Rationale
AT_{nc}	Averaging Time – noncarcinogens	days	7,300 (adult) 2,190 (child)	USEPA, 1989	Exhibit 6-9; Period over which exposure is averaged; ED expressed in days (20 years adult x 365 days or 6 years child x 365 days)	9,125	USEPA, 1989	Exhibit 6-9; Period over which exposure is averaged; ED expressed in days (25 years x 365 days)	365	USEPA, 2014	Source references USEPA, 1989, page 6-23; ED expressed in days (1 year x 365 days)	5,110 (adult) 3,650 (adl)	USEPA, 1989	Exhibit 6-9; Period over which exposure is averaged; ED expressed in days (14 years adult x 365 days or 10 years adl x 365 days)
AT_c	Averaging Time – carcinogens	days	25,550	USEPA, 2014 as "lifetime"	70-year lifetime expressed in days (70 years x 365 days)	25,550	USEPA, 2014 as "lifetime"	70-year lifetime expressed in days (70 years x 365 days)	25,550	USEPA, 2014 as "lifetime"	70-year lifetime expressed in days (70 years x 365 days)	25,550	USEPA, 2014 as "lifetime"	70-year lifetime expressed in days (70 years x 365 days)
FA	Fraction absorbed	unitless	Chemical-specific	USEPA, 2004	Exhibit B-3	Chemical-specific	USEPA, 2004	Exhibit B-3	Chemical-specific	USEPA, 2004	Exhibit B-3	Chemical-specific	USEPA, 2004	Exhibit B-3
B	Relative contribution of permeability coefficient	unitless	Chemical-specific	USEPA, 2017d	--	Chemical-specific	USEPA, 2017d	--	Chemical-specific	USEPA, 2017d	--	Chemical-specific	USEPA, 2017d	--
t^*	Time it takes to reach steady state	hours	Chemical-specific	USEPA, 2004	Exhibit B-3	Chemical-specific	USEPA, 2004	Exhibit B-3	Chemical-specific	USEPA, 2004	Exhibit B-3	Chemical-specific	USEPA, 2004	Exhibit B-3
τ_{event}	Lag Time per Event	hr/event	Chemical-specific	USEPA, 2017d	--	Chemical-specific	USEPA, 2017d	--	Chemical-specific	USEPA, 2017d	--	Chemical-specific	USEPA, 2017d	--

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	P57-SS-A1-1.0-1.5		P57-SS-A1-1.5-2.0		FTMM-57-SS09-0.5-1.0		FTMM-57-SS09-2.0-2.5		FTMM-57-SS09-5.5-6.0		FTMM-57-SS10-0.0-0.5		FTMM-57-SS10-3.0-3.5		FTMM-57-SS10-7.0-7.5		P57-A1-A (0.5-1)	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	0.72	0.072	0.54 U	0.054	0.77 J	0.077	0.0023 J	0.00023	10	1	0.27	0.027	0.0053 J	0.00053	0.0044 U	0.00044	9.5 JD	0.95
Benzo(a)pyrene	1	0.77	0.77	0.54 U	0.54	0.88	0.88	0.0031 J	0.0031	8	8	0.27	0.27	0.0049 J	0.0049	0.0044 U	0.0044	9.9	9.9
Benzo(b)fluoranthene	0.1	1.54	0.154	0.54 U	0.054	1.2 J	0.12	0.0039 J	0.00039	11	1.1	0.39	0.039	0.0058 J	0.00058	0.0044 U	0.00044	9.9 JD	0.99
Benzo(k)fluoranthene	0.01	0.55 J	0.0055	0.54 U	0.0054	0.35 J	0.0035	0.0038 U	0.000038	3.3	0.033	0.12	0.0012	0.0031 J	0.000031	0.0044 U	0.000044	7	0.07
Chrysene	0.001	0.95	0.00095	0.54 U	0.00054		0		0		0		0		0		0	10 JD	0.01
Dibenz(a,h)anthracene	1	0.55 U	0.55	0.54 U	0.54	0.29 J	0.29	0.0038 U	0.0038	1.8	1.8	0.075	0.075	0.0044 U	0.0044	0.0044 U	0.0044		0
Indeno(1,2,3-cd)pyrene	0.1	0.39 J	0.039	0.54 U	0.054	0.57 J	0.057	0.0038 U	0.00038	4.5	0.45	0.2	0.02	0.0031 J	0.00031	0.0044 U	0.00044	3.2	0.32
BaP Equivalent			**1.6**		**1.2 U**		**1.4**		**0.0079**		**12**		**0.43**		**0.011**		**0.01 U**		**12**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	P57-A1-C (7.5-8)		P57-SS-A1-A-6.5-7.0		P57-SS-A1-B-6.5-7.0		P57-SS-A1-C-8.0-8.5		P57-A2-A (0-0.5)		P57-A2-C (5.5-6)		P57-A3-A (0.5-1)		P57-A3-C (4-4.5)		P57-B3-A (0.5-1)	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	1.3 U	0.13	0.62 U	0.062	0.62 U	0.062	0.65 U	0.065	0.22 J	0.022	1.3 U	0.13	0.1 J	0.01	1.1 U	0.11	0.21 J	0.021
Benzo(a)pyrene	1	1.3 U	1.3	0.62 U	0.62	0.62 U	0.62	0.65 U	0.65	0.21 J	0.21	1.3 U	1.3	1.2 U	1.2	1.1 U	1.1	1.1 U	1.1
Benzo(b)fluoranthene	0.1	1.3 U	0.13	0.62 U	0.062	0.62 U	0.062	0.65 U	0.065	0.33 J	0.033	1.3 U	0.13	1.2 U	0.12	1.1 U	0.11	1.1 U	0.11
Benzo(k)fluoranthene	0.01	1.3 U	0.013	0.62 U	0.0062	0.62 U	0.0062	0.65 U	0.0065	0.11 J	0.0011	1.3 U	0.013	1.2 U	0.012	1.1 U	0.011	1.1 U	0.011
Chrysene	0.001	1.3 U	0.0013	0.62 U	0.00062	0.62 U	0.00062	0.65 U	0.00065	0.27 J	0.00027	1.3 U	0.0013	0.13 J	0.00013	1.1 U	0.0011	0.25 J	0.00025
Dibenz(a,h)anthracene	1		0	0.62 U	0.62	0.62 U	0.62	0.65 U	0.65		0		0		0		0		0
Indeno(1,2,3-cd)pyrene	0.1	1.3 U	0.13	0.62 U	0.062	0.62 U	0.062	0.65 U	0.065	0.082 J	0.0082	1.3 U	0.13	1.2 U	0.12	1.1 U	0.11	1.1 U	0.11
BaP Equivalent			**1.7 U**		**1.4 U**		**1.4 U**		**1.5 U**		**0.27**		**1.7 U**		**1.5**		**1.4 U**		**1.4**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	P57-B3-C (7-7.5)		FTMM-57-SS14-0.0-0.5		FTMM-57-SS14-3.0-3.5		FTMM-57-SS14-5.0-5.5		FTMM-57-SS17-0.0-0.5		FTMM-57-SS17-3.0-3.5		FTMM-57-SS17-5.5-6.0		FTMM-57-SS18-0.0-0.5		FTMM-57-SS18-5.0-5.5		FTMM-57-SS21-0.0-0.5	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	1.2 U	0.12	1.2	0.12	0.035	0.0035	0.0037 U	0.00037	4.3	0.43	0.004 U	0.0004	0.0027 J	0.00027	3.7	0.37	0.037	0.0037	7.8	0.78
Benzo(a)pyrene	1	1.2 U	1.2	0.97	0.97	0.035	0.035	0.0037 U	0.0037	4.8	4.8	0.004 U	0.004	0.0023 J	0.0023	2.3	2.3	0.035	0.035	8.2	8.2
Benzo(b)fluoranthene	0.1	1.2 U	0.12	1.4	0.14	0.041	0.0041	0.0037 U	0.00037	6.1	0.61	0.004 U	0.0004	0.0038 U	0.00038	3.8	0.38	0.049	0.0049	11	1.1
Benzo(k)fluoranthene	0.01	1.2 U	0.012	0.48	0.0048	0.014	0.00014	0.0037 U	0.000037	2.2	0.022	0.004 U	0.00004	0.0046 J	0.000046	1.1	0.011	0.013	0.00013	3.2	0.032
Chrysene	0.001	1.2 U	0.0012		0		0		0		0		0		0		0		0		0
Dibenz(a,h)anthracene	1		0	0.19	0.19	0.012	0.012	0.0037 U	0.0037	1.2	1.2	0.004 U	0.004	0.0038 U	0.0038	0.4	0.4	0.0068 J	0.0068	2.3	2.3
Indeno(1,2,3-cd)pyrene	0.1	1.2 U	0.12	0.51	0.051	0.023	0.0023	0.0037 U	0.00037	2.5	0.25	0.004 U	0.0004	0.0038 U	0.00038	1.1	0.11	0.025	0.0025	6	0.6
BaP Equivalent			**1.6 U**		**1.5**		**0.057**		**0.0085 U**	7.3	**7.3**		**0.0092 U**		**0.0072**		**3.6**		**0.053**		**13**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	FTMM-57-SS21-3.0-3.5		P57-C3-A (0.5-1)		P57-C3-C (6.5-7)		P57-C3-C DUP (6.5-7)		PAR-57-SB-29-0.5-1		PAR-57-SB-29-3.5-4		PAR-57-SB-29-7.5-8		P57-SS-C5-1.0-1.5		P57-SS-C5-1.5-2.0		FTMM-57-SS13-0.0-0.5	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	0.15	0.015	2.9	0.29	0.1 J	0.01	1.1 U	0.11	1.6	0.16	0.0073 J	0.00073	0.0025 J	0.00025	0.57 U	0.057	0.54 U	0.054	0.98	0.098
Benzo(a)pyrene	1	0.15	0.15	2	2	0.081 J	0.081	1.1 **U**	1.1	1.2	1.2	0.005 J	0.005	0.0041 U	0.0041	0.57 U	0.57	0.54 U	0.54	0.89	0.89
Benzo(b)fluoranthene	0.1	0.2	0.02	3.1	0.31	0.11 J	0.011	1.1 U	0.11	1.1	0.11	0.0038 J	0.00038	0.0041 U	0.00041	0.57 U	0.057	0.54 U	0.054	1.2	0.12
Benzo(k)fluoranthene	0.01	0.061	0.00061	1.9	0.019	0.059 J	0.00059	1.1 U	0.011		0		0		0	0.57 U	0.0057	0.54 U	0.0054	0.31	0.0031
Chrysene	0.001		0	3	0.003	0.12 J	0.00012	1.1 U	0.0011		0		0		0	0.57 U	0.00057	0.54 U	0.00054		0
Dibenz(a,h)anthracene	1	0.039	0.039		0		0		0	0.21	0.21	0.0039 U	0.0039	0.0041 U	0.0041	0.57 U	0.57	0.54 U	0.54	0.17	0.17
Indeno(1,2,3-cd)pyrene	0.1	0.098	0.0098	0.69 J	0.069	1.1 U	0.11	1.1 U	0.11	0.67	0.067	0.0023 J	0.00023	0.0041 U	0.00041	0.57 U	0.057	0.54 U	0.054	0.52	0.052
BaP Equivalent			**0.23**		**2.7**		**0.21**		**1.4 U**		**1.7**		**0.01**		**0.0093**		**1.3 U**		**1.2 U**		**1.3**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	FTMM-57-SS13-3.0-3.5		FTMM-57-SS13-6.5-7.0		FTMM-57-SS15-0.0-0.5		FTMM-57-SS15-3.0-3.5		FTMM-57-SS15-5.5-6.0		FTMM-57-SS16-0.0-0.5		FTMM-57-SS16-1.5-2.0		FTMM-57-SS16-6.0-6.5		P57-B4-A (0.5-1)		P57-B4-C (6.5-7)	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	0.0039 U	0.00039	0.0041 U	0.00041	0.066	0.0066	0.0039 U	0.00039	0.034	0.0034	0.81	0.081	0.2	0.02	0.0039 U	0.00039	0.6 J	0.06	1.1 U	0.11
Benzo(a)pyrene	1	0.0039 U	0.0039	0.0041 U	0.0041	0.077	0.077	0.0039 U	0.0039	0.031	0.031	0.66	0.66	0.22	0.22	0.0039 U	0.0039	0.48 J	0.48	1.1 U	1.1
Benzo(b)fluoranthene	0.1	0.0039 U	0.00039	0.0041 U	0.00041	0.092	0.0092	0.0039 U	0.00039	0.038	0.0038	1.1	0.11	0.39	0.039	0.0039 U	0.00039	0.79 J	0.079	1.1 U	0.11
Benzo(k)fluoranthene	0.01	0.0039 U	0.000039	0.0041 U	0.000041	0.019	0.00019	0.0039 U	0.000039	0.016	0.00016	0.28	0.0028	0.035 U	0.00035	0.0039 U	0.000039	0.36 J	0.0036	1.1 U	0.011
Chrysene	0.001		0		0		0		0		0		0		0		0	0.69 J	0.00069	1.1 U	0.0011
Dibenz(a,h)anthracene	1	0.0039 U	0.0039	0.0041 U	0.0041	0.021	0.021	0.0039 U	0.0039	0.0036 U	0.0036	0.038 U	0.038	0.035 U	0.035	0.0039 U	0.0039		0		0
Indeno(1,2,3-cd)pyrene	0.1	0.0039 U	0.00039	0.0041 U	0.00041	0.047	0.0047	0.0039 U	0.00039	0.023	0.0023	0.44	0.044	0.035 U	0.0035	0.0039 U	0.00039	0.15 J	0.015	1.1 U	0.11
BaP Equivalent			**0.009 U**		**0.0095 U**	0.12	**0.12**		**0.009 U**		**0.044**		**0.94**		**0.32**		**0.009 U**		**0.64**		**1.4 U**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	P57-B5-A (0.5-1)		P57-B5-C (6.5-7)		P57-B5-C DUP (6.5-7)		P57-C4-A (0.5-1)		P57-C4-C (6.5-7)		P57-C5-A (0.5-1)		P57-C5-C (7-7.5)		FTMM-57-SS11-0.0-0.5		FTMM-57-SS111-3.0-3.5		FTMM-57-SS11-3.0-3.5	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	0.46 J	0.046	1.2 U	0.12	1.2 U	0.12	0.42 J	0.042	1.1 U	0.11	1.2	0.12	1.1 U	0.11	0.25 J	0.025	0.015	0.0015	0.01	0.001
Benzo(a)pyrene	1	1.1 U	1.1	1.2 U	1.2	1.2 U	1.2	0.47 J	0.47	1.1 U	1.1	0.95 J	0.95	1.1 U	1.1	0.21 J	0.21	0.015	0.015	0.012	0.012
Benzo(b)fluoranthene	0.1	0.52 J	0.052	1.2 U	0.12	1.2 U	0.12	0.65 J	0.065	1.1 U	0.11	1.5	0.15	1.1 U	0.11	0.27 J	0.027	0.019	0.0019	0.016	0.0016
Benzo(k)fluoranthene	0.01	0.35 J	0.0035	1.2 U	0.012	1.2 U	0.012	0.29 J	0.0029	1.1 U	0.011	0.48 J	0.0048	1.1 U	0.011	0.11 J	0.0011	0.0042 J	0.000042	0.005 J	0.00005
Chrysene	0.001	0.51 J	0.00051	1.2 U	0.0012	1.2 U	0.0012	0.52 J	0.00052	1.1 U	0.0011	1.3	0.0013	1.1 U	0.0011		0		0		0
Dibenz(a,h)anthracene	1		0		0		0		0		0		0		0	0.056 J	0.056	0.0038 U	0.0038	0.0038 U	0.0038
Indeno(1,2,3-cd)pyrene	0.1	1.1 U	0.11	1.2 U	0.12	1.2 U	0.12	1 U	0.1	1.1 U	0.11	0.33 J	0.033	1.1 U	0.11	0.14 J	0.014	0.011	0.0011	0.005 J	0.0005
BaP Equivalent			**1.3**		**1.6 U**		**1.6 U**		**0.68**		**1.4 U**		**1.3**		**1.4 U**		**0.33**		**0.023**		**0.019**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	FTMM-57-SS11-7.0-7.5		FTMM-57-SS20-0.0-0.5		FTMM-57-SS20-3.0-3.5		FTMM-57-SS20-5.0-5.5		P57-A4-A (0.5-1)		P57-A4-C (6.5-7)		P57-A5-A (0.5-1)		P57-A5-C (7.5-8)		P57-A6-A (0.5-1)		P57-A6-C (7-7.5)	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	0.0035 J	0.00035	0.27	0.027	0.023	0.0023	0.51	0.051	0.31 J	0.031	1.1 U	0.11	0.34 J	0.034	1.2 U	0.12	0.35 J	0.035	0.054 J	0.0054
Benzo(a)pyrene	1	0.0039 J	0.0039	0.3	0.3	0.013	0.013	0.27	0.27	0.35 J	0.35	1.1 **U**	1.1	1.1 U	1.1	1.2 **U**	1.2	1.1 U	1.1	1.1 U	1.1
Benzo(b)fluoranthene	0.1	0.0048 J	0.00048	0.44	0.044	0.02	0.002	0.4	0.04	0.47 J	0.047	1.1 U	0.11	0.52 J	0.052	1.2 U	0.12	1.1 U	0.11	0.069 J	0.0069
Benzo(k)fluoranthene	0.01	0.0043 U	0.000043	0.12	0.0012	0.013	0.00013	0.17	0.0017	0.16 J	0.0016	1.1 U	0.011	0.21 J	0.0021	1.2 U	0.012	1.1 U	0.011	0.039 J	0.00039
Chrysene	0.001		0		0		0		0	0.39 J	0.00039	1.1 U	0.0011	0.43 J	0.00043	1.2 U	0.0012	0.47 J	0.00047	0.077 J	0.000077
Dibenz(a,h)anthracene	1	0.0043 U	0.0043	0.079	0.079	0.0039 U	0.0039	0.039 U	0.039		0		0		0		0		0		0
Indeno(1,2,3-cd)pyrene	0.1	0.0026 J	0.00026	0.2	0.02	0.011	0.0011	0.21	0.021	1.1 U	0.11	1.1 U	0.11	1.1 U	0.11	1.2 U	0.12	1.1 U	0.11	1.1 U	0.11
BaP Equivalent			**0.0093**		**0.47**		**0.022**		**0.42**		**0.54**		**1.4 U**		**1.3**		**1.6 U**		**1.4**		**1.2**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	FTMM-57-SS112-0.0-0.5		FTMM-57-SS12-0.0-0.5		FTMM-57-SS12-3.0-3.5		FTMM-57-SS12-7.0-7.5		FTMM-57-SS24-0.0-0.5		P57-A7-A (0-0.5)		P57-A7-C (5.5-6)		P57-A8-A (0.5-1)		P57-A8-C (6-6.5)		P57-A9-A (0-0.5)	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	0.24 J	0.024	4.7 J	0.47	0.043	0.0043	0.026	0.0026	0.1	0.01	0.24 J	0.024	0.1 J	0.01	1.1 J	0.11	1.1 U	0.11	0.089 J	0.0089
Benzo(a)pyrene	1	0.26 J	0.26	3.7 J	3.7	0.039	0.039	0.02	0.02	0.1	0.1	0.24 J	0.24	0.088 J	0.088	4.4 U	4.4	1.1 U	1.1	0.08 J	0.08
Benzo(b)fluoranthene	0.1	0.37 J	0.037	4.5 J	0.45	0.054	0.0054	0.026	0.0026	0.16	0.016	0.43 J	0.043	0.072 J	0.0072	4.4 U	0.44	1.1 U	0.11	0.13 J	0.013
Benzo(k)fluoranthene	0.01	0.11 J	0.0011	2 J	0.02	0.024	0.00024	0.011	0.00011	0.061	0.00061	0.1 J	0.001	0.077 J	0.00077	4.4 U	0.044	1.1 U	0.011	1.2 U	0.012
Chrysene	0.001		0		0		0		0		0	0.32 J	0.00032	0.14 J	0.00014	1.5 J	0.0015	1.1 U	0.0011	0.12 J	0.00012
Dibenz(a,h)anthracene	1	0.046 J	0.046	0.85 J	0.85	0.01	0.01	0.0039 U	0.0039	0.022	0.022		0		0		0		0		0
Indeno(1,2,3-cd)pyrene	0.1	0.16 J	0.016	2.3 J	0.23	0.023	0.0023	0.0093	0.00093	0.072	0.0072	1.1 U	0.11	1.1 U	0.11	4.4 U	0.44	1.1 U	0.11	1.2 U	0.12
BaP Equivalent			**0.38**		**5.7**		**0.061**		**0.03**		**0.16**		**0.42**		**0.22**		**5.4**		**1.4 U**		**0.23**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	P57-A9-C (7.5-8)		P57-A9-C DUP (7.5-8)		FTMM-57-SS22-0.0-0.5		FTMM-57-SS22-3.0-3.5		FTMM-57-SS25-0.0-0.5		P57-SS-A1-D-6.0-6.5		PAR-57-SB-27-0-0.5		PAR-57-SB-27-3.5-4		PAR-57-SB-27-7.5-8		PAR-57-SB-28-0.5-1	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	1.1 U	0.11	0.23 J	0.023	0.32	0.032	0.033	0.0033	0.0076	0.00076	0.63 U	0.063	0.12	0.012	0.0039 U	0.00039	0.0039 U	0.00039	0.4	0.04
Benzo(a)pyrene	1	1.1 U	1.1	0.15 J	0.15	0.39	0.39	0.035	0.035	0.0076	0.0076	0.63 U	0.63	0.17	0.17	0.0039 U	0.0039	0.0039 U	0.0039	0.32	0.32
Benzo(b)fluoranthene	0.1	1.1 U	0.11	0.22 J	0.022	0.53	0.053	0.048	0.0048	0.0087	0.00087	0.63 U	0.063	0.2	0.02	0.0039 U	0.00039	0.0039 U	0.00039	0.28	0.028
Benzo(k)fluoranthene	0.01	1.1 U	0.011	0.093 J	0.00093	0.17	0.0017	0.015	0.00015	0.0018 J	0.000018	0.63 U	0.0063		0		0		0		0
Chrysene	0.001	1.1 U	0.0011	0.25 J	0.00025		0		0		0	0.63 U	0.00063		0		0		0		0
Dibenz(a,h)anthracene	1		0		0	0.1	0.1	0.0086	0.0086	0.0036 U	0.0036	0.63 U	0.63	0.027	0.027	0.0039 U	0.0039	0.0039 U	0.0039	0.057	0.057
Indeno(1,2,3-cd)pyrene	0.1	1.1 U	0.11	1.2 U	0.12	0.38	0.038	0.025	0.0025	0.0047 J	0.00047	0.63 U	0.063	0.12	0.012	0.0039 U	0.00039	0.0039 U	0.00039	0.16	0.016
BaP Equivalent			**1.4 U**		**0.32**		**0.61**		**0.054**		**0.013**		**1.5 U**		**0.24**		**0.009 U**		**0.009 U**		**0.46**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.4
BENZO(A)PYRENE-EQUIVALENT
Parcel 57
Fort Monmouth, New Jersey

	Sample ID	PAR-57-SB-28-3.5-4		PAR-57-SB-28-7.5-8		PAR-57-SB-30-0.5-1		PAR-57-SB-30-3.5-4		PAR-57-SB-30-7.5-8	
Analyte	**Relative Potency Factors [1]**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**	**Concentration [2] (mg/kg)**	**B(a)P-Equivalent Concentration (mg/kg)**
Benzo(a)anthracene	0.1	0.0032 J	0.00032	0.0042 U	0.00042	0.3	0.03	0.004 U	0.0004	0.0027 J	0.00027
Benzo(a)pyrene	1	0.0042 U	0.0042	0.0042 U	0.0042	0.32	0.32	0.004 U	0.004	0.003 J	0.003
Benzo(b)fluoranthene	0.1	0.0042 U	0.00042	0.0042 U	0.00042	0.43	0.043	0.004 U	0.0004	0.0036 U	0.00036
Benzo(k)fluoranthene	0.01		0		0		0		0		0
Chrysene	0.001		0		0		0		0		0
Dibenz(a,h)anthracene	1	0.0042 U	0.0042	0.0042 U	0.0042	0.057	0.057	0.004 U	0.004	0.0036 U	0.0036
Indeno(1,2,3-cd)pyrene	0.1	0.0042 U	0.00042	0.0042 U	0.00042	0.19	0.019	0.004 U	0.0004	0.0033 J	0.00033
BaP Equivalent			**0.0096**		**0.0097 U**		**0.47**		**0.0092 U**		**0.0076**

Notes:

[1] Relative Potency Factors as described in Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993a).

[2] Concentration in soil sample. If not detected, then the maximum method detection limit used to calculate B(a)P-equivalent.

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

U = analyte not detected above method detection limit (MDL).

Table H.2.5
SURFACE SOIL EXPOSURE POINT CONCENTRATIONS
Parcel 57
Fort Monmouth, New Jersey

		Parcel 57				Exposure Area 1				Exposure Area 2			
CAS Number [1]	COPC [2]	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)
Polycyclic Aromatic Hydrocarbons													
50-32-8	BaP Equivalent	13	4.0	4	UCL	12	8.5	8.5	UCL	13	NC	13	Max
Inorganics													
7440-38-2	Arsenic	17.8	8.89	8.89	UCL	17.8	NC	17.8	Max	2.36	NC	2.36	Max
7440-48-4	Cobalt	8.68	5.03	5.03	UCL	3.48	NC	3.48	Max	0.756	NC	0.756	Max
7440-62-2	Vanadium	77.6	58.7	58.7	UCL	77.6	NC	77.6	Max	30.9	NC	30.9	Max

Table H.2.5
SURFACE SOIL EXPOSURE POINT CONCENTRATIONS
Parcel 57
Fort Monmouth, New Jersey

		Exposure Area 3				Exposure Area 4				Exposure Area 5			
CAS Number [1]	COPC [2]	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)
Polycyclic Aromatic Hydrocarbons													
50-32-8	BaP Equivalent	1.3	1.0	1.0	UCL	1.4	NC	1.4	Max	5.7	NC	5.7	Max
Inorganics													
7440-38-2	Arsenic	5.89	NC	5.89	Max	6.16	NC	6.16	Max	10.3	NC	10.3	Max
7440-48-4	Cobalt	8.68	NC	8.68	Max	8.52	NC	8.52	Max	6.6	NC	6.6	Max
7440-62-2	Vanadium	65.3	NC	65.3	Max	60.4	NC	60.4	Max	70.6	NC	70.6	Max

Table H.2.6
COMBINED SURFACE SOIL AND SUBSURFACE SOIL EXPOSURE POINT CONCENTRATIONS
Parcel 57
Fort Monmouth, New Jersey

		Parcel 57				Exposure Area 1				Exposure Area 2			
CAS Number [1]	COPC [2]	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)
Polycyclic Aromatic Hydrocarbons													
50-32-8	BaP Equivalent	13	5.2	5.2	UCL	12	5.2	5.2	UCL	13	6.12	6.12	UCL
Inorganics													
7440-38-2	Arsenic	17.8	8.38	8.38	UCL	17.8	12.9	12.9	UCL	4.98	NC	4.98	Max
7440-48-4	Cobalt	8.68	3.90	3.90	UCL	3.48	2.39	2.39	UCL	1.42	NC	1.42	Max
7440-62-2	Vanadium	91.4	57.2	57.2	UCL	86.1	70.4	70.4	UCL	46.7	NC	46.7	Max

Table H.2.6
COMBINED SURFACE SOIL AND SUBSURFACE SOIL EXPOSURE POINT CONCENTRATIONS
Parcel 57
Fort Monmouth, New Jersey

		Exposure Area 3				Exposure Area 4				Exposure Area 5			
CAS Number [1]	COPC [2]	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)	Maximum Surface Soil Exposure Point Concentration (mg/kg)	95% UCL Surface Soil Exposure Point Concentration (mg/kg)	Selected Surface Soil Concentration [3] (mg/kg)	Source (Max or UCL)
Polycyclic Aromatic Hydrocarbons													
50-32-8	BaP Equivalent	1.3	0.73	0.73	UCL	1.4	0.86	0.86	UCL	5.7	5.8	5.7	Max
Inorganics													
7440-38-2	Arsenic	11.4	8.19	8.19	UCL	13.2	NC	13.2	Max	10.3	NC	10.3	Max
7440-48-4	Cobalt	8.68	5.02	5.02	UCL	8.52	NC	8.52	Max	6.60	NC	6.60	Max
7440-62-2	Vanadium	91.4	69.5	69.5	UCL	70.2	NC	70.2	Max	70.6	NC	70.6	Max

Table H.2.7
GROUNDWATER EXPOSURE POINT CONCENTRATIONS Parcel 57
Fort Monmouth, New Jersey

		Parcel 57				800MW01				800MW02				PAR-57-MW01				PAR-57-MW02			
CAS Number	COPC	Groundwater Exposure Point Concentration (µg/L)	95% UCL Exposure Point Concentration (µg/L)	Selected Exposure Point Concentration (µg/L)	Source (Max or UCL)	Groundwater Exposure Point Concentration (µg/L)	95% UCL Exposure Point Concentration (µg/L)	Selected Exposure Point Concentration (µg/L)	Source (Max or UCL)	Groundwater Exposure Point Concentration (µg/L)	95% UCL Exposure Point Concentration (µg/L)	Selected Exposure Point Concentration (µg/L)	Source (Max or UCL)	Groundwater Exposure Point Concentration (µg/L)	95% UCL Exposure Point Concentration (µg/L)	Selected Exposure Point Concentration (µg/L)	Source (Max or UCL)	Groundwater Exposure Point Concentration (µg/L)	95% UCL Exposure Point Concentration (µg/L)	Selected Exposure Point Concentration (µg/L)	Source (Max or UCL)
	Inorganics																				
7429-90-5	Aluminum	24,600	NC	24600	Max	410	NC	410	Max	300	NC	300	Max	1,010	NC	1010	Max	24,600	NC	24600	Max
7440-43-9	Cadmium	15	NC	15	Max	0.7 U	NC	ND U	ND	3 U	NC	ND U	ND	2.5 U	NC	ND U	ND	15	NC	15	Max
7440-02-0	Nickel	610	NC	610	Max	7.3 U	NC	ND U	ND	16.9	NC	16.9	Max	2.9 J	NC	2.9 J	Max	610	NC	610	Max
7440-66-6	Zinc	1,900	NC	1900	Max	11 J	NC	11 J	Max	130	NC	130	Max	10 J	NC	10.2 J	Max	1,900	NC	1900	Max

Table H.2.8
PARTICULATE EMISSION FACTOR AND VOLATILIZATION FACTOR EXPOSURE PARAMETERS
Parcel 57
Fort Monmouth, New Jersey

Abbreviation	Parameter	Units	All Receptors	Sources	Rationale
Q/C	Inverse of mean concentration at center of square source area for Philadelphia, Pennsylvania	g/m^2-s per kg/m^3	87.36898	USEPA, 2014b	Source references USEPA, 2002, Exhibit D-2
V	Fraction of vegetative cover	unitless	0.5	USEPA, 2014b	Source references USEPA, 2002, Equation 4-5
U_m	Mean annual wind speed	m/s	4.69	USEPA, 2014b	Source references USEPA, 2002, Equation 4-5
U_t	Equivalent threshold value of wind speed at 7m	m/s	11.32	USEPA, 2014b	Source references USEPA, 2002, Equation 4-5
F(x)	Function Dependent on U_m/U_t	unitless	0.194	USEPA, 2014b, Cowherd et. al. 1985	Source references USEPA, 2002, Equation 4-5
D_A	Apparent diffusivity	cm^2/s	Chemical-specific	USEPA, 2014b	Source references USEPA, 2002, Equation 4-8
T	Exposure interval	seconds	9.50E+08	USEPA, 2002	USEPA, 2002, Equation 4-8
ρ_b	Dry soil bulk density	g/cm^3	1.5	USEPA, 2014b	Source references USEPA, 2002, Equation 4-8
θ_a	Air-filled Soil Porosity (calculated as $n - \theta_w$)	L_{air}/L_{soil}	0.28	USEPA, 2014b	Source references USEPA, 2002, Equation 4-8
n	Total Soil Porosity	L_{pore}/L_{soil}	0.43	USEPA, 2014b	Source references USEPA, 2002, Equation 4-8
θ_w	Water-filled Soil Porosity	L_{water}/L_{soil}	0.15	USEPA, 2014b	Source references USEPA, 2002, Equation 4-8
ρ_s	Soil particle density	g/cm^3	2.65	USEPA, 2014b	Source references USEPA, 2002, Equation 4-8
D_i	Diffusivity in Air	cm^2/second	Chemical-specific	USEPA, 2015c	--
H'	Henry's law constant	dimensionless	Chemical-specific	USEPA, 2015c	--
D_w	Diffusivity in Water	cm^2/second	Chemical-specific	USEPA, 2015c	--
K_d	Soil-water Partition Coefficient	L/kg	Chemical-specific	USEPA, 2015c	Calculated as K_{OC} X f_{OC}
K_{OC}	Soil organic carbon-water Partition Coefficient	L/kg	Chemical-specific	USEPA, 2015c	--
f_{OC}	Organic Carbon Content of Soil	g/g	0.006	USEPA, 2014b	Source references USEPA, 2002, Equation 4-8

Table H.2.9
CALCULATION OF PARTICULATE EMISSION FACTOR
Parcel 57
Fort Monmouth, New Jersey

Parameters				Equation
Parameter	**Abbreviation**	**Value**	**Units**	
Inverse of mean concentration at center of square source area [1]	Q/C	87.37	g/m^2-s per kg/m^3	$PEF = Q/C \times \frac{3{,}600 s/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
Fraction of vegetative cover	V	0.5	unitless	
Mean annual wind speed	U_m	4.69	m/s	
Equivalent threshold value of wind speed at 7m	U_t	11.32	m/s	
Function Dependent on Um /Ut	F(x)	0.194	unitless	
Particulate emission factor	PEF	1.27E+09	m^3/kg	

Notes:
[1] Nearest city with air dispersion model data and Q/C value is Philadelphia, PA.

Table H.2.10
CALCULATION OF VOLATILIZATION FACTOR
Parcel 57
Fort Monmouth, New Jersey

Parameters	Abbreviation	Value	Units
Inverse of mean concentration at center of square source area [1]	Q/C	87.37	g/m^2-s per kg/m^3
Apparent diffusivity	D_a	chemical specific	cm^2 per s
Exposure interval	T	9.50E+08	s
Dry soil bulk density	ρ_b	1.50	g/cm^3
Air-filled Soil Porosity (calculated as n - θw)	θ_a	0.28	L_{air}/L_{soil}
Total Soil Porosity	n	0.43	L_{pore}/L_{soil}
Soil particle density	ρ_s	2.65	g/cm^3
Water-filled Soil Porosity	θ_w	0.15	L_{water}/L_{soil}
Diffusivity in Air	D_i	Chemical-specific	cm^2/s
Henry's law constant	H'	Chemical-specific	unitless
Diffusivity in Water	D_w	Chemical-specific	cm^2/s
Soil-water Partition Coefficient	K_d	Chemical-specific	cm^3/g
Soil organic carbon-water Partition Coefficient	K_{OC}	Chemical-specific	cm^3/g
Organic Carbon Content of Soil	f_{OC}	0.006	g/g

Equations

$$VF = (Q/C)\left(\frac{((3.14)(D_A)(T))^{1/2}}{((2)(\rho_b)(D_A))}\right)(10^{-4}\,m^2/cm^2)$$

where:

$$D_A = \frac{\left[\left(\left(\theta_a^{10/3}\right)(D_i)(H')\right)+\left(\left(\theta_w^{10/3}\right)(D_w)\right)\right]/n^2}{((\rho_b)(K_d))+\theta_w+\left((\theta_a)(H')\right)}$$

where:

$$\theta_a = n - \theta_w$$

$$n = 1 - \left(\rho_b / \rho_s\right)$$

where, for organics:

$$K_d = (K_{OC})(f_{OC})$$

COPC [2]	CAS Number [3]	Diffusivity in Air (D_i) [4] (cm^2/s)	Henry's Law Constant (H') [4] (unitless)	Diffusivity in Water (D_w) [4] (cm^2/s)	Soil-water Partition Coefficient (K_d) [4] (cm^3/g)	Soil Organic Carbon-water Partition Coefficient (K_{OC}) [4] (cm^3/g)	D_A (cm^2/s)	Volatilization Factor (VF) (m^3/kg)
Semivolatile Organic Compounds								
Benzo(a)pyrene	50-32-8	4.76E-02	1.87E-05	5.56E-06	3.52E+03	5.87E+05	2.3E-11	3.3E+07
Inorganics								
Arsenic	7440-38-2	--	--	--	2.90E+01	--	--	--
Cobalt	7440-48-4	--	--	--	4.50E+01	--	--	--
Vanadium	7440-62-2	--	--	--	1.00E+03	--	--	--

Notes:

[1] Nearest city with air dispersion model data and Q/C value is Philadelphia, PA.

[2] COPC = Constituent of potential concern.

[3] CAS = Chemical Abstracts Service number. For Extractable/Volatile Petroleum Hydrocarbons, the CAS number is the Total Petroleum Hydrocarbon consistent with the USEPA RSLs that was used for the calculation.

[4] Values consistent with the USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 1.0), Chemical Specific Parameters Supporting Table, June 2017. Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017.

-- = toxicity data not available.

Table H.2.11
TOXICITY VALUES
Parcel 57
Fort Monmouth, New Jersey

					Ingestion					Dermal Contact		Inhalation				
CAS Number [1]	Analyte	Volatile Organic Compound (Yes/No)	Mutagenic Compound (Yes/No)	ABS_d [2] (unitless)	RfD_o [2] (mg/kg-day)	Reference	Sfo [2] $((mg/kg\text{-}day)^{-1})$	Reference	GIABS [2] (unitless)	RfD_d [3] (mg/kg-day)	SF_d [3] $((mg/kg\text{-}day)^{-1})$	RfC_i [2] (mg/m^3)	Reference	IUR [2] $((\mu g/m^3)^{-1})$	Reference	C_{sat} [2] (mg/kg)
	SVOCs															
50-32-8	Benzo(a)pyrene	No	Yes	0.13	3.00E-04	I	1.0E+00	I	1	3.00E-04	1.0E+00	2.00E-06	I	6.00E-04	I	--
	Inorganics															
7429-90-5	Aluminum	No	No	--	1.00E+00	P	--		1	1.00E+00	--	5.00E-03	P	--		--
7440-38-2	Arsenic	No	No	0.03	3.00E-04	I	1.5E+00	I	1	3.00E-04	1.5E+00	1.50E-05	C	4.30E-03	I	--
7440-43-9	Cadmium (water)	No	No	0.001	5.00E-04	I	--		0.05	2.50E-05	--	1.00E-05	A	1.80E-03	I	--
7440-48-4	Cobalt	No	No	--	3.00E-04	P	--		1	3.00E-04	--	6.00E-06	P	9.00E-03	P	--
7440-02-0	Nickel	No	No	--	2.00E-02	I	--		0.04	8.00E-04	--	9.00E-05	A	2.60E-04	C	--
7440-62-2	Vanadium	No	No	--	5.00E-03	S	--		0.026	1.30E-04	--	1.00E-04	A	--		--
7440-66-6	Zinc	No	No	--	3.00E-01	I	--		1	3.00E-01	--	--		--		--

[1] CAS = Chemical Abstracts Service number.

[2] ABSd is the recommended dermal absorption fraction of contaminants in soil. SFo is the oral slope factor. RfDo is the oral slope reference dose. GIABS is the oral absorption factor of analytes that are absorbed in the intestinal tract. RfCi in the inhalation reference dose. IUR is the inhalation slope factor. Csat is the inhalation sat is the soil saturation concentration. All values are consistent with the USEPA RSLs for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 1.0), Summary Table, June 2017. Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017.

[3] RfD_d is the dermal reference dose and is based on the absorbed dose. The RFD_d is calculated as RfD_o*GIABS. SFd is the dermal slope factor and is based on absorbed dose. The SFd is calculated as SFo / GIABS.

-- = toxicity data not available or analyte not in USEPA RSL table.

References:
A = ATSDR
C = Cal EPA
I = IRIS
J = New Jersey Department of Environmental Protection. See Section 5.6 of the RSL User Guide
P= PPRTV
S = RSL User Guide, Section 5.3
X= PPRTV Appendix H = HEAST

Table H.2.12
CHEMICAL-SPECIFIC PARAMETERS
Parcel 57
Fort Monmouth, New Jersey

		Volatility Parameters [1]					Diffusivity in Air and Water [1]			Partition Coefficients [1]				Water Solubility [1]		Tapwater Dermal Parameters [1]					
Analyte	**CAS #**	H` (unitless)	HLC (atm-m^3/mole)	H` and HLC Ref	Vapor Pressure	VP Ref	Dia (cm^2/s)	Diw (cm^2/s)	Dia Ref	K_d (L/kg)	K_d Ref	K_{oc} (L/kg)	K_{oc} Ref	S (mg/L)	S Ref	B (unitless)	τ_{event} (hr/event)	t* (hr)	K_p (cm/hr)	KPREF	FA [2]
Semivolatile Organic Compounds																					
Benzo(a)pyrene	50-32-8	1.87E-05	4.57E-07	PHYSPROP	5.49E-09	EPI	4.76E-02	5.56E-06	WATER9 (U.S. EPA, 2001)	--	--	5.87E+05	EPI	1.62E-03	PHYSPROP	4.36E+00	2.72E+00	1.18E+01	7.13E-01	EPI	1
Inorganics																					
Aluminum	7429-90-5	--	--	--	0.00E+00	NIOSH	--	--	--	1.50E+03	BAES	--	--	--	--	2.00E-03	1.49E-01	3.57E-01	1.00E-03	RAGSE	1
Arsenic	7440-38-2	--	--	--	--	--	--	--	--	2.90E+01	SSL	--	--	--	--	3.33E-03	2.76E-01	6.63E-01	1.00E-03	RAGSE	1
Cadmium (water)	7440-43-9	--	--	--	0.00E+00	NIOSH	--	--	--	7.50E+01	SSL	--	--	--	--	4.08E-03	4.48E-01	1.08E+00	1.00E-03	RAGSE	1
Cobalt	7440-48-4	--	--	--	0.00E+00	NIOSH	--	--	--	4.50E+01	BAES	--	--	--	--	1.18E-03	2.25E-01	5.40E-01	4.00E-04	RAGSE	1
Nickel	7440-02-0	--	--	--	0.00E+00	NIOSH	--	--	--	6.50E+01	SSL	--	--	--	--	5.89E-04	2.24E-01	5.38E-01	2.00E-04	RAGSE	1
Vanadium	7440-62-2	--	--	--	--	--	--	--	--	1.00E+03	SSL	--	--	--	--	2.75E-03	2.03E-01	4.87E-01	1.00E-03	RAGSE	1
Zinc	7440-66-6	--	--	--	--	--	--	--	--	6.20E+01	SSL	--	--	--	--	1.87E-03	2.44E-01	5.86E-01	6.00E-04	RAGSE	1

[1] Values will be consistent with the USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 1.0), Chemical Specific Parameters Supporting Table, June 2017. Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017.

[2] FA values consistent with the USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 1.0), Residential Tapwater Table, June 2017. Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017.

Table H.2.13
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where:
$$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk:
$$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard:
$$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	8.5	UCL	5.6E-05 [6]	0.00011	0.000010	1.0E+00	3.0E-04	5.6E-05	59%	0.36	25%	0.034	25%
Inorganics														
Arsenic	7440-38-2	17.8	Max	2.6E-05	0.00023	0.000021	1.5E+00	3.0E-04	3.8E-05	41%	0.76	52%	0.071	52%
Cobalt	7440-48-4	3.48	Max	--	0.000044	0.0000042	--	3.0E-04	--	--	0.15	10%	0.014	10%
Vanadium	7440-62-2	77.6	Max	--	0.00099	0.000093	--	5.0E-03	--	--	0.20	14%	0.019	14%
									Cancer Risk		**Hazard Index**		**Hazard Index**	
								Pathway Sums:	9E-05	100%	1.5	100%	0.14	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

(6) See Table H.2.14 for mutagenic mode of action ingestion intake calculation and risk calculation.

-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.14
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC [1]	CAS Number [2]	Cs [3] (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent [5]	50-32-8	8.5	5.6E-05	1.0E+00	5.6E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.15
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where: $$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

where: $$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

Carcinogenic Risk: $$Risk = (DAD)(SF_d)$$

where: $$SF_d = SF_o / GIABS$$

Noncarcinogenic Hazard: $$HQ = DAD / Rf_d$$

where: $$RfD_d = (RfD_o)(GIABS)$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD - Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	8.5	UCL	0.13	1.0E+00	3.0E-04	2.1E-05 [6]	3.8E-05	5.6E-06	2.1E-05	86%	0.13	67%	0.019	67%
Inorganics															
Arsenic	7440-38-2	17.8	Max	0.03	1.5E+00	3.0E-04	2.3E-06	1.8E-05	2.7E-06	3.5E-06	14%	0.061	33%	0.0090	33%
Cobalt	7440-48-4	3.48	Max	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	77.6	Max	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**		**Hazard Index**	
									Pathway Sums:	2E-05	100%	0.19	100%	0.028	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

(6) See Table H.2.16 for mutagenic mode of action dermal contact calculation and risk calculation.

-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.16
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left\{\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right\}(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC [1]	CAS Number [2]	Cs [3] (mg/kg)	ABS [4] (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent [5]	50-32-8	8.5	1.3E-01	2.1E-05	1.0E+00	2.1E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.17
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor Parameter	UU/UE RECEPTOR Abbreviation	Value	Units
COPC concentration in air (C_a)	C_a	chemical-specific	µg/m^3
COPC concentration in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\ -\ inh}$	9490	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration	RfC	chemical-specific	mg/m^3
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat}, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ \mu g/mg\right)\left(\frac{1}{VF}\right)\right]$$

$$Risk = [EC(air)][IUR]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\ \mu g/mg\right)}$$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le C_{sat}$?	Volatilization Factor (6) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR (5) (µg/m3)$^{-1}$	RfC_i (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	8.5	UCL	--	--	3.3E+07	2.6E-04	2.8E-04 (8)	2.5E-04	6.0E-04	2.0E-06	1.7E-07	84%	0.13	99%
Inorganics															
Arsenic	7440-38-2	17.8	Max	--	--	--	1.4E-05	5.0E-06	1.3E-05	4.3E-03	1.5E-05	2.2E-08	11%	0.00090	1%
Cobalt	7440-48-4	3.48	Max	--	--	--	2.7E-06	9.8E-07	2.6E-06	9.0E-03	6.0E-06	8.8E-09	5%	0.00044	0%
Vanadium	7440-62-2	77.6	Max	--	--	--	6.1E-05	--	5.9E-05	--	1.0E-04	--	--	0.00059	0%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	2E-07	100%	0.13	100%

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

(8) See Table H.2.18 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.18
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	8.5	3.3E+07	2.6E-04	2.8E-04	6.0E-04	1.7E-07

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.19
HUMAN HEALTH RISK EVALUATION SUMMARY FOR SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	8.5	UCL	5.6E-05	2.1E-05	1.7E-07	**8E-05**	0.36	0.13	0.034	0.019	0.13	0.62	0.18
Inorganics														
Arsenic	7440-38-2	17.8	Max	3.8E-05	3.5E-06	2.2E-08	**4E-05**	0.76	0.061	0.071	0.0090	0.00090	0.82	0.081
Cobalt	7440-48-4	3.48	Max	--	--	8.8E-09	**9E-09**	0.15	--	0.014	--	0.00044	0.15	0.014
Vanadium	7440-62-2	77.6	Max	--	--	--	--	0.20	--	0.019	--	0.00059	0.20	0.019
			Pathway Risk	**9E-05**	**2E-05**	**2E-07**	**--**	**1**	**0.2**	**0.1**	**0.03**	**0.1**	**--**	**--**
						Total Risk	**1E-04**					**Hazard Index**	**2**	**0.3**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.20
TARGET ORGANS AND TOXIC CRITICAL EFFECTS FOR SEGREGATED HAZARD INDICES FOR SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Constituent	Child Ingestion +	Inhalation Hazard	Ingestion + Dermal		Inhalation		Source
			Target Organ	Toxic Critical Effect	Target Organ	Toxic Critical Effect	
Benzo(a)pyrene [B(a)P Equivalent Concentration]	0.5	0.1	Developmental	Neurobehavioral changes	Developmental	Decreased embryo/fetal survival	IRIS
Arsenic	0.8	0.0009	Skin/ Cardiovascular	Hyperpigmentation, keratosis and possible vascular complications (IRIS)	Reproductive/ development; cardiovascular system; nervous system; lung; skin (2)	Decreased intellectual function in 10 year old children (Cal EPA) (2)	IRIS; Cal EPA
Cobalt	0.1	0.0004	Thyroid	Decreased iodine uptake	Respiratory Tract Lung	Decreased pulmonary function and respiratory tract irritation	PPRTV
Vanadium	0.2	0.0006	Skin	Decreased hair cystine (IRIS)	Respiratory	Degeneration of respiratory epithelium of the epiglottis (ATSDR) https://www.atsdr.cdc.gov/toxprofiles/tp58-a.pdf	IRIS; ATSDR

(1) See Table H.2.19 for hazard indices.

(2) California Environmental Protection Agency (Cal EPA) Office of Environmental Health Hazard Assessment (OEHHA), 2008. Air Toxics Hot Spots Program Technical Support Document for the Derivation of Noncancer Reference Exposure Levels. Appendix D.1. Individual Acute, 8-Hour, and Chronic Reference Exposure Level Summaries. Updated July 2014. (https://oehha.ca.gov/media/downloads/crnr/appendixd1final.pdf).

ATSDR - Agency for Toxic Substances and Disease Registry (http://www.atsdr.cdc.gov/)
Cal EPA - California Environmental Protection Agency
IRIS - Integrated Risk Information System (http://www.epa.gov/IRIS/)
PPRTV - Provisional Peer Reviewed Toxicity Values for Superfund (http://hhpprtv.ornl.gov/)

Table H.2.21
NONCANCER HAZARDS SEPARATED BY TARGET ORGAN FOR SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Target Organ	Constituent Groupings for Ingestion + Dermal Exposure Pathways	Ingestion + Dermal Hazard Index (1)	Constituent Groupings for Inhalation Exposure Pathways	Inhalation Hazard Index (1)	Summed Segregated Hazard Index (2)
Cardiovascular system	Arsenic	0.8	Arsenic	0.0009	0.8
Central nervous system	N/A	--	Arsenic	0.0009	0.0009
Develomental	BaP	0.5	Arsenic	0.0009	0.6
			BaP	0.1	
Respiratory system	N/A	--	Arsenic	0.0009	0.002
			Cobalt	0.0004	
			Vanadium	0.0006	
Skin	Arsenic	0.8	Arsenic	0.0009	1
	Vanadium	0.2			
Thyroid	Cobalt	0.1	N/A	--	0.1

(1) See Table H.2.20.

(2) Sum of the ingestion+dermal and inhalation hazard indices for the applicable target organ.

-- Hazard not calculated because toxicity value was not available.

N/A - Not applicable.

Table H.2.22
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	13	Max	8.6E-05 [6]	0.00017	0.000016	1.0E+00	3.0E-04	8.6E-05	94%	0.55	72%	0.052	72%
Inorganics														
Arsenic	7440-38-2	2.36	Max	3.4E-06	0.000030	0.0000028	1.5E+00	3.0E-04	5.1E-06	5.6%	0.10	13%	0.0094	13%
Cobalt	7440-48-4	0.756	Max	--	0.000010	0.00000091	--	3.0E-04	--	--	0.032	4%	0.0030	4%
Vanadium	7440-62-2	30.9	Max	--	0.00040	0.000037	--	5.0E-03	--	--	0.079	10%	0.0074	10%
									Cancer Risk		**Hazard Index**		**Hazard Index**	
								Pathway Sums:	9.1E-05	100%	0.77	100%	0.072	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.23 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.23
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	13	8.6E-05	1.0E+00	8.6E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.24
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where: $$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where: $$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD - Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	13	Max	0.13	1.0E+00	3.0E-04	3.2E-05 [6]	5.8E-05	8.6E-06	3.2E-05	99%	0.19	96%	0.029	96%
Inorganics															
Arsenic	7440-38-2	2.36	Max	0.03	1.5E+00	3.0E-04	3.1E-07	2.4E-06	3.6E-07	4.7E-07	1.4%	0.0081	4.0%	0.0012	4.0%
Cobalt	7440-48-4	0.756	Max	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	30.9	Max	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**		**Hazard Index**	
									Pathway Sums:	3E-05	100%	0.20	100%	0.030	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.25 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.25
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC [1]	CAS Number [2]	Cs [3] (mg/kg)	ABS [4] (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent [5]	50-32-8	13	1.3E-01	3.2E-05	1.0E+00	3.2E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.26
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC concentration in air (C_a)	C_a	chemical-specific	µg/m^3
COPC concentration in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\ -\ inh}$	9490	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration	RfC	chemical-specific	mg/m^3
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor [1]	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)$$

$$Risk = [EC(air)][IUR]$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat}, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{VF}\right)\right]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\ {}^{\mu g}/_{mg}\right)}$$

COPC [2]	CAS Number [3]	C_s [4] (mg/kg)	UCL or Max	C_{sat} [5] (mg/kg)	Is $C_s \le C_{sat}$?	Volatilization Factor [6] (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR [5] (µg/m3)$^{-1}$	RfC_i [5] (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [7]	50-32-8	13	Max	--	--	3.3E+07	4.0E-04	4.2E-04 [8]	3.9E-04	6.0E-04	2.0E-06	2.5E-07	98%	0.19	100%
Inorganics															
Arsenic	7440-38-2	2.36	Max	--	--	--	1.9E-06	6.6E-07	1.8E-06	4.3E-03	1.5E-05	2.9E-09	1.1%	0.00012	0.061%
Cobalt	7440-48-4	0.756	Max	--	--	--	6.0E-07	2.1E-07	5.7E-07	9.0E-03	6.0E-06	1.9E-09	0.74%	0.00010	0.049%
Vanadium	7440-62-2	30.9	Max	--	--	--	2.4E-05	--	2.3E-05	--	1.0E-04	--	--	0.00023	0.12%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	3E-07	100%	0.19	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.27 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.27
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	13	3.3E+07	4.0E-04	4.2E-04	6.0E-04	2.5E-07

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.28
HUMAN HEALTH RISK EVALUATION SUMMARY FOR SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	13	Max	8.6E-05	3.2E-05	2.5E-07	**1E-04**	0.55	0.19	0.052	0.029	0.19	0.94	0.27
Inorganics														
Arsenic	7440-38-2	2.36	Max	5.1E-06	4.7E-07	2.9E-09	**6E-06**	0.10	0.0081	0.0094	0.0012	0.00012	0.11	0.011
Cobalt	7440-48-4	0.756	Max	--	--	1.9E-09	**2E-09**	0.032	--	0.0030	--	0.00010	0.032	0.0031
Vanadium	7440-62-2	30.9	Max	--	--	--	**--**	0.079	--	0.0074	--	0.00023	0.079	0.0076
			Pathway Risk	**9E-05**	**3E-05**	**3E-07**	**--**	**0.8**	**0.2**	**0.07**	**0.03**	**0.2**	**--**	**--**
						Total Risk	**1E-04**					**Hazard Index**	**1**	**0.3**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.29
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age\text{-}adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	1.0	UCL	6.6E-06 [6]	0.000013	0.0000012	1.0E+00	3.0E-04	6.6E-06	34%	0.043	5.1%	0.0040	5.1%
Inorganics														
Arsenic	7440-38-2	5.89	Max	8.5E-06	0.000075	0.0000071	1.5E+00	3.0E-04	1.3E-05	66%	0.25	30%	0.024	30%
Cobalt	7440-48-4	8.68	Max	--	0.00011	0.000010	--	3.0E-04	--	--	0.37	45%	0.035	45%
Vanadium	7440-62-2	65.3	Max	--	0.00083	0.000078	--	5.0E-03	--	--	0.17	20%	0.016	20%
								Pathway Sums:	**Cancer Risk** 1.9E-05	100%	**Hazard Index** 0.83	100%	**Hazard Index** 0.078	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.30 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.30
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	1.0	6.6E-06	1.0E+00	6.6E-06

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.31
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where: $$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where: $$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD - Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	1.0	UCL	0.13	1.0E+00	3.0E-04	2.5E-06 [6]	4.5E-06	6.6E-07	2.5E-06	68%	0.015	42%	0.0022	42%
Inorganics															
Arsenic	7440-38-2	5.89	Max	0.03	1.5E+00	3.0E-04	7.8E-07	6.1E-06	8.9E-07	1.2E-06	32%	0.020	58%	0.0030	58%
Cobalt	7440-48-4	8.68	Max	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	65.3	Max	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**		**Hazard Index**	
									Pathway Sums:	3.6E-06	100%	0.035	100%	0.0052	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.32 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.32
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC [1]	CAS Number [2]	Cs [3] (mg/kg)	ABS [4] (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent [5]	50-32-8	1.0	1.3E-01	2.5E-06	1.0E+00	2.5E-06

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.33
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor		UU/UE RECEPTOR	
Parameter	**Abbreviation**	**Value**	**Units**
COPC concentration in air (C_a)	C_a	chemical-specific	µg/m^3
COPC concentration in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\ -\ inh}$	9490	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration	RfC	chemical-specific	mg/m^3
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat}, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{VF}\right)\right]$$

$$Risk = [EC(air)][IUR]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\ {}^{\mu g}/_{mg}\right)}$$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le C_{sat}$?	Volatilization Factor (6) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR (5) (µg/m3)$^{-1}$	RfC_i (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	1.0	UCL	--	--	3.3E+07	3.1E-05	3.2E-05 (8)	3.0E-05	6.0E-04	2.0E-06	1.9E-08	40%	0.015	89%
Inorganics															
Arsenic	7440-38-2	5.89	Max	--	--	--	4.7E-06	1.7E-06	4.5E-06	4.3E-03	1.5E-05	7.1E-09	15%	0.00030	1.8%
Cobalt	7440-48-4	8.68	Max	--	--	--	6.9E-06	2.4E-06	6.6E-06	9.0E-03	6.0E-06	2.2E-08	45%	0.0011	6.5%
Vanadium	7440-62-2	65.3	Max	--	--	--	5.2E-05	--	4.9E-05	--	1.0E-04	--	--	0.00049	2.9%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	4.9E-08	100%	0.017	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.34 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.34
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	1.0	3.3E+07	3.1E-05	3.2E-05	6.0E-04	1.9E-08

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.35
HUMAN HEALTH RISK EVALUATION SUMMARY FOR SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	1.0	UCL	6.6E-06	2.5E-06	1.9E-08	**9E-06**	0.043	0.015	0.0040	0.0022	0.015	0.072	0.021
Inorganics														
Arsenic	7440-38-2	5.89	Max	1.3E-05	1.2E-06	7.1E-09	**1E-05**	0.25	0.020	0.024	0.0030	0.00030	0.27	0.027
Cobalt	7440-48-4	8.68	Max	--	--	2.2E-08	**2E-08**	0.37	--	0.035	--	0.0011	0.37	0.036
Vanadium	7440-62-2	65.3	Max	--	--	--	**--**	0.17	--	0.016	--	0.00049	0.17	0.016
			Pathway Risk	**2E-05**	**4E-06**	**5E-08**	**--**	**0.8**	**0.04**	**0.08**	**0.005**	**0.02**	**--**	**--**
						Total Risk	**2E-05**					**Hazard Index**	**0.9**	**0.1**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.36
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	1.4	Max	9.2E-06 [6]	0.000018	0.0000017	1.0E+00	3.0E-04	9.2E-06	41%	0.060	7.1%	0.0056	7.1%
Inorganics														
Arsenic	7440-38-2	6.16	Max	8.9E-06	0.000079	0.0000074	1.5E+00	3.0E-04	1.3E-05	59%	0.26	31%	0.025	31%
Cobalt	7440-48-4	8.52	Max	--	0.00011	0.000010	--	3.0E-04	--	--	0.36	43%	0.034	43%
Vanadium	7440-62-2	60.4	Max	--	0.00077	0.000072	--	5.0E-03	--	--	0.15	18%	0.014	18%
								Pathway Sums:	**Cancer Risk** 2.3E-05	100%	**Hazard Index** 0.84	100%	**Hazard Index** 0.079	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.37 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.37
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	1.4	9.2E-06	1.0E+00	9.2E-06

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.38
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where: $$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where: $$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD - Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	1.4	Max	0.13	1.0E+00	3.0E-04	3.4E-06 [6]	6.3E-06	9.2E-07	3.4E-06	74%	0.021	50%	0.0031	50%
Inorganics															
Arsenic	7440-38-2	6.16	Max	0.03	1.5E+00	3.0E-04	8.1E-07	6.4E-06	9.4E-07	1.2E-06	26%	0.021	50%	0.0031	50%
Cobalt	7440-48-4	8.52	Max	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	60.4	Max	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**		**Hazard Index**	
									Pathway Sums:	4.7E-06	100%	0.042	100%	0.0062	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.39 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.39
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC [1]	CAS Number [2]	Cs [3] (mg/kg)	ABS [4] (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent [5]	50-32-8	1.4	1.3E-01	3.4E-06	1.0E+00	3.4E-06

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.40
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC concentration in air (C_a)	C_a	chemical-specific	µg/m^3
COPC concentration in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\ -\ inh}$	9490	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration	RfC	chemical-specific	mg/m^3
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor [1]	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat}, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ \mu g/mg\right)\left(\frac{1}{VF}\right)\right]$$

$$Risk = [EC(air)][IUR]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\ \mu g/mg\right)}$$

COPC [2]	CAS Number [3]	C_s [4] (mg/kg)	UCL or Max	C_{sat} [5] (mg/kg)	Is $C_s \le C_{sat}$?	Volatilization Factor [6] (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR [5] (µg/m3)$^{-1}$	RfC_i [5] (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [7]	50-32-8	1.4	Max	--	--	3.3E+07	4.4E-05	4.5E-05 [8]	4.2E-05	6.0E-04	2.0E-06	2.7E-08	48%	0.021	92%
Inorganics															
Arsenic	7440-38-2	6.16	Max	--	--	--	4.9E-06	1.7E-06	4.7E-06	4.3E-03	1.5E-05	7.4E-09	13%	0.00031	1.4%
Cobalt	7440-48-4	8.52	Max	--	--	--	6.7E-06	2.4E-06	6.5E-06	9.0E-03	6.0E-06	2.2E-08	38%	0.0011	4.7%
Vanadium	7440-62-2	60.4	Max	--	--	--	4.8E-05	--	4.6E-05	--	1.0E-04	--	--	0.00046	2.0%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	5.6E-08	100%	0.023	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.41 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.41
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	1.4	3.3E+07	4.4E-05	4.5E-05	6.0E-04	2.7E-08

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.42
HUMAN HEALTH RISK EVALUATION SUMMARY FOR SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	1.4	Max	9.2E-06	3.4E-06	2.7E-08	**1E-05**	0.060	0.021	0.0056	0.0031	0.021	0.10	0.030
Inorganics														
Arsenic	7440-38-2	6.16	Max	1.3E-05	1.2E-06	7.4E-09	**1E-05**	0.26	0.021	0.025	0.0031	0.00031	0.28	0.028
Cobalt	7440-48-4	8.52	Max	--	--	2.2E-08	**2E-08**	0.36	--	0.034	--	0.0011	0.36	0.035
Vanadium	7440-62-2	60.4	Max	--	--	--	**--**	0.15	--	0.014	--	0.00046	0.15	0.015
			Pathway Risk	**2E-05**	**5E-06**	**6E-08**	**--**	**0.8**	**0.04**	**0.08**	**0.006**	**0.02**	**--**	**--**
						Total Risk	**3E-05**					**Hazard Index**	**0.9**	**0.1**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.43
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	5.7	Max	3.8E-05 [6]	0.000073	0.0000068	1.0E+00	3.0E-04	3.8E-05	63%	0.24	21%	0.023	21%
Inorganics														
Arsenic	7440-38-2	10.3	Max	1.5E-05	0.000132	0.0000123	1.5E+00	3.0E-04	2.2E-05	37%	0.44	38%	0.041	38%
Cobalt	7440-48-4	6.60	Max	--	0.00008	0.000008	--	3.0E-04	--	--	0.28	25%	0.026	25%
Vanadium	7440-62-2	70.6	Max	--	0.00090	0.000085	--	5.0E-03	--	--	0.18	16%	0.017	16%
									Cancer Risk		**Hazard Index**		**Hazard Index**	
								Pathway Sums:	6.0E-05	100%	1.1	100%	0.11	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.44 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.44
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	5.7	3.8E-05	1.0E+00	3.8E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.45
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where: $$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where: $$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD - Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	5.7	Max	0.13	1.0E+00	3.0E-04	1.4E-05 [6]	2.5E-05	3.8E-06	1.4E-05	87%	0.085	71%	0.013	71%
Inorganics															
Arsenic	7440-38-2	10.3	Max	0.03	1.5E+00	3.0E-04	1.4E-06	1.1E-05	1.6E-06	2.0E-06	13%	0.035	29%	0.0052	29%
Cobalt	7440-48-4	6.60	Max	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	70.6	Max	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**		**Hazard Index**	
									Pathway Sums:	1.6E-05	100%	0.12	100%	0.018	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.46 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.46
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC [1]	CAS Number [2]	Cs [3] (mg/kg)	ABS [4] (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent [5]	50-32-8	5.7	1.3E-01	1.4E-05	1.0E+00	1.4E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.47
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC concentration in air (C_a)	C_a	chemical-specific	µg/m^3
COPC concentration in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\ -\ inh}$	9490	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration	RfC	chemical-specific	mg/m^3
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor [1]	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)$$

$$Risk = [EC(air)][IUR]$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat}, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{VF}\right)\right]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\ {}^{\mu g}/_{mg}\right)}$$

COPC [2]	CAS Number [3]	C_s [4] (mg/kg)	UCL or Max	C_{sat} [5] (mg/kg)	Is $C_s \le C_{sat}$?	Volatilization Factor [6] (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR [5] (µg/m3)$^{-1}$	RfC_i [5] (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [7]	50-32-8	5.7	Max	--	--	3.3E+07	1.8E-04	1.8E-04 [8]	1.7E-04	6.0E-04	2.0E-06	1.1E-07	79%	0.085	98%
Inorganics															
Arsenic	7440-38-2	10.3	Max	--	--	--	8.1E-06	2.9E-06	7.8E-06	4.3E-03	1.5E-05	1.2E-08	8.9%	0.00052	0.60%
Cobalt	7440-48-4	6.60	Max	--	--	--	5.2E-06	1.9E-06	5.0E-06	9.0E-03	6.0E-06	1.7E-08	12%	0.0008	1.0%
Vanadium	7440-62-2	70.6	Max	--	--	--	5.6E-05	--	5.3E-05	--	1.0E-04	--	--	0.00053	0.61%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	1.4E-07	100%	0.087	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.48 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.48
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	5.7	3.3E+07	1.8E-04	1.8E-04	6.0E-04	1.1E-07

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.49
HUMAN HEALTH RISK EVALUATION SUMMARY FOR SURFACE SOIL (0-2')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	5.7	Max	3.8E-05	1.4E-05	1.1E-07	**5E-05**	0.24	0.085	0.023	0.013	0.085	0.41	0.12
Inorganics														
Arsenic	7440-38-2	10.3	Max	2.2E-05	2.0E-06	1.2E-08	**2E-05**	0.44	0.035	0.041	0.0052	0.00052	0.47	0.047
Cobalt	7440-48-4	6.60	Max	--	--	1.7E-08	**2E-08**	0.28	--	0.026	--	0.00083	0.28	0.027
Vanadium	7440-62-2	70.6	Max	--	--	--	**--**	0.18	--	0.017	--	0.00053	0.18	0.017
			Pathway Risk	**6E-05**	**2E-05**	**1E-07**	**--**	**1**	**0.1**	**0.1**	**0.02**	**0.09**	**--**	**--**
						Total Risk	**8E-05**					**Hazard Index**	**1**	**0.2**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.50
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
UTILITY WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	UTILITY WORKER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	330	mg/day
Exposure Frequency	EF	30	days/year
Exposure Duration - adult	ED_{adult}	1	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	365	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day
Fraction Ingested	FI	1	unitless

Equations

Incidental ingestion of noncarcinogenic and carcinogenic COPCs in soil :

$$Ingestion = \frac{(C_s)(IRS_{adult})(EF)(ED_{adult})(CF_S)(FI)}{(AT)(BW_{adult})}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds											
BaP-equivalent [5]	50-32-8	4	UCL	1.9E-08	1.4E-06	1.0E+00	3.0E-04	1.9E-08	23%	0.0045	19%
Inorganics											
Arsenic	7440-38-2	8.89	UCL	4.3E-08	3.0E-06	1.5E+00	3.0E-04	6.5E-08	77%	0.010	41%
Cobalt	7440-48-4	5.03	UCL	--	1.7E-06	--	3.0E-04	--	--	0.0057	
Vanadium	7440-62-2	58.7	UCL	--	2.0E-05	--	5.0E-03	--	--	0.0040	16%
								Cancer Risk		**Hazard Index**	
							Pathway Sums:	8E-08	100%	0.024	77%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.51
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
UTILITY WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor		UTILITY WORKER	
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	30	days/year
Exposure Duration - adult	ED_{adult}	1	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	3470	cm2
Adherence Factor - adult	AF_{adult}	0.2	mg/cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	365	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose of noncarcinogenic and carcinogenic COPCs in soil:

$$DAD = \frac{(DA_{event})(EF)(ED_{adult})(EV)(SA_{adult})}{(BW_{adult})(AT)}$$

where: $$DA_{event} = (C_s)(AF_a)(ABS)(CF)$$

Carcinogenic Risk: $$Risk = (DAD)(SF_d)$$

$$SF_d = SF_o / GIABS$$

Noncarcinogenic Hazard: $$HQ = DAD / Rf_d$$

where: $$RfD_d = (RfD_o)(GIABS)$$

COPC [1]	CAS Number [2]	Exposure Point Concentration [3] (mg/kg)	UCL or Max	ABS [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	DAevent $(mg/cm^2\text{-}event)$	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds													
BaP-equivalent [5]	50-32-8	4	UCL	0.13	1.0E+00	3.0E-04	1.0E-07	5.3E-09	3.7E-07	5.3E-09	57%	0.0012	66%
Inorganics													
Arsenic	7440-38-2	8.89	UCL	0.03	1.5E+00	3.0E-04	5.3E-08	2.7E-09	1.9E-07	4.1E-09	43%	0.00063	34%
Cobalt	7440-48-4	5.03	UCL	--	--	3.0E-04	--	--	--	--	--	--	--
Vanadium	7440-62-2	58.7	UCL	--	--	1.3E-04	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**	
									Pathway Sums:	9E-09	100%	0.0019	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

-- = value not calculated because analyte not detected, or because toxicity data not available.

NA = Not analyzed in any sample

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

Table H.2.52
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
UTILITY WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UTILITY WORKER

Parameter	Abbreviation	Value	Units
COPC in air	C_a	chemical-specific	$\mu g/m^3$
COPC in surface soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	30	days/year
Exposure Duration - adult	ED_{adult}	1	years
Exposure Time	ET	0.33	unitless
Averaging Time – carcinogens	AT_C	25550	days
Averaging Time – noncarcinogens, adult	ATnc - adult	365	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	$(\mu g/m^3)^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	$\mu g/m^3$

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC\ (air\ ) = \frac{(C_a)(ET)(EF)(ED)}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)$$

Where for organics with $C_s \le C_{sat}$, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\,{}^{\mu g}/_{mg}\right)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_S)\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{PEF}\right)\right]+\left[(C_{sat})\left(1{,}000\ {}^{\mu g}/_{mg}\right)\left(\frac{1}{VF}\right)\right]$$

Carcinogenic Risk: $Risk_{inh} = [EC(air)](IUR)$

Noncarcinogenic Hazard: $HQ_{inh} = \frac{EC(air)}{(RfC)\left(1{,}000\ {}^{\mu g}/_{mg}\right)}$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le$ Csat?	Volatilization Factor (6) (m^3/kg)	C_a ($\mu g/m^3$)	Carcinogenic EC(air) ($\mu g/m^3$)	Noncarcinogenic EC(air) ($\mu g/m^3$)	IUR (5) $(\mu g/m^3)^{-1}$	RfC_i (5) (mg/m3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	4	UCL	--	Yes	3.3E+07	1.2E-04	4.8E-08	3.4E-06	6.0E-04	2.0E-06	2.9E-11	53%	0.0017	98%
Inorganics															
Arsenic	7440-38-2	8.89	UCL	--	Yes	--	7.0E-06	2.7E-09	1.9E-07	4.3E-03	1.5E-05	1.2E-11	21%	0.000013	0.73%
Cobalt	7440-48-4	5.03	UCL	--	Yes	--	4.0E-06	1.5E-09	1.1E-07	9.0E-03	6.0E-06	1.4E-11	25%	0.000018	1.0%
Vanadium	7440-62-2	58.7	UCL	--	Yes	--	4.6E-05	--	1.3E-06	--	1.0E-04	--	--	0.000013	0.73%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	5E-11	100%	0.0017	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.53
HUMAN HEALTH RISK EVALUATION SUMMARY FOR SURFACE SOIL (0-2')
UTILITY WORKER
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Adult Only Ingestion Carcinogenic Risk	Adult Only Dermal Carcinogenic Risk	Adult Only Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Adult Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds											
BaP-equivalent [4]	50-32-8	4	UCL	1.9E-08	5.3E-09	2.9E-11	**2E-08**	0.0045	0.0012	0.0017	**0.007**
Inorganics											
Arsenic	7440-38-2	8.89	UCL	6.5E-08	4.1E-09	1.2E-11	**7E-08**	0.010	0.00063	0.000013	**0.01**
Cobalt	7440-48-4	5.03	UCL								
Vanadium	7440-62-2	58.7	UCL	--	--	--	--	0.0040	--	0.000013	**0.004**
			Pathway Risk	**8E-08**	**9E-09**	**4E-11**	--	**0.02**	**0.002**	**0.002**	--
						Total Risk	**9E-08**			**Hazard Index**	**0.02**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

NA = Not analyzed in any sample

Table H.2.54
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
OUTDOOR WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	OUTDOOR WORKER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Exposure Frequency	EF	225	days/year
Exposure Duration - adult	ED_{adult}	25	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	9125	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day
Fraction Ingested	FI	1	unitless

Equations

Incidental ingestion of noncarcinogenic and carcinogenic COPCs in soil:

$$Ingestion = \frac{(C_s)(IRS_{adult})(EF)(ED_{adult})(CF_S)(FI)}{(AT)(BW_{adult})}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds											
BaP-equivalent [5]	50-32-8	4	UCL	1.1E-06	3.1E-06	1.0E+00	3.0E-04	1.1E-06	23%	0.010	19%
Inorganics											
Arsenic	7440-38-2	8.89	UCL	2.4E-06	6.9E-06	1.5E+00	3.0E-04	3.7E-06	77%	0.023	41%
Cobalt	7440-48-4	5.03	UCL	--	3.9E-06	--	3.0E-04	--	--	0.013	
Vanadium	7440-62-2	58.7	UCL	--	4.5E-05	--	5.0E-03	--	--	0.0090	16%
							Pathway Sums:	**Cancer Risk**		**Hazard Index**	
								5E-06	100%	0.055	77%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.55
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
OUTDOOR WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor		OUTDOOR WORKER	
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	225	days/year
Exposure Duration - adult	ED_{adult}	25	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	3470	cm2
Adherence Factor - adult	AF_{adult}	0.12	mg/cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	9125	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose of noncarcinogenic and carcinogenic COPCs in soil:

$$DAD = \frac{(DA_{event})(EF)(ED_{adult})(EV)(SA_{adult})}{(BW_{adult})(AT)}$$

where: $DA_{event} = (C_s)(AF_a)(ABS)(CF)$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

$$SF_d = SF_o / GIABS$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	Exposure Point Concentration [3] (mg/kg)	UCL or Max	ABS [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	DAevent (mg/cm^2-event)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds													
BaP-equivalent [5]	50-32-8	4	UCL	0.13	1.0E+00	3.0E-04	6.2E-08	6.0E-07	1.7E-06	6.0E-07	57%	0.0056	66%
Inorganics													
Arsenic	7440-38-2	8.89	UCL	0.03	1.5E+00	3.0E-04	3.2E-08	3.1E-07	8.6E-07	4.6E-07	43%	0.0029	34%
Cobalt	7440-48-4	5.03	UCL	--	--	3.0E-04	--	--	--	--	--	--	--
Vanadium	7440-62-2	58.7	UCL	--	--	1.3E-04	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**	
									Pathway Sums:	1E-06	100%	0.0084	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.56
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
OUTDOOR WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	OUTDOOR WORKER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC in surface soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	225	days/year
Exposure Duration - adult	ED_{adult}	25	years
Exposure Time	ET	0.33	unitless
Averaging Time – carcinogens	AT_C	25550	days
Averaging Time – noncarcinogens, adult	ATnc - adult	9125	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC\ (air\ ) = \frac{(C_a)(ET)(EF)(ED)}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)$$

Where for organics with $C_s \le C_{sat}$, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\,\mu g/mg\right)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)\right]+\left[(C_{sat})\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{VF}\right)\right]$$

Carcinogenic Risk:

$$Risk_{inh} = [EC(air)](IUR)$$

Noncarcinogenic Hazard:

$$HQ_{inh} = \frac{EC(air)}{(RfC)\left(1{,}000\ \mu g/mg\right)}$$

COPC (2)	CAS Number (3)	Exposure Point Concentration (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is EPC ≤ Csat? (6)	Volatilization Factor (6) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR (5) (µg/m^3)$^{-1}$	RfC_i (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	4	UCL	--	Yes	3.3E+07	1.2E-04	9.0E-06	2.5E-05	6.0E-04	2.0E-06	5.4E-09	53%	0.013	98%
Inorganics															
Arsenic	7440-38-2	8.89	UCL	--	Yes	--	7.0E-06	5.1E-07	1.4E-06	4.3E-03	1.5E-05	2.2E-09	21%	0.00010	0.73%
Cobalt	7440-48-4	5.03	UCL	--	Yes	--	4.0E-06	2.9E-07	8.1E-07	9.0E-03	6.0E-06	2.6E-09	25%	0.00013	1.0%
Vanadium	7440-62-2	58.7	UCL	--	Yes	--	4.6E-05	--	9.4E-06	--	1.0E-04	--	--	0.000094	0.73%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	1.0E-08	100%	0.013	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.57
HUMAN HEALTH RISK EVALUATION SUMMARY FOR SURFACE SOIL (0-2')
OUTDOOR WORKER
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Adult Only Ingestion Carcinogenic Risk	Adult Only Dermal Carcinogenic Risk	Adult Only Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Adult Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds											
BaP-equivalent [4]	50-32-8	4	UCL	1.1E-06	6.0E-07	5.4E-09	**2E-06**	0.010	0.0056	0.013	**0.0**
Inorganics											
Arsenic	7440-38-2	8.89	UCL	3.7E-06	4.6E-07	2.2E-09	**4E-06**	0.023	0.0029	0.00010	**0.03**
Cobalt	7440-48-4	5.03	UCL	--	--	2.6E-09	**3E-09**	0.013	--	0.00013	**0.01**
Vanadium	7440-62-2	58.7	UCL	--	--	--	**--**	0.0090	--	0.000094	**0.009**
			Pathway Risk	**5E-06**	**1E-06**	**1E-08**	**--**	**0.06**	**0.008**	**0.01**	**--**
						Total Risk	**6E-06**			**Hazard Index**	**0.08**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

NA = Not analyzed in any sample

Table H.2.58
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
RECREATIONAL USER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	RECREATIONAL USER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	50	mg/day
Soil Ingestion Rate - adolescent	IRS_{adl}	100	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	31.5	(mg-year)/(kg-day)
Exposure Frequency	EF	50	days/year
Exposure Duration - adult	ED_{adult}	14	years
Exposure Duration - adolescent	Ed_{adl}	10	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adolescent	AT_{nc} - adl	3650	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	5110	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - adolescent	Bw_{adl}	44	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{adl})(IRS_{adl})}{(BW_{adl})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Adolescent (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Adolescent	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	4	UCL	6.0E-07 [6]	0.0000012	0.00000034	1.0E+00	3.0E-04	6.0E-07	42%	0.0042	19%	0.0011	19%
Inorganics														
Arsenic	7440-38-2	8.89	UCL	5.5E-07	0.0000028	0.00000076	1.5E+00	3.0E-04	8.2E-07	58%	0.0092	41%	0.0025	41%
Cobalt	7440-48-4	5.03	UCL	--	0.0000016	0.00000043	--	3.0E-04	--	--	0.0052	23%	0.0014	23%
Vanadium	7440-62-2	58.7	UCL	--	0.000018	0.0000050	--	5.0E-03	--	--	0.0037	16%	0.0010	16%
									Cancer Risk		**Hazard Index**		**Hazard Index**	
								Pathway Sums:	1E-06	100%	0.022	100%	0.0061	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.59 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.59
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF SURFACE SOIL (0-2')
RECREATIONAL USER
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

Incidental ingestion for multiple age groups simultaneously of mutagenic COPCs in soil for recreational user receptors:

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{6-16})(IRS_{adl})(3))}{BW_{adl}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: RECREATIONAL USER

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	50	mg/day
Soil Ingestion Rate - adolescent	IRS_{adl}	100	mg/day
Exposure Frequency	EF	50	days/year
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - adolescent	BW_{adl}	44	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	4.0	6.0E-07	1.0E+00	6.0E-07

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.60
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
RECREATIONAL USER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: RECREATIONAL USER

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	50	days/year
Exposure Duration - adult	ED_{adult}	14	years
Exposure Duration - adolescent	ED_{adl}	10	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	3470	cm^2
Exposed Skin Surface Area - adolescent	SA_{adl}	2160	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	74	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.09	mg/cm^2
Adherence Factor - adolescent	AF_{adl}	0.04	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adolescent	AT_{nc} - adl	3650	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	5110	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - adolescent	BW_{adl}	44	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD_{age\text{-}adj} = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where:

$$SFS_{adj} = \frac{(ED_{adl})(AF_{adl})(SA_{adl})}{(BW_{adl})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where:

$$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Adolescent (mg/kg-day)	Noncarcinogenic DAD - Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Adolescent	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	4	UCL	0.13	1.0E+00	3.0E-04	1.2E-07 [6]	1.4E-07	2.8E-07	1.2E-07	67%	0.00047	66%	0.00093	66%
Inorganics															
Arsenic	7440-38-2	8.89	UCL	0.03	1.5E+00	3.0E-04	3.9E-08	7.2E-08	1.4E-07	5.8E-08	33%	0.00024	34%	0.00048	34%
Cobalt	7440-48-4	5.03	UCL	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	58.7	UCL	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**		**Hazard Index**	
									Pathway Sums:	1.7E-07	100%	0.00071	100%	0.0014	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.61 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.61
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH SURFACE SOIL (0-2')
RECREATIONAL USER
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{6-16})(AF_{adl})(SA_{adl})(3))}{BW_{adl}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor	RECREATIONAL USER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.09	mg/cm^2
Adherence Factor - adolescent	AF_{adl}	0.04	mg/cm^2
Exposed Skin Surface Area - adult	SA_{adult}	3470	cm^2
Exposed Skin Surface Area - adolescent	SA_{adl}	2160	cm^2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	50	days/year
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - adolescent	BW_{adl}	44	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC (1)	CAS Number (2)	C_s (3)	ABS (4) (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	4.0	1.3E-01	1.2E-07	1.0E+00	1.2E-07

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.5.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.62
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
RECREATIONAL USER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: RECREATIONAL USER

Parameter	Abbreviation	Value	Units
COPC in air (C_a)	C_a	chemical-specific	µg/m^3
COPC in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	50	days/year
Exposure Duration - inhalation	ED_{inh}	24	years
Exposure Time	ET	0.083	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\text{ - }inh}$	8760	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}\!/_{mg}\right)\left(\frac{1}{PEF}\right)$$

$$Risk = [EC(air)][IUR]$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat}, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}\!/_{mg}\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\ {}^{\mu g}\!/_{mg}\right)}$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_S)\left(1000\ {}^{\mu g}\!/_{mg}\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ {}^{\mu g}\!/_{mg}\right)\left(\frac{1}{VF}\right)\right]$$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le C_{sat}$? (5)	Volatilization Factor (6) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR (5) (µg/m^3)$^{-1}$	RfC_i (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	4	UCL	--	--	3.3E+07	1.2E-04	8.9E-07 (8)	1.4E-06	6.0E-04	2.0E-06	5.3E-10	67%	0.00071	98%
Inorganics															
Arsenic	7440-38-2	8.89	UCL	--	--	--	7.0E-06	2.7E-08	8.0E-08	4.3E-03	1.5E-05	1.2E-10	15%	0.0000053	0.73%
Cobalt	7440-48-4	5.03	UCL	--	--	--	4.0E-06	1.5E-08	4.5E-08	9.0E-03	6.0E-06	1.4E-10	18%	0.0000075	1.0%
Vanadium	7440-62-2	58.7	UCL	--	--	--	4.6E-05	--	5.3E-07	--	1.0E-04	--	--	0.0000053	0.73%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	7.9E-10	100%	0.00073	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.63 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.63
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM SURFACE SOIL (0-2')
RECREATIONAL USER
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{6-16})(3)) + ((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = \left[\left(EC(air)\right)\left(IUR\right)\right]$$

Exposure Assumptions

Receptor	RECREATIONAL USER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	50	days/year
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	0.083	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	4.0	3.3E+07	1.2E-04	8.9E-07	6.0E-04	5.3E-10

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.64
HUMAN HEALTH RISK EVALUATION SUMMARY FOR SURFACE SOIL (0-2')
RECREATIONAL USER
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Adolescent Ingestion Hazard Quotient	Adolescent Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Adolescent	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	4	UCL	6.0E-07	1.2E-07	5.3E-10	**7E-07**	0.0042	0.00047	0.0011	0.00093	0.00071	**0.01**	**0.003**
Inorganics														
Arsenic	7440-38-2	8.89	UCL	8.2E-07	5.8E-08	1.2E-10	**9E-07**	0.0092	0.00024	0.0025	0.00048	0.0000053	**0.009**	**0.003**
Cobalt	7440-48-4	5.03	UCL	--	--	1.4E-10	**1E-10**	0.0052	--	0.0014	--	0.0000075	**0.005**	**0.001**
Vanadium	7440-62-2	58.7	UCL	--	--	--	**--**	0.0037	--	0.0010	--	0.0000053	**0.004**	**0.001**
			Pathway Risk	**1E-06**	**2E-07**	**8E-10**	**--**	**0.02**	**0.0007**	**0.006**	**0.001**	**0.0007**	**--**	**--**
						Total Risk	**2E-06**					**Hazard Index**	**0.02**	**0.008**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.5.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.65
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	$RfDo$ [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	5.2	UCL	3.4E-05 [6]	0.000066	0.0000062	1.0E+00	3.0E-04	3.4E-05	55%	0.22	21%	0.021	21%
Inorganics														
Arsenic	7440-38-2	12.9	UCL	1.9E-05	0.00016	0.000015	1.5E+00	3.0E-04	2.8E-05	44.8%	0.55	52%	0.052	52%
Cobalt	7440-48-4	2.39	UCL	--	0.000031	0.0000029	--	3.0E-04	--	--	0.10	10%	0.010	10%
Vanadium	7440-62-2	70.4	UCL	--	0.00090	0.000084	--	5.0E-03	--	--	0.18	17%	0.017	17%
								Pathway Sums:	**Cancer Risk**		**Hazard Index**		**Hazard Index**	
									6E-05	100%	1.1	100%	0.10	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.66 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.66
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	5.2	3.4E-05	1.0E+00	3.4E-05

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.67
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD_{age-adj} = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where:

$$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where: $DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	5.2	UCL	0.13	1.0E+00	3.0E-04	1.3E-05 [6]	2.3E-05	3.4E-06	1.3E-05	83%	0.077	64%	0.011	64%
Inorganics															
Arsenic	7440-38-2	12.9	UCL	0.03	1.5E+00	3.0E-04	1.7E-06	1.3E-05	2.0E-06	2.6E-06	17%	0.044	36%	0.0065	36%
Cobalt	7440-48-4	2.39	UCL	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	70.4	UCL	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
									Pathway Sums:	**Cancer Risk**		**Hazard Index**		**Hazard Index**	
										1.5E-05	100%	0.12	100%	0.018	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.68 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.68
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left\{\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right\}(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC (1)	CAS Number (2)	C_s (3)	ABS (4) (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	5.2	1.3E-01	1.3E-05	1.0E+00	1.3E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.69
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air (C_a)	C_a	chemical-specific	µg/m^3
COPC in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\text{ - }inh}$	9490	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)$$

$$Risk = [EC(air)](IUR)$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat} value, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\,\mu g/mg\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ \mu g/mg\right)\left(\frac{1}{VF}\right)\right]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\,\mu g/mg\right)}$$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le C_{sat}$? (5)	Volatilization Factor (6) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR (5) (µg/m^3)$^{-1}$	RfC (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	5.2	UCL	--	--	3.3E+07	1.6E-04	1.7E-04 (8)	1.6E-04	6.0E-04	2.0E-06	1.0E-07	82%	0.078	98%
Inorganics															
Arsenic	7440-38-2	12.9	UCL	--	--	--	1.0E-05	3.6E-06	9.8E-06	4.3E-03	1.5E-05	1.6E-08	13%	0.0007	0.82%
Cobalt	7440-48-4	2.39	UCL	--	--	--	1.9E-06	6.7E-07	1.8E-06	9.0E-03	6.0E-06	6.0E-09	4.9%	0.0003	0.38%
Vanadium	7440-62-2	70.4	UCL	--	--	--	5.6E-05	--	5.3E-05	--	1.0E-04	--	--	0.00053	0.67%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	1.2E-07	100%	0.079	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.70 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.70
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = \left[(EC(air))(IUR)\right]$$

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	5.2	3.3E+07	1.6E-04	1.7E-04	6.0E-04	1.0E-07

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.71
HUMAN HEALTH RISK EVALUATION SUMMARY FOR COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 1
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	5.2	UCL	3.4E-05	1.3E-05	1.0E-07	**5E-05**	0.22	0.077	0.021	0.011	0.078	**0.4**	**0.1**
Inorganics														
Arsenic	7440-38-2	12.9	UCL	2.8E-05	2.6E-06	1.6E-08	**3E-05**	0.55	0.044	0.052	0.0065	0.00065	**0.6**	**0.06**
Cobalt	7440-48-4	2.39	UCL	--	--	6.0E-09	**6E-09**	0.10	--	0.010	--	0.00030	**0.1**	**0.01**
Vanadium	7440-62-2	70.4	UCL	--	--	--	**--**	0.18	--	0.017	--	0.00053	**0.2**	**0.02**
			Pathway Risk	**6E-05**	**2E-05**	**1E-07**	**--**	**1**	**0.1**	**0.1**	**0.02**	**0.1**	**--**	**--**
						Total Risk	**8E-05**					**Hazard Index**	**1**	**0.2**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.72
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	6.1	UCL	4.0E-05 [6]	0.000078	0.0000073	1.0E+00	3.0E-04	4.0E-05	79%	0.26	40%	0.024	40%
Inorganics														
Arsenic	7440-38-2	4.98	Max	7.2E-06	0.000064	0.0000060	1.5E+00	3.0E-04	1.1E-05	21%	0.21	33%	0.020	33%
Cobalt	7440-48-4	1.42	Max	--	0.000018	0.0000017	--	3.0E-04	--	--	0.061	9.3%	0.0057	9.3%
Vanadium	7440-62-2	46.7	Max	--	0.00060	0.000056	--	5.0E-03	--	--	0.12	18%	0.011	18%
								Pathway Sums:	**Cancer Risk** 5.1E-05	100%	**Hazard Index** 0.65	100%	**Hazard Index** 0.061	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.73 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.73
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	6.1	4.0E-05	1.0E+00	4.0E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.74
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD_{age-adj} = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where:
$$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where:
$$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	6.1	UCL	0.13	1.0E+00	3.0E-04	1.5E-05 [6]	2.7E-05	4.0E-06	1.5E-05	94%	0.091	84%	0.013	84%
Inorganics															
Arsenic	7440-38-2	4.98	Max	0.03	1.5E+00	3.0E-04	6.6E-07	5.1E-06	7.6E-07	9.8E-07	6.1%	0.017	16%	0.0025	16%
Cobalt	7440-48-4	1.42	Max	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	46.7	Max	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
									Pathway Sums:	**Cancer Risk**		**Hazard Index**		**Hazard Index**	
										1.6E-05	100%	0.11	100%	0.016	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.75 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.75
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC (1)	CAS Number (2)	C_s (3)	ABS (4) (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	6.1	1.3E-01	1.5E-05	1.0E+00	1.5E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.76
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air (C_a)	C_a	chemical-specific	µg/m^3
COPC in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\text{ - }inh}$	9490	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)$$

$$Risk = [EC(air)](IUR)$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat} value, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\,\mu g/mg\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ \mu g/mg\right)\left(\frac{1}{VF}\right)\right]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\,\mu g/mg\right)}$$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le C_{sat}$? (5)	Volatilization Factor (6) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m^3)	IUR (5) (µg/m^3)$^{-1}$	RfC (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	6.1	UCL	--	--	3.3E+07	1.9E-04	2.0E-04 (8)	1.8E-04	6.0E-04	2.0E-06	1.2E-07	93%	0.091	99%
Inorganics															
Arsenic	7440-38-2	4.98	Max	--	--	--	3.9E-06	1.4E-06	3.8E-06	4.3E-03	1.5E-05	6.0E-09	4.7%	0.0003	0.27%
Cobalt	7440-48-4	1.42	Max	--	--	--	1.1E-06	4.0E-07	1.1E-06	9.0E-03	6.0E-06	3.6E-09	2.8%	0.0002	0.19%
Vanadium	7440-62-2	46.7	Max	--	--	--	3.7E-05	--	3.5E-05	--	1.0E-04	--	--	0.00035	0.38%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	1.3E-07	100%	0.092	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.77 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.77
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	6.1	3.3E+07	1.9E-04	2.0E-04	6.0E-04	1.2E-07

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.78
HUMAN HEALTH RISK EVALUATION SUMMARY FOR COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 2
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	6.1	UCL	4.0E-05	1.5E-05	1.2E-07	**6E-05**	0.26	0.091	0.024	0.013	0.091	**0.4**	**0.1**
Inorganics														
Arsenic	7440-38-2	4.98	Max	1.1E-05	9.8E-07	6.0E-09	**1E-05**	0.21	0.017	0.020	0.0025	0.00025	**0.2**	**0.02**
Cobalt	7440-48-4	1.42	Max	--	--	3.6E-09	**4E-09**	0.06	--	0.006	--	0.00018	**0.1**	**0.01**
Vanadium	7440-62-2	46.7	Max	--	--	--	**--**	0.12	--	0.011	--	0.00035	**0.1**	**0.01**
			Pathway Risk	**5E-05**	**2E-05**	**1E-07**	**--**	**1**	**0.1**	**0.1**	**0.02**	**0.1**	**--**	**--**
						Total Risk	**7E-05**					**Hazard Index**	**0.9**	**0.2**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.79
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SF_o [4] $(mg/kg\text{-}day)^{-1}$	RfD_o [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	0.73	UCL	4.8E-06 [6]	0.0000093	0.00000088	1.0E+00	3.0E-04	4.8E-06	21%	0.031	4.0%	0.0029	4.0%
Inorganics														
Arsenic	7440-38-2	8.19	UCL	1.2E-05	0.00010	0.000010	1.5E+00	3.0E-04	1.8E-05	79%	0.35	45%	0.033	45%
Cobalt	7440-48-4	5.02	UCL	--	0.000064	0.0000060	--	3.0E-04	--	--	0.21	28%	0.020	28%
Vanadium	7440-62-2	69.5	UCL	--	0.00089	0.000083	--	5.0E-03	--	--	0.18	23%	0.017	23%
								Pathway Sums:	**Cancer Risk**		**Hazard Index**		**Hazard Index**	
									2.2E-05	100%	0.77	100%	0.072	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.80 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.80
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	0.73	4.8E-06	1.0E+00	4.8E-06

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.81
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD_{age-adj} = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where:

$$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where:

$$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	0.73	UCL	0.13	1.0E+00	3.0E-04	1.8E-06 [6]	3.3E-06	4.8E-07	1.8E-06	53%	0.011	28%	0.0016	28%
Inorganics															
Arsenic	7440-38-2	8.19	UCL	0.03	1.5E+00	3.0E-04	1.1E-06	8.5E-06	1.2E-06	1.6E-06	47%	0.028	72%	0.0041	72%
Cobalt	7440-48-4	5.02	UCL	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	69.5	UCL	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
									Pathway Sums:	**Cancer Risk** 3.4E-06	100%	**Hazard Index** 0.039	100%	**Hazard Index** 0.0057	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.82 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.82
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC (1)	CAS Number (2)	C_s (3)	ABS (4) (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	0.73	1.3E-01	1.8E-06	1.0E+00	1.8E-06

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.83
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air (C_a)	C_a	chemical-specific	$\mu g/m^3$
COPC in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\text{ - }inh}$	9490	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	$(\mu g/m^3)^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	$\mu g/m^3$

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)$$

$$Risk = [EC(air)][IUR]$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat} value, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\,\mu g/mg\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ \mu g/mg\right)\left(\frac{1}{VF}\right)\right]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\,\mu g/mg\right)}$$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le C_{sat}$? (5)	Volatilization Factor (6) (m^3/kg)	C_a ($\mu g/m^3$)	Carcinogenic EC(air) ($\mu g/m^3$)	Noncarcinogenic EC(air) ($\mu g/m^3$)	IUR (5) $(\mu g/m^3)^{-1}$	RfC (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	0.73	UCL	--	--	3.3E+07	2.3E-05	2.4E-05 (8)	2.2E-05	6.0E-04	2.0E-06	1.4E-08	39%	0.011	87%
Inorganics															
Arsenic	7440-38-2	8.19	UCL	--	--	--	6.5E-06	2.3E-06	6.2E-06	4.3E-03	1.5E-05	9.9E-09	27%	0.00041	3.3%
Cobalt	7440-48-4	5.02	UCL	--	--	--	4.0E-06	1.4E-06	3.8E-06	9.0E-03	6.0E-06	1.3E-08	35%	0.00063	5.1%
Vanadium	7440-62-2	69.5	UCL	--	--	--	5.5E-05	--	5.3E-05	--	1.0E-04	--	--	0.00053	4.2%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	3.7E-08	100%	0.012	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.84 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.84
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	0.73	3.3E+07	2.3E-05	2.4E-05	6.0E-04	1.4E-08

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.85
HUMAN HEALTH RISK EVALUATION SUMMARY FOR COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 3
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	0.73	UCL	4.8E-06	1.8E-06	1.4E-08	**7E-06**	0.031	0.011	0.0029	0.0016	0.011	**0.05**	**0.02**
Inorganics														
Arsenic	7440-38-2	8.19	UCL	1.8E-05	1.6E-06	9.9E-09	**2E-05**	0.35	0.028	0.033	0.0041	0.00041	**0.4**	**0.04**
Cobalt	7440-48-4	5.02	UCL	--	--	1.3E-08	**1E-08**	0.21	--	0.020	--	0.00063	**0.2**	**0.02**
Vanadium	7440-62-2	69.5	UCL	--	--	--	**--**	0.18	--	0.017	--	0.00053	**0.2**	**0.02**
			Pathway Risk	**2E-05**	**3E-06**	**4E-08**	**--**	**0.8**	**0.04**	**0.07**	**0.006**	**0.01**	**--**	**--**
						Total Risk	**3E-05**					**Hazard Index**	**0.8**	**0.09**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.86
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	$RfDo$ [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	0.86	UCL	5.7E-06 [6]	0.000011	0.0000010	1.0E+00	3.0E-04	5.7E-06	17%	0.037	3.2%	0.0034	3.2%
Inorganics														
Arsenic	7440-38-2	13.2	Max	1.9E-05	0.00017	0.000016	1.5E+00	3.0E-04	2.8E-05	83%	0.56	49%	0.053	49%
Cobalt	7440-48-4	8.52	Max	--	0.00011	0.000010	--	3.0E-04	--	--	0.36	32%	0.034	32%
Vanadium	7440-62-2	70.2	Max	--	0.00090	0.000084	--	5.0E-03	--	--	0.18	16%	0.017	16%
								Pathway Sums:	**Cancer Risk**		**Hazard Index**		**Hazard Index**	
									3.4E-05	100%	1.1	100%	0.11	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.87 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.87
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	0.86	5.7E-06	1.0E+00	5.7E-06

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.88
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD_{age-adj} = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where:

$$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where:

$$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	0.86	UCL	0.13	1.0E+00	3.0E-04	2.1E-06 [6]	3.8E-06	5.7E-07	2.1E-06	45%	0.013	22%	0.0019	22%
Inorganics															
Arsenic	7440-38-2	13.2	Max	0.03	1.5E+00	3.0E-04	1.7E-06	1.4E-05	2.0E-06	2.6E-06	55%	0.045	78%	0.0067	78%
Cobalt	7440-48-4	8.52	Max	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	70.2	Max	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
									Pathway Sums:	**Cancer Risk** 4.7E-06	100%	**Hazard Index** 0.058	100%	**Hazard Index** 0.0086	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.89 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.89
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC (1)	CAS Number (2)	C_s (3)	ABS (4) (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	0.86	1.3E-01	2.1E-06	1.0E+00	2.1E-06

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.90
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air (C_a)	C_a	chemical-specific	$\mu g/m^3$
COPC in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\text{ - }inh}$	9490	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	$(\mu g/m^3)^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	$\mu g/m^3$

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)$$

$$Risk = [EC(air)][IUR]$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat} value, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\,\mu g/mg\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ \mu g/mg\right)\left(\frac{1}{VF}\right)\right]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\,\mu g/mg\right)}$$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le C_{sat}$? (5)	Volatilization Factor (6) (m^3/kg)	C_a ($\mu g/m^3$)	Carcinogenic EC(air) ($\mu g/m^3$)	Noncarcinogenic EC(air) ($\mu g/m^3$)	IUR (5) $(\mu g/m^3)^{-1}$	RfC (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	0.86	UCL	--	--	3.3E+07	2.7E-05	2.8E-05 (8)	2.6E-05	6.0E-04	2.0E-06	1.7E-08	31%	0.013	85%
Inorganics															
Arsenic	7440-38-2	13.2	Max	--	--	--	1.0E-05	3.7E-06	1.0E-05	4.3E-03	1.5E-05	1.6E-08	29%	0.00067	4.4%
Cobalt	7440-48-4	8.52	Max	--	--	--	6.7E-06	2.4E-06	6.5E-06	9.0E-03	6.0E-06	2.2E-08	40%	0.0011	7.1%
Vanadium	7440-62-2	70.2	Max	--	--	--	5.5E-05	--	5.3E-05	--	1.0E-04	--	--	0.00053	3.5%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	5.4E-08	100%	0.015	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.91 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.91
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	0.86	3.3E+07	2.7E-05	2.8E-05	6.0E-04	1.7E-08

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.92
HUMAN HEALTH RISK EVALUATION SUMMARY FOR COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 4
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	0.86	UCL	5.7E-06	2.1E-06	1.7E-08	**8E-06**	0.037	0.013	0.0034	0.0019	0.013	**0.06**	**0.02**
Inorganics														
Arsenic	7440-38-2	13.2	Max	2.8E-05	2.6E-06	1.6E-08	**3E-05**	0.56	0.045	0.053	0.0067	0.00067	**0.6**	**0.06**
Cobalt	7440-48-4	8.52	Max	--	--	2.2E-08	**2E-08**	0.36	--	0.034	--	0.0011	**0.4**	**0.04**
Vanadium	7440-62-2	70.2	Max	--	--	--	**--**	0.18	--	0.017	--	0.00053	**0.2**	**0.02**
			Pathway Risk	**3E-05**	**5E-06**	**5E-08**	**--**	**1**	**0.06**	**0.1**	**0.009**	**0.02**	**--**	**--**
						Total Risk	**4E-05**					**Hazard Index**	**1**	**0.1**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.93
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Age-adjusted soil ingestion factor	IFS_{adj}	105	(mg-year)/(kg-day)
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Fraction Ingested	FI	1	unitless
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in soil for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_s)(IFS_{adj})(EF)(CF_S)(FI)}{(AT_c)}$$

where: $$IFS_{adj} = \frac{(ED_{child})(IRS_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRS_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in soil for separate age groups:

$$Ingestion = \frac{(C_s)(IRS)(EF)(ED)(CF_S)(FI)}{(AT_{nc})(BW)}$$

Carcinogenic Risk: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic Hazard: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic $Ingestion_{age-adj}$ (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	$RfDo$ [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds														
BaP-equivalent [5]	50-32-8	5.7	Max	3.8E-05 [6]	0.000073	0.0000068	1.0E+00	3.0E-04	3.8E-05	63%	0.24	21%	0.023	21%
Inorganics														
Arsenic	7440-38-2	10.3	Max	1.5E-05	0.00013	0.000012	1.5E+00	3.0E-04	2.2E-05	37%	0.44	38%	0.041	38%
Cobalt	7440-48-4	6.60	Max	--	0.00008	0.000008	--	3.0E-04	--	--	0.28	25%	0.026	25%
Vanadium	7440-62-2	70.6	Max	--	0.00090	0.000085	--	5.0E-03	--	--	0.18	16%	0.017	16%
								Pathway Sums:	**Cancer Risk**		**Hazard Index**		**Hazard Index**	
									6.0E-05	100%	1.1	100%	0.11	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.94 for mutagenic mode of action ingestion intake calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.94
MUTAGENIC MODE OF ACTION -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Risk Equation

$$Ingestion = \frac{C_s \times \left(\frac{((ED_{0-2})(IRS_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(IRS_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(IRS_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(IRS_{adult})(1))}{BW_{adult}} \right) \times EF \times CF_s}{AT_c}$$

Mutagenic Risk: $Risk = (Ingestion)(SF_o)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil (C_s)	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	100	mg/day
Soil Ingestion Rate - child	IRS_{child}	200	mg/day
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg

COPC (1)	CAS Number (2)	Cs (3) (mg/kg)	Carcinogenic Ingestion (mg/kg-day)	SFo (4) $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	5.7	3.8E-05	1.0E+00	3.8E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.95
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm^2
Exposed Skin Surface Area - child	SA_{child}	2690	cm^2
Age-adjusted dermal contact factor	SFS_{adj}	321	(mg-year)/(kg-event)
Adherence Factor - adult	AF_{adult}	0.07	mg/cm^2
Adherence Factor - child	AF_{child}	0.2	mg/cm^2
Dermal Absorption Factor	ABS_d	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Fraction of contaminantt absorbed in gastrointestinal tract	GIABS	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose for carcinogenic COPCs in soil for multiple age groups simultaneously:

$$DAD_{age-adj} = \frac{(C_s)(SFS_{adj})(ABS_d)(EF)(EV)(CF)}{(AT)}$$

where:

$$SFS_{adj} = \frac{(ED_{child})(AF_{child})(SA_{child})}{(BW_{child})} + \frac{(ED_{adult})(AF_{adult})(SA_{adult})}{(BW_{adult})}$$

Carcinogenic Risk: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Dermal absorbed dose of noncarcinogenic COPCs in soil for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

Noncarcinogenic Hazard: $HQ = DAD / Rf_d$

where:

$$DA_{event} = (C_S)(CF_S)(AF)(ABS_d)$$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS_d [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - Child (mg/kg-day)	Noncarcinogenic DAD Adult (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [5]	50-32-8	5.7	Max	0.13	1.0E+00	3.0E-04	1.4E-05 [6]	2.5E-05	3.8E-06	1.4E-05	87%	0.085	71%	0.013	71%
Inorganics															
Arsenic	7440-38-2	10.3	Max	0.03	1.5E+00	3.0E-04	1.4E-06	1.1E-05	1.6E-06	2.0E-06	13%	0.035	29%	0.0052	29%
Cobalt	7440-48-4	6.60	Max	--	--	3.0E-04	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	70.6	Max	--	--	1.3E-04	--	--	--	--	--	--	--	--	--
									Pathway Sums:	**Cancer Risk**		**Hazard Index**		**Hazard Index**	
										1.6E-05	100%	0.12	100%	0.018	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
(6) See Table H.2.96 for mutagenic mode of action dermal contact calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.96
MUTAGENIC MODE OF ACTION -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Equations

$$DAD = \frac{(C_s)\left(\frac{((ED_{0-2})(AF_{child})(SA_{child})(10))}{BW_{child}} + \frac{((ED_{2-6})(AF_{child})(SA_{child})(3))}{BW_{child}} + \frac{((ED_{6-16})(AF_{adult})(SA_{adult})(3))}{BW_{adult}} + \frac{((ED_{16-30})(AF_{adult})(SA_{adult})(1))}{BW_{adult}}\right)(ABS)(EF)(CF)}{AT_c}$$

Mutagenic Risk: $Risk = (DAD)(SF_d)$

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Soil	Cs	chemical-specific	mg/kg
Adherence Factor - adult	AF_{adult}	0.07	mg/cm2
Adherence Factor - child	AF_{child}	0.2	mg/cm2
Exposed Skin Surface Area - adult	SA_{adult}	6032	cm2
Exposed Skin Surface Area - child	SA_{child}	2690	cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Body Weight - adult	BW_{adult}	80	kg
Body Weight - child	BW_{child}	15	kg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$

COPC (1)	CAS Number (2)	C_s (3)	ABS (4) (unitless)	Carcinogenic DAD (mg/kg-day)	SF_d $(mg/kg\text{-}day)^{-1}$	Cancer Risk
BaP-equivalent (5)	50-32-8	5.7	1.3E-01	1.4E-05	1.0E+00	1.4E-05

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H2.6.

(4) Human Health Toxicity Values shown in Table H.2.11.

(5) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.97
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air (C_a)	C_a	chemical-specific	$\mu g/m^3$
COPC in surface soil (C_s)	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration - inhalation	ED_{inh}	26	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time - noncarcinogens, inhalation	$AT_{nc\text{ - }inh}$	9490	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	$(\mu g/m^3)^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) (1)	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	$\mu g/m^3$

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC(air) = \frac{(C_a)(ET)(EF)(ED_{inh})}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)$$

$$Risk = [EC(air)][IUR]$$

Where for organics with $C_s \le C_{sat}$, or if no C_{sat} value, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\,\mu g/mg\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_s)\left(1000\ \mu g/mg\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1000\ \mu g/mg\right)\left(\frac{1}{VF}\right)\right]$$

$$HQ = \frac{EC(air)}{(RfC)\left(1{,}000\,\mu g/mg\right)}$$

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	UCL or Max	C_{sat} (5) (mg/kg)	Is $C_s \le C_{sat}$? (5)	Volatilization Factor (6) (m^3/kg)	C_a ($\mu g/m^3$)	Carcinogenic EC(air) ($\mu g/m^3$)	Noncarcinogenic EC(air) ($\mu g/m^3$)	IUR (5) $(\mu g/m^3)^{-1}$	RfC (5) (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent (7)	50-32-8	5.7	Max	--	--	3.3E+07	1.8E-04	1.8E-04 (8)	1.7E-04	6.0E-04	2.0E-06	1.1E-07	79%	0.085	98%
Inorganics															
Arsenic	7440-38-2	10.3	Max	--	--	--	8.1E-06	2.9E-06	7.8E-06	4.3E-03	1.5E-05	1.2E-08	8.9%	0.00052	0.60%
Cobalt	7440-48-4	6.60	Max	--	--	--	5.2E-06	1.9E-06	5.0E-06	9.0E-03	6.0E-06	1.7E-08	12%	0.00083	1.0%
Vanadium	7440-62-2	70.6	Max	--	--	--	5.6E-05	--	5.3E-05	--	1.0E-04	--	--	0.00053	0.61%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	1.4E-07	100%	0.087	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
(8) See Table H.2.98 for mutagenic mode of action inhalation calculation and risk calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.98
MUTAGENIC MODE OF ACTION -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

Equations

$$EC(air) = \frac{(C_a)(ET)(EF)[((ED_{0-2})(10))+((ED_{2-6})(3))+((ED_{6-16})(3))+((ED_{6-30})(1))]}{AT_c}$$

where: $$C_a = (C_s)(1{,}000\,\mu g/mg)\left(\frac{1}{VF}+\frac{1}{PEF}\right)$$

$$Mutagenic\ Risk_{inh} = [(EC(air))(IUR)]$$

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	350	days/year
Exposure Duration, 0 to 2 years of age	ED_{0-2}	2	years
Exposure Duration, 2 to 6 years of age	ED_{2-6}	4	years
Exposure Duration, 6 to 16 years of age	ED_{6-16}	10	years
Exposure Duration, 16 to 30 years of age	ED_{16-30}	14	years
Exposure Time	ET	1	unitless
Averaging Time – carcinogens	AT_c	25550	days
Inhalation Unit Risk	IUR	chemical-specific	(µg/m^3)$^{-1}$
Volatilization Factor	VF	chemical-specific	m^3/kg
Particulate emission factor (1)	PEF	1.27E+09	m^3/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

COPC (2)	CAS Number (3)	C_s (4) (mg/kg)	Volatilization Factor (5) (m^3/kg)	C_a (µg/m^3)	Carcinogenic EC(air) (µg/m^3)	IUR (6) (µg/m^3)$^{-1}$	Cancer Risk
BaP-equivalent (7)	50-32-8	5.7	3.3E+07	1.8E-04	1.8E-04	6.0E-04	1.1E-07

(1) PEF calculated as shown in Table H.2.9.

(2) COPC = Constituent of potential concern.

(3) CAS = Chemical Abstracts Service number.

(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(5) Human Health Toxicity Values shown in Table H.2.11.

(6) See Table H.2.10 for VF calculation.

(7) See Table H.2.4 for B(a)P-equivalent calculation.

Table H.2.99
HUMAN HEALTH RISK EVALUATION SUMMARY FOR COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UU/UE RECEPTOR
EXPOSURE AREA 5
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds														
BaP-equivalent [4]	50-32-8	5.7	Max	3.8E-05	1.4E-05	1.1E-07	**5E-05**	0.24	0.085	0.023	0.013	0.085	**0.4**	**0.1**
Inorganics														
Arsenic	7440-38-2	10.3	Max	2.2E-05	2.0E-06	1.2E-08	**2E-05**	0.44	0.035	0.041	0.0052	0.00052	**0.5**	**0.05**
Cobalt	7440-48-4	6.60	Max	--	--	1.7E-08	**2E-08**	0.28	--	0.026	--	0.00083	**0.3**	**0.03**
Vanadium	7440-62-2	70.6	Max	--	--	--	**--**	0.18	--	0.017	--	0.00053	**0.2**	**0.02**
			Pathway Risk	**6E-05**	**2E-05**	**1E-07**	**--**	**1**	**0.1**	**0.1**	**0.02**	**0.09**	**--**	**--**
						Total Risk	**8E-05**					**Hazard Index**	**1**	**0.2**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.100
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UTILITY WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions			
Receptor	UTILITY WORKER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Soil Ingestion Rate - adult	IRS_{adult}	330	mg/day
Exposure Frequency	EF	30	days/year
Exposure Duration - adult	ED_{adult}	1	years
Conversion Factor-soil	CF_s	0.000001	kg/mg
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	365	days
Oral Slope Factor	SF_o	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose	RfD_o	chemical-specific	mg/kg-day
Fraction Ingested	FI	1	unitless

Equations

Incidental ingestion of noncarcinogenic and carcinogenic COPCs in soil:

$$Ingestion = \frac{(C_s)(IRS_{adult})(EF)(ED_{adult})(CF_S)(FI)}{(AT)(BW_{adult})}$$

Carcinogenic Risk: $Risk = (Ingestion)(SF_o)$

Noncarcinogenic Hazard: $HQ = Ingestion / RfD_o$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SFo [4] $(mg/kg\text{-}day)^{-1}$	RfDo [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Adult	% of Total
Semivolatile Organic Compounds											
BaP-equivalent [5]	50-32-8	5.2	UCL	2.5E-08	1.8E-06	1.0E+00	3.00E-04	2.5E-08	29%	0.00588	25%
Inorganics											
Arsenic	7440-38-2	8.38	UCL	4.1E-08	2.8E-06	1.5E+00	3.00E-04	6.1E-08	71%	0.0095	40%
Cobalt	7440-48-4	3.9	UCL	--	1.3E-06	--	3.00E-04	--	--	0.0044	19%
Vanadium	7440-62-2	57.2	UCL	--	1.9E-05	--	5.00E-03	--	--	0.0039	16%
							Pathway Sums:	**Cancer Risk**		**Hazard Index**	
								8.6E-08	100%	0.024	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.101
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UTILITY WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor		UTILITY WORKER	
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	30	days/year
Exposure Duration - adult	ED_{adult}	1	years
Event Frequency	EV	1	events/day
Exposed Skin Surface Area - adult	SA_{adult}	3470	cm2
Adherence Factor - adult	AF_{adult}	0.2	mg/cm2
Dermal Absorption Factor	ABS	chemical-specific	unitless
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	365	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Conversion Factor-soil	CF_s	0.000001	kg/mg
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal absorbed dose of noncarcinogenic and carcinogenic COPCs in soil:

$$DAD = \frac{(DA_{event})(EF)(ED_{adult})(EV)(SA_{adult})}{(BW_{adult})(AT)}$$

where: $$DA_{event} = (C_s)(AF_a)(ABS)(CF)$$

Carcinogenic Risk: $$Risk = (DAD)(SF_d)$$

$$SF_d = SF_o \,/\, GIABS$$

Noncarcinogenic Hazard: $$HQ = DAD \,/\, Rf_d$$

where: $$RfD_d = (RfD_o)(GIABS)$$

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	ABS [4] (unitless)	SF_d [4] $(mg/kg\text{-}day)^{-1}$	RfD_d [4] (mg/kg-day)	DAevent (mg/cm^2-event)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds													
BaP-equivalent [5]	50-32-8	5.2	UCL	0.13	1.0E+00	3.0E-04	1.4E-07	6.9E-09	4.8E-07	6.9E-09	64%	0.0016	73%
Inorganics													
Arsenic	7440-38-2	8.38	UCL	0.03	1.5E+00	3.0E-04	5.0E-08	2.6E-09	1.8E-07	3.8E-09	36%	0.00060	27%
Cobalt	7440-48-4	3.9	UCL	--	--	3.0E-04	--	--	--	--	--	--	--
Vanadium	7440-62-2	57.2	UCL	--	--	1.3E-04	--	--	--	--	--	--	--
										Cancer Risk		**Hazard Index**	
									Pathway Sums:	1.1E-08	100%	0.002	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(4) Human Health Toxicity Values shown in Table H.2.11.
(5) See Table H.2.4 for B(a)P-equivalent calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.102
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES/FUGITIVE DUST FROM COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UTILITY WORKER
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UTILITY WORKER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC in air	C_a	chemical-specific	µg/m^3
COPC in surface soil	C_s	chemical-specific	mg/kg
Exposure Frequency	EF	30	days/year
Exposure Duration - adult	ED_{adult}	1	years
Exposure Time	ET	0.33	unitless
Averaging Time – carcinogens	AT_C	25550	days
Averaging Time – noncarcinogens, adult	ATnc - adult	365	days
Inhalation Unit Risk (IUR)	IUR	chemical-specific	(µg/m^3)$^{-1}$
Inhalation Reference Concentration (RfC)	RfC	chemical-specific	mg/m^3
Volatilization Factor (VF)	VF	chemical-specific	m^3/kg
Particulate emission factor (PEF) [1]	PEF	1.27E+09	m^3/kg
Soil saturation	C_{sat}	chemical-specific	mg/kg
Exposure concentration in air	EC(air)	chemical-specific	µg/m^3

Equations

Exposure concentration in air for soil particulates and vapors emitted from soil for carcinogens and noncarcinogens:

$$EC\ (air) = \frac{(C_a)(ET)(EF)(ED)}{(AT)}$$

Where for inorganics, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\ {}^{\mu g}\!/_{mg}\right)\left(\frac{1}{PEF}\right)$$

Where for organics with $C_s \le C_{sat}$, C_a calculated as:

$$C_a = (C_S)\left(1{,}000\,{}^{\mu g}\!/_{mg}\right)\left(\frac{1}{VF} + \frac{1}{PEF}\right)$$

Where for organics with $C_s > C_{sat}$, C_a calculated as:

$$C_a = \left[(C_S)\left(1{,}000\ {}^{\mu g}\!/_{mg}\right)\left(\frac{1}{PEF}\right)\right] + \left[(C_{sat})\left(1{,}000\ {}^{\mu g}\!/_{mg}\right)\left(\frac{1}{VF}\right)\right]$$

Carcinogenic Risk: $Risk_{inh} = [EC(air)](IUR)$

Noncarcinogenic Hazard: $HQ_{inh} = \frac{EC(air)}{(RfC)\left(1{,}000\ {}^{\mu g}\!/_{mg}\right)}$

COPC [2]	CAS Number [3]	C_s [4] (mg/kg)	UCL or Max	C_{sat} [5] (mg/kg)	Is EPC ≤ Csat?	Volatilization Factor [6] (m^3/kg)	C_a (µg/m$_3$)	Carcinogenic EC(air) (µg/m^3)	Noncarcinogenic EC(air) (µg/m3)	IUR [5] (µg/m^3)$^{-1}$	RfC$_i$ [5] (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Semivolatile Organic Compounds															
BaP-equivalent [7]	50-32-8	5.2	UCL	--	Yes	3.3E+07	1.6E-04	6.3E-08	4.4E-06	6.0E-04	2.0E-06	3.8E-11	63%	0.0022	98%
Inorganics															
Arsenic	7440-38-2	8.38	UCL	--	Yes	--	6.6E-06	2.6E-09	1.8E-07	4.3E-03	1.5E-05	1.1E-11	19%	0.000012	0.54%
Cobalt	7440-48-4	3.9	UCL	--	Yes	--	3.1E-06	1.2E-09	8.4E-08	9.0E-03	6.0E-06	1.1E-11	18%	0.000014	0.62%
Vanadium	7440-62-2	57.2	UCL	--	Yes	--	4.5E-05	--	1.2E-06	--	1.0E-04	--	--	0.000012	0.55%
												Cancer Risk		**Hazard Index**	
											Pathway Sums:	5.9E-11	100%	0.0022	100%

(1) PEF calculated as shown in Table H.2.9.
(2) COPC = Constituent of potential concern.
(3) CAS = Chemical Abstracts Service number.
(4) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.
(5) Human Health Toxicity Values shown in Table H.2.11.
(6) See Table H.2.10 for VF calculation.
(7) See Table H.2.4 for B(a)P-equivalent calculation.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.103
HUMAN HEALTH RISK EVALUATION SUMMARY FOR COMBINED SURFACE AND SUBSURFACE SOIL (0-15')
UTILITY WORKER
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_s [3] (mg/kg)	UCL or Max	Adult Only Ingestion Carcinogenic Risk	Adult Only Dermal Carcinogenic Risk	Adult Only Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Adult Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds											
BaP-equivalent [4]	50-32-8	5.2	UCL	2.5E-08	6.9E-09	3.8E-11	**3E-08**	0.0059	0.0016	0.002	**0.01**
Inorganics											
Arsenic	7440-38-2	8.38	UCL	6.1E-08	3.8E-09	1.1E-11	**6E-08**	0.0095	0.00060	0.000012	**0.01**
Cobalt	7440-48-4	3.9	UCL	--	--	1.1E-11	**1E-11**	0.0044	--	0.000014	**0.004**
Vanadium	7440-62-2	57.2	UCL	--	--	--	**--**	0.0039	--	0.000012	**0.004**
			Pathway Risk	**9E-08**	**1E-08**	**6E-11**	**--**	**0.02**	**0.002**	**0.002**	**--**
						Total Risk	**1E-07**			**Hazard Index**	**0.03**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Soil (C_s) is the 95% UCL or the maximum detected concentration. See Table H.2.6.

(4) See Table H.2.4 for B(a)P-equivalent calculation.

-- Risk/hazard not calculated because toxicity value was not available.

Table H.2.104

RISK AND HAZARD ESTIMATES -- INGESTION OF GROUNDWATER
UU/UE RECEPTOR
ALL WELLS COMBINED
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
COPC Concentration in Groundwater	C_w	chemical-specific	mg/L
Age-adjusted Groundwater Ingestion Rate	IFW_{adj}	0.94	L-yr/kg-day
Groundwater Ingestion - child	IRW_{child}	0.78	L/day
Groundwater Ingestion - adult	IRW_{adult}	2.50	L/day
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	year
Exposure Duration - child	ED_{child}	6	year
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor (SF_o)	SFo	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_W)(IFW_{adj})(EF)}{(AT)}$$

where: $$IFW_{adj} = \frac{(ED_{child})(IRW_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRW_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in groundwater for separate age groups:

$$Ingestion = \frac{(C_W)(ED)(IRW)(EF)}{(BW)(AT)}$$

Carcinogenic: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SF_o [4] $(mg/kg\text{-}day)^{-1}$	RfD_o [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics															
Aluminum	7429-90-5	24600	24.6	Max	3.2E-01	1.2	0.74	--	1.0E+00	--	--	1.2	27%	0.74	27%
Cadmium	7440-43-9	15	0.015	Max	1.9E-04	0.00075	0.00045	--	5.0E-04	--	--	1.5	33%	0.90	33%
Nickel	7440-02-0	610	0.61	Max	7.8E-03	0.030	0.018	--	2.0E-02	--	--	1.5	33%	0.91	33%
Zinc	7440-66-6	1900	1.9	Max	2.4E-02	0.095	0.057	--	3.0E-01	--	--	0.3	7%	0.19	7%
										Cancer Risk		**Hazard Index**		**Hazard Index**	
									Pathway Sums:	--	--	5	100%	3	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.

(4) Human Health Toxicity Values shown in Table H.2.11.

-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.105
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH GROUNDWATER
UU/UE RECEPTOR
ALL WELLS COMBINED
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
Age-adjusted Dermal Factor	SFW_{adj}	chemical-specific	events-cm^2/kg
Exposure Frequency	EF	350	days/year
Event Duration - child	t_{event} - child	0.54	hours/event
Event Duration - adult	t_{event} - adult	0.71	hours/event
0	t*	0	0
Event Frequency	EV	1	events/day
Exposure Duration - child	ED_{child}	6	year
Exposure Duration - adult	ED_{adult}	20	year
Exposed Skin Surface Area - child	SA_{child}	6378	cm^2
Exposed Skin Surface Area - adult	SA_{adult}	20900	cm^2
Permeability Constant	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	(mg/kg-day)$^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_{abs}	chemical-specific	mg/kg-day
Concentration in water	C_w	chemical-specific	mg/cm^3
Fraction absorbed	FA	Chemical-specific	unitless
Lag Time per Event	τ_{event}	Chemical-specific	hr/event
Relative contribution of permeability coefficient	B	Chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal contact of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$DAD = \frac{(EV)(EF)(SFW_{adj})}{(AT)}$$

where:

$$SFW_{adj} = \left[\frac{(ED_{child})(SA_{child})(DA_{event\text{-}child})}{(BW_{child})}\right] + \left[\frac{(ED_{adult})(SA_{adult})(DA_{event\text{-}adult})}{(BW_{adult})}\right]$$

Dermal contact of noncarcinogenic COPCs in groundwater for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

where for inorganic compounds:
Note: t_{event} is different for adult and child

$$DA_{event} = (K_p)(C_w)(t_{event})$$

where for organic compounds if $t_{event} \le t^*$, then:
Note: t_{event} is different for adult and child

$$DA_{event} = (2)(FA)(K_p)(C_w)\sqrt{\frac{((6)(\tau_{event})(t_{event}))}{\pi}}$$

where for organic compounds if $t_{event} > t^*$, then:

$$DA_{event} = (FA)(K_p)(C_w)\left[\left(\frac{(t_{event})}{(1+B)}\right) + ((2)(\tau_{event}))\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Note: t_{event} is different for adult and child

Carcinogenic: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Noncarcinogenic: $HQ = DAD / RfD_d$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t* [4] (hours)	For organic compounds, is $t_{event\text{-}child} \le t^*$? (Yes/No)	For organic compounds, is $t_{event\text{-}adult} \le t^*$? (Yes/No)	FA [4] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} - child (mg/cm^2-event)	DA_{event} - adult (mg/cm^2-event)	SFW_{adj} (events-cm^2/kg)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - child (mg/kg-day)	Noncarcinogenic DAD - adult (mg/kg-day)	SF_d [5] (mg/kg-day)$^{-1}$	RfD_d [5] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																								
Aluminum	7429-90-5	24600	0.0246	Max	1.0E-03	3.6E-01	--	--	1	0.15	0.0020	1.3E-05	1.7E-05	--	--	5.4E-03	4.4E-03	--	1	--	--	0.01	2%	0.00	2%
Cadmium	7440-43-9	15	0.000015	Max	1.0E-03	1.1E+00	--	--	1	0.45	0.0041	8.1E-09	1.1E-08	--	--	3.3E-06	2.7E-06	--	0.0000125	--	--	0.26	87%	0.21	87%
Nickel	7440-02-0	610	0.00061	Max	2.0E-04	5.4E-01	--	--	1	0.22	0.0006	6.6E-08	8.7E-08	--	--	2.7E-05	2.2E-05	--	0.0008	--	--	0.03	11%	0.03	11%
Zinc	7440-66-6	1900	0.0019	Max	6.0E-04	5.9E-01	--	--	1	0.24	0.0019	6.2E-07	8.1E-07	--	--	2.5E-04	2.0E-04	--	0.3	--	--	0.00	0%	0.00	0%
																				Cancer Risk		**Hazard Index**		**Hazard Index**	
																			Pathway Sums	--	--	0.3	100%	0.2	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.
(4) Chemical specific parameters shown in Table H.2.12.
(5) Human Health Toxicity Values shown in Table H.2.11.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.106
HUMAN HEALTH RISK EVALUATION SUMMARY FOR GROUNDWATER
UU/UE RECEPTOR
ALL WELLS COMBINED
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Inorganics															
Aluminum	7429-90-5	24600	24.6	Max	--	--	NC	--	1.2	0.01	0.74	0.00	NC	**1**	**1**
Cadmium	7440-43-9	15	0.015	Max	--	--	NC	--	1.5	0.26	0.90	0.21	NC	**2**	**1**
Nickel	7440-02-0	610	0.61	Max	--	--	NC	--	1.5	0.03	0.91	0.03	NC	**2**	**1**
Zinc	7440-66-6	1900	1.9	Max	--	--	NC	--	0.3	0.00	0.19	0.00	NC	**0.3**	**0.2**
				Pathway Sum	--	--	--	--	**5**	**0.3**	**3**	**0.2**	--	--	--
							Total Risk	--					**Hazard Index**	**5**	**3**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7. -- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.107
TARGET ORGANS AND TOXIC CRITICAL EFFECTS FOR SEGREGATED HAZARD INDICES FOR GROUNDWATER
UU/UE RECEPTOR
ALL WELLS COMBINED
Parcel 57
Fort Monmouth, New Jersey

Constituent	Child Ingestion + Dermal Hazard Index [1]	Adult Ingestion + Dermal Hazard Index [1]	Inhalation Hazard Index [1]	Ingestion + Dermal		Inhalation		Source
				Target Organ	Toxic Critical Effect	Target Organ	Toxic Critical Effect	
Aluminum	1	0.7	--	Neurological	Minimal neurotoxicity in the offspring of mice	Neurological	Psychomotor and cognitive impairment	PPRTV
Cadmium	2	1	--	Urinary	Significant proteinuria (IRIS)	Urinary	10% increase in the prevalence of β2-microglobulin proteinuria (ATSDR) https://www.atsdr.cdc.gov/toxprofiles/tp5-a.pdf	IRIS, ATSDR
Nickel	2	0.9	--	Body weight/ whole body	Decreased body and organ weights (IRIS)	Lung/Respiratory	Chronic active inflammation and lung fibrosis in rats (ATSDR) https://www.atsdr.cdc.gov/toxprofiles/tp15-a.pdf	IRIS, ATSDR
Zinc	0.3	0.2	--	Immune, Hematologic	Decreases in erythrocyte Cu, Zn-superoxide dismutase (ESOD) activity in healthy adult male and female volunteers	--	--	IRIS

(1) See Table H.2.106 for hazard indices.

(2) California Environmental Protection Agency (Cal EPA) Office of Environmental Health Hazard Assessment (OEHHA), 2008. Air Toxics Hot Spots Program Technical Support Document for the Derivation of Noncancer Reference Exposure Levels. Appendix D.1. Individual Acute, 8-Hour, and Chronic Reference Exposure Level Summaries. Revised August 2013. (http://oehha.ca.gov/air/hot_spots/2008/AppendixD1_final.pdf).

-- Hazard not calculated because toxicity value was not available.

ATSDR - Agency for Toxic Substances and Disease Registry (http://www.atsdr.cdc.gov/)

Cal EPA - California Environmental Protection Agency

IRIS - Integrated Risk Information System (http://www.epa.gov/IRIS/)

PPRTV - Provisional Peer Reviewed Toxicity Values for Superfund (http://hhpprtv.ornl.gov/)

PPRTV Appendix - EPA's PPRTV screening toxicity values in appendices to certain PPRTV assessments

Table H.2.108
NONCANCER HAZARDS SEPARATED BY TARGET ORGAN FOR GROUNDWATER
UU/UE RECEPTOR
ALL WELLS COMBINED
Parcel 57
Fort Monmouth, New Jersey

Target Organ	Constituent Groupings for Ingestion + Dermal Exposure Pathways	Child Ingestion + Dermal Hazard Index [1]	Adult Ingestion + Dermal Hazard Index [1]	Constituent Groupings for Inhalation Exposure Pathways	Inhalation Hazard Index [1]	Child Summed Segregated Hazard Index [2]	Adult Summed Segregated Hazard Index [2]
Blood	Zinc	0.3	0.2	N/A	--	0.3	0.2
Body weight/whole body	Nickel	2	0.9	N/A	--	2	0.9
Cental Nervous System	Aluminum	1	0.7	Aluminum	--	1	0.7
Immune	Zinc	0.3	0.2	N/A	--	0.3	0.2
Respiratory system	N/A	--	--	Nickel	--	--	--
Urinary	Cadmium	2	1	Camium	--	2	1

(1) See Table H.2.107.

(2) Sum of the ingestion+dermal and inhalation hazard indices for the applicable target organ.

-- Hazard not calculated because toxicity value was not available.

N/A - Not applicable.

Table H.2.109
RISK AND HAZARD ESTIMATES -- INGESTION OF GROUNDWATER
UTILITY WORKER
ALL WELLS COMBINED
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UTILITY WORKER

Parameter	Abbreviation	Value	Units
COPC Concentration in Groundwater (C_W)	C_W	chemical-specific	mg/L
Groundwater Ingestion - adult	IRW_{adult}	0.02	L/day
Exposure Frequency	EF	30	days/year
Exposure Duration - adult	ED_{adult}	1	year
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	365	days
Oral Slope Factor	SFo	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose	RfDo	chemical-specific	mg/kg-day

Equations

Incidental ingestion of noncarcinogenic and carcinogenic COPCs in groundwater:

$$Ingestion = \frac{(C_W)(ED_{adult})(IRW_{adult})(EF)}{(BW_{adult})(AT)}$$

Carcinogenic: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SF_o [4] $(mg/kg\text{-}day)^{-1}$	RfD_o [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Adult	% of Total
Inorganics												
Aluminum	7429-90-5	24600	24.6	Max	7.2E-06	5.1E-04	--	1.0E+00	--	--	0.00051	27%
Cadmium	7440-43-9	15	0.015	Max	4.4E-09	3.1E-07	--	5.0E-04	--	--	0.00062	33%
Nickel	7440-02-0	610	0.61	Max	1.8E-07	1.3E-05	--	2.0E-02	--	--	0.00063	33%
Zinc	7440-66-6	1900	1.9	Max	5.6E-07	3.9E-05	--	3.0E-01	--	--	0.00013	7%
									Cancer Risk		**Hazard Index**	
								Pathway Sums:	--	--	0.0019	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.

(4) Human Health Toxicity Values shown in Table H.2.11.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.110
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH GROUNDWATER
UTILITY WORKER
ALL WELLS COMBINED
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UTILITY WORKER

Parameter	Abbreviation	Value	Units
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event
Exposure Frequency	EF	30	kg
Event Duration - adult	t_{event} - adult	2	year
Time it takes to reach steady state	t*	chemical-specific	hours
Event Frequency	EV	1	unitless
Exposure Duration - adult	ED_{adult}	1	kg
Exposed Skin Surface Area - adult	SA_{adult}	4840	hours
Permeability Constant	K_p	Chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	365	unitless
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	(mg/kg-day)$^{-1}$
Body Weight - adult	BW_{adult}	80	days
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Concentration in water	C_w	chemical-specific	mg/cm^3
Fraction absorbed	FA	chemical-specific	unitless
Lag Time per Event	τ_{event}	chemical-specific	hr/event
Relative contribution of permeability coefficient	B	chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal contact of noncarcinogenic and carcinogenic COPCs in groundwater:

$$DAD = \frac{(DA_{event})(EV)(ED_{adult})(EF)(SA_{adult})}{(BW_{adult})(AT)}$$

for inorganic compounds: $DA_{event} = (K_p)(C_w)(t_{event})$

for organic compounds:

where for organic compounds if $t_{event} \le t^*$, then:

$$DA_{event} = (2)(FA)(K_p)(C_w)\sqrt{\frac{((6)(\tau_{event})(t_{event}))}{\pi}}$$

If $t_{event} > t^*$, then: $$DA_{event} = (FA)(K_p)(C_w)\left[\left(\frac{t_{event}}{(1+B)}\right)+((2)(\tau_{event}))\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Carcinogenic: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Noncarcinogenic: $HQ = DAD / RfD_d$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t* [4] (hours)	For organics, is $t_{event-adult} \le t^*$? (Yes/No)	FA [4] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} (mg/cm^2-event)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD (mg/kg-day)	GIABS [5] (unitless)	SF_o [5] (mg/kg-day)$^{-1}$	RfD_o [5] (mg/kg-day)	SF_d [5] (mg/kg-day)$^{-1}$	RfD_d [5] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																						
Aluminum	7429-90-5	24600	0.0246	Max	1.00E-03	0.36	--	1	0.1489	0.0020	4.9E-05	--	0.00024465	1	--	1.0E+00	--	1.0E+00	--	--	0.00024	3.2%
Cadmium	7440-43-9	15	0.000015	Max	1.00E-03	1.08	--	1	0.4480	0.0041	3.0E-08	--	0.00000015	0.05	--	5.0E-04	--	2.5E-05	--	--	0.0060	77%
Nickel	7440-02-0	610	0.00061	Max	2.00E-04	0.54	--	1	0.2242	0.0006	2.4E-07	--	0.00000121	0.04	--	2.0E-02	--	8.0E-04	--	--	0.0015	20%
Zinc	7440-66-6	1900	0.0019	Max	6.00E-04	0.59	--	1	0.2443	0.0019	2.3E-06	--	0.00001134	1	--	3.0E-01	--	3.0E-01	--	--	0.000038	0.49%
																			Cancer Risk		**Hazard Index**	
																		Pathway sums:	--	--	0.0078	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.

(4) Chemical specific parameters shown in Table H.2.12.

(5) Human Health Toxicity Values shown in Table H.2.11.

-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.111
HUMAN HEALTH RISK EVALUATION SUMMARY FOR GROUNDWATER
UTILITY WORKER
ALL WELLS COMBINED
Parcel 57
Fort Monmouth, New Jersey

COPC (1)	CAS Number (2)	C_w (3) (µg/L)	$C_{w\ (mg/L)}$	UCL or Max	Adult Only Ingestion Carcinogenic Risk	Adult Only Dermal Carcinogenic Risk	Adult Only Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Adult Inhalation Hazard Quotient	Total Hazard Quotient
Inorganics												
Aluminum	7429-90-5	24600	24.6	Max	--	--	NC	--	0.00051	0.00024	NC	**0.0008**
Cadmium	7440-43-9	15	0.015	Max	--	--	NC	--	0.00062	0.0060	NC	**0.007**
Nickel	7440-02-0	610	0.61	Max	--	--	NC	--	0.00063	0.0015	NC	**0.002**
Zinc	7440-66-6	1900	1.9	Max	--	--	NC	--	0.00013	0.000038	NC	**0.0002**
				Pathway Risk	--	--	NC	--	**0.002**	**0.01**	NC	--
							Total Risk	--			**Hazard Index**	**0.01**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.

-- = value not calculated because analyte not detected, or because toxicity data not available. NC = Exposure pathway is complete but not significant.

Table H.2.112
RISK AND HAZARD ESTIMATES -- INGESTION OF GROUNDWATER
UU/UE RECEPTOR
800MW01
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Groundwater	C_w	chemical-specific	mg/L
Age-adjusted Groundwater Ingestion Rate	IFW_{adj}	0.94	L-yr/kg-day
Groundwater Ingestion - child	IRW_{child}	0.78	L/day
Groundwater Ingestion - adult	IRW_{adult}	2.50	L/day
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	year
Exposure Duration - child	ED_{child}	6	year
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor (SF_o)	SFo	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_W)(IFW_{adj})(EF)}{(AT)}$$

where: $$IFW_{adj} = \frac{(ED_{child})(IRW_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRW_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in groundwater for separate age groups:

$$Ingestion = \frac{(C_W)(ED)(IRW)(EF)}{(BW)(AT)}$$

Carcinogenic: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)		C_w (mg/L)		UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SF_o [4] $(mg/kg\text{-}day)^{-1}$	RfD_o [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																	
Aluminum	7429-90-5	410		0.41		Max	5.3E-03	0.020	0.012	--	1.0E+00	--	--	0.020	92%	0.012	92%
Cadmium	7440-43-9	ND	U	ND	U	ND	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	ND	U	ND	U	ND	--	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	11	J	0.011	J	Max	1.4E-04	0.00055	0.00033	--	3.0E-01	--	--	0.0018	8.2%	0.0011	8.2%
												Cancer Risk		**Hazard Index**		**Hazard Index**	
											Pathway Sums:	--	--	0.022	100%	0.013	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.

(4) Human Health Toxicity Values shown in Table H.2.11.

-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.113
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH GROUNDWATER
UU/UE RECEPTOR
800MW01
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
Age-adjusted Dermal Factor	SFW_{adj}	chemical-specific	events-cm^2/kg
Exposure Frequency	EF	350	days/year
Event Duration - child	t_{event} - child	0.54	hours/event
Event Duration - adult	t_{event} - adult	0.71	hours/event
Time it takes to reach steady state	t*	chemical-specific	hours
Event Frequency	EV	1	events/day
Exposure Duration - child	ED_{child}	6	year
Exposure Duration - adult	ED_{adult}	20	year
Exposed Skin Surface Area - child	SA_{child}	6378	cm^2
Exposed Skin Surface Area - adult	SA_{adult}	20900	cm^2
Permeability Constant	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_{abs}	chemical-specific	mg/kg-day
Concentration in water	C_w	chemical-specific	mg/cm^3
Fraction absorbed	FA	Chemical-specific	unitless
Lag Time per Event	τ_{event}	Chemical-specific	hr/event
Relative contribution of permeability coefficient	B	Chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal contact of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$DAD = \frac{(EV)(EF)(SFW_{adj})}{(AT)}$$

where:

$$SFW_{adj} = \left[\frac{(ED_{child})(SA_{child})(DA_{event\text{-}child})}{(BW_{child})}\right] + \left[\frac{(ED_{adult})(SA_{adult})(DA_{event\text{-}adult})}{(BW_{adult})}\right]$$

Dermal contact of noncarcinogenic COPCs in groundwater for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

where for inorganic compounds:
Note: t_{event} is different for adult and child

$$DA_{event} = (K_p)(C_w)(t_{event})$$

where for organic compounds if $t_{event} \le t^*$, then:
Note: t_{event} is different for adult and child

$$DA_{event} = (2)(FA)(K_p)(C_w)\sqrt{\frac{((6)(\tau_{event})(t_{event}))}{\pi}}$$

where for organic compounds if $t_{event} > t^*$, then:

$$DA_{event} = (FA)(K_p)(C_w)\left[\left(\frac{(t_{event})}{(1+B)}\right) + ((2)(\tau_{event}))\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Note: t_{event} is different for adult and child

Carcinogenic: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Noncarcinogenic: $HQ = DAD / RfD_d$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_w [3] ($\mu g/L$)	C_w (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t^* [4] (hours)	For organic compounds, is $t_{event\text{-}child} \le t^*$? (Yes/No)	For organic compounds, is $t_{event\text{-}adult} \le t^*$? (Yes/No)	FA [4] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} - child (mg/cm^2-event)	DA_{event} - adult (mg/cm^2-event)	SFW_{adj} (events-cm^2/kg)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - child (mg/kg-day)	Noncarcinogenic DAD - adult (mg/kg-day)	SF_d [5] $(mg/kg\text{-}day)^{-1}$	RfD_d [5] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																									
Aluminum	7429-90-5	410	0.00041	Max	1.0E-03	3.6E-01	--	--	1	0.15	0.0020	2.2E-07	2.9E-07	--	--	9.0E-05	7.3E-05	--	1	--	--	0.000090	95%	0.000073	95%
Cadmium	7440-43-9	ND U	ND U	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	ND U	ND U	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	11 J	0.000011 J	Max	6.0E-04	5.9E-01	--	--	1	0.24	0.0019	3.6E-09	4.7E-09	--	--	1.5E-06	1.2E-06	--	0.3	--	--	0.0000048	5.1%	0.0000039	5.1%
																				Cancer Risk		**Hazard Index**		**Hazard Index**	
																			Pathway Sums	--	--	0.000095	100%	0.000077	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.
(4) Chemical specific parameters shown in Table H.2.12.
(5) Human Health Toxicity Values shown in Table H.2.11.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.114
HUMAN HEALTH RISK EVALUATION SUMMARY FOR GROUNDWATER
UU/UE RECEPTOR
800MW01
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_w [3] (µg/L)		C_w (mg/L)		UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Inorganics																	
Aluminum	7429-90-5	410		0.41		Max	--	--	NC	--	0.020	0.000090	0.012	0.000073	NC	**0.02**	**0.01**
Cadmium	7440-43-9	ND	U	ND	U	ND	--	--	NC	--	--	--	--	--	NC	**0**	**0**
Nickel	7440-02-0	ND	U	ND	U	ND	--	--	NC	--	--	--	--	--	NC	**0**	**0**
Zinc	7440-66-6	11	J	0.011	J	Max	--	--	NC	--	0.0018	0.0000048	0.0011	0.0000039	NC	**0.002**	**0.001**
						Pathway Sum	--	--	--	--	**0.02**	**0.0001**	**0.01**	**0.00008**	--	--	--
									Total Risk	--					**Hazard Index**	**0.02**	**0.01**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7. -- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.115
RISK AND HAZARD ESTIMATES -- INGESTION OF GROUNDWATER
UU/UE RECEPTOR
800MW02
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Groundwater	C_w	chemical-specific	mg/L
Age-adjusted Groundwater Ingestion Rate	IFW_{adj}	0.94	L-yr/kg-day
Groundwater Ingestion - child	IRW_{child}	0.78	L/day
Groundwater Ingestion - adult	IRW_{adult}	2.50	L/day
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	year
Exposure Duration - child	ED_{child}	6	year
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor (SF_o)	SFo	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_W)(IFW_{adj})(EF)}{(AT)}$$

where: $$IFW_{adj} = \frac{(ED_{child})(IRW_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRW_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in groundwater for separate age groups:

$$Ingestion = \frac{(C_W)(ED)(IRW)(EF)}{(BW)(AT)}$$

Carcinogenic: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)		C_w (mg/L)		UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SF_o [4] $(mg/kg\text{-}day)^{-1}$	RfD_o [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																	
Aluminum	7429-90-5	300		0.3		Max	3.9E-03	0.015	0.0090	--	1.0E+00	--	--	0.015	19%	0.0090	19%
Cadmium	7440-43-9	ND	U	ND	U	ND	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	16.9		0.0169		Max	2.2E-04	0.00084	0.00051	--	2.0E-02	--	--	0.042	54%	0.025	54%
Zinc	7440-66-6	130		0.13		Max	1.7E-03	0.0065	0.0039	--	3.0E-01	--	--	0.022	27%	0.013	27%
												Cancer Risk		**Hazard Index**		**Hazard Index**	
											Pathway Sums:	--	--	0.079	100%	0.047	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.

(4) Human Health Toxicity Values shown in Table H.2.11.

-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.116
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH GROUNDWATER
UU/UE RECEPTOR
800MW02
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
Age-adjusted Dermal Factor	SFW_{adj}	chemical-specific	events-cm^2/kg
Exposure Frequency	EF	350	days/year
Event Duration - child	t_{event} - child	0.54	hours/event
Event Duration - adult	t_{event} - adult	0.71	hours/event
Time it takes to reach steady state	t*	chemical-specific	hours
Event Frequency	EV	1	events/day
Exposure Duration - child	ED_{child}	6	year
Exposure Duration - adult	ED_{adult}	20	year
Exposed Skin Surface Area - child	SA_{child}	6378	cm^2
Exposed Skin Surface Area - adult	SA_{adult}	20900	cm^2
Permeability Constant	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	(mg/kg-day)$^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_{abs}	chemical-specific	mg/kg-day
Concentration in water	C_w	chemical-specific	mg/cm^3
Fraction absorbed	FA	Chemical-specific	unitless
Lag Time per Event	τ_{event}	Chemical-specific	hr/event
Relative contribution of permeability coefficient	B	Chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal contact of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$DAD = \frac{(EV)(EF)(SFW_{adj})}{(AT)}$$

where:

$$SFW_{adj} = \left[\frac{(ED_{child})(SA_{child})(DA_{event\text{-}child})}{(BW_{child})}\right] + \left[\frac{(ED_{adult})(SA_{adult})(DA_{event\text{-}adult})}{(BW_{adult})}\right]$$

Dermal contact of noncarcinogenic COPCs in groundwater for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

where for inorganic compounds:
Note: t_{event} is different for adult and child

$$DA_{event} = (K_p)(C_w)(t_{event})$$

where for organic compounds if $t_{event} \le t^*$, then:
Note: t_{event} is different for adult and child

$$DA_{event} = (2)(FA)(K_p)(C_w)\sqrt{\frac{((6)(\tau_{event})(t_{event}))}{\pi}}$$

where for organic compounds if $t_{event} > t^*$, then:

$$DA_{event} = (FA)(K_p)(C_w)\left[\left(\frac{(t_{event})}{(1+B)}\right) + ((2)(\tau_{event}))\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Note: t_{event} is different for adult and child

Carcinogenic: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Noncarcinogenic: $HQ = DAD / RfD_d$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t* [4] (hours)	For organic compounds, is $t_{event\text{-}child} \le t^*$? (Yes/No)	For organic compounds, is $t_{event\text{-}adult} \le t^*$? (Yes/No)	FA [4] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} - child (mg/cm^2-event)	DA_{event} - adult (mg/cm^2-event)	SFW_{adj} (events-cm^2/kg)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - child (mg/kg-day)	Noncarcinogenic DAD - adult (mg/kg-day)	SF_d [5] (mg/kg-day)$^{-1}$	RfD_d [5] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																								
Aluminum	7429-90-5	300	0.0003	Max	1.0E-03	3.6E-01	--	--	1	0.15	0.0020	1.6E-07	2.1E-07	--	--	6.6E-05	5.3E-05	--	1	--	--	0.000066	6.3%	0.000053	6.3%
Cadmium	7440-43-9	ND U	ND U	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	16.9	0.0000169	Max	2.0E-04	5.4E-01	--	--	1	0.22	0.0006	1.8E-09	2.4E-09	--	--	7.4E-07	6.0E-07	--	0.0008	--	--	0.00093	88%	0.00075	88%
Zinc	7440-66-6	130	0.00013	Max	6.0E-04	5.9E-01	--	--	1	0.24	0.0019	4.2E-08	5.5E-08	--	--	1.7E-05	1.4E-05	--	0.3	--	--	0.000057	5.4%	0.000046	5.4%
																				Cancer Risk		**Hazard Index**		**Hazard Index**	
																			Pathway Sums	--	--	0.0011	100%	0.00085	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.
(4) Chemical specific parameters shown in Table H.2.12.
(5) Human Health Toxicity Values shown in Table H.2.11.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.117
HUMAN HEALTH RISK EVALUATION SUMMARY FOR GROUNDWATER
UU/UE RECEPTOR
800MW02
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Inorganics															
Aluminum	7429-90-5	300	0.3	Max	--	--	NC	--	0.015	0.000066	0.0090	0.000053	NC	**0.02**	**0.009**
Cadmium	7440-43-9	ND U	ND U	ND	--	--	NC	--	--	--	--	--	NC	**0**	**0**
Nickel	7440-02-0	16.9	0.0169	Max	--	--	NC	--	0.042	0.00093	0.025	0.00075	NC	**0.04**	**0.03**
Zinc	7440-66-6	130	0.13	Max	--	--	NC	--	0.022	0.000057	0.013	0.000046	NC	**0.02**	**0.01**
				Pathway Sum	--	--	--	--	**0.08**	**0.001**	**0.05**	**0.0009**	--	--	--
							Total Risk	--					**Hazard Index**	**0.08**	**0.05**

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.118
RISK AND HAZARD ESTIMATES -- INGESTION OF GROUNDWATER
UU/UE RECEPTOR
PAR-57-MW01
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Groundwater	C_w	chemical-specific	mg/L
Age-adjusted Groundwater Ingestion Rate	IFW_{adj}	0.94	L-yr/kg-day
Groundwater Ingestion - child	IRW_{child}	0.78	L/day
Groundwater Ingestion - adult	IRW_{adult}	2.50	L/day
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	year
Exposure Duration - child	ED_{child}	6	year
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor (SF_o)	SFo	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_W)(IFW_{adj})(EF)}{(AT)}$$

where: $$IFW_{adj} = \frac{(ED_{child})(IRW_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRW_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in groundwater for separate age groups:

$$Ingestion = \frac{(C_W)(ED)(IRW)(EF)}{(BW)(AT)}$$

Carcinogenic: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)		C_w (mg/L)		UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SF_o [4] $(mg/kg\text{-}day)^{-1}$	RfD_o [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																	
Aluminum	7429-90-5	1010		1.01		Max	1.3E-02	0.050	0.030	--	1.0E+00	--	--	0.050	85%	0.030	85%
Cadmium	7440-43-9	ND	U	ND	U	ND	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	2.9	J	0.0029	J	Max	3.7E-05	0.00014	0.000087	--	2.0E-02	--	--	0.0072	12%	0.0043	12%
Zinc	7440-66-6	10.2	J	0.0102	J	Max	1.3E-04	0.00051	0.00031	--	3.0E-01	--	--	0.0017	2.9%	0.0010	2.9%
												Cancer Risk		**Hazard Index**		**Hazard Index**	
											Pathway Sums:	--	--	0.059	100%	0.036	100%

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.

(4) Human Health Toxicity Values shown in Table H.2.11.

-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.119
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH GROUNDWATER
UU/UE RECEPTOR
PAR-57-MW01
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
Age-adjusted Dermal Factor	SFW_{adj}	chemical-specific	events-cm^2/kg
Exposure Frequency	EF	350	days/year
Event Duration - child	t_{event} - child	0.54	hours/event
Event Duration - adult	t_{event} - adult	0.71	hours/event
Time it takes to reach steady state	t*	chemical-specific	hours
Event Frequency	EV	1	events/day
Exposure Duration - child	ED_{child}	6	year
Exposure Duration - adult	ED_{adult}	20	year
Exposed Skin Surface Area - child	SA_{child}	6378	cm^2
Exposed Skin Surface Area - adult	SA_{adult}	20900	cm^2
Permeability Constant	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_{abs}	chemical-specific	mg/kg-day
Concentration in water	C_w	chemical-specific	mg/cm^3
Fraction absorbed	FA	Chemical-specific	unitless
Lag Time per Event	τ_{event}	Chemical-specific	hr/event
Relative contribution of permeability coefficient	B	Chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal contact of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$DAD = \frac{(EV)(EF)(SFW_{adj})}{(AT)}$$

where:

$$SFW_{adj} = \left[\frac{(ED_{child})(SA_{child})(DA_{event\text{-}child})}{(BW_{child})}\right] + \left[\frac{(ED_{adult})(SA_{adult})(DA_{event\text{-}adult})}{(BW_{adult})}\right]$$

Dermal contact of noncarcinogenic COPCs in groundwater for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

where for inorganic compounds:
Note: t_{event} is different for adult and child

$$DA_{event} = (K_p)(C_w)(t_{event})$$

where for organic compounds if $t_{event} \le t^*$, then:
Note: t_{event} is different for adult and child

$$DA_{event} = (2)(FA)(K_p)(C_w)\sqrt{\frac{((6)(\tau_{event})(t_{event}))}{\pi}}$$

where for organic compounds if $t_{event} > t^*$, then:

$$DA_{event} = (FA)(K_p)(C_w)\left[\left(\frac{(t_{event})}{(1+B)}\right) + ((2)(\tau_{event}))\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Note: t_{event} is different for adult and child

Carcinogenic: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Noncarcinogenic: $HQ = DAD / RfD_d$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t* [4] (hours)	For organic compounds, is $t_{event\text{-}child} \le t^*$? (Yes/No)	For organic compounds, is $t_{event\text{-}adult} \le t^*$? (Yes/No)	FA [4] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} - child (mg/cm^2-event)	DA_{event} - adult (mg/cm^2-event)	SFW_{adj} (events-cm^2/kg)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - child (mg/kg-day)	Noncarcinogenic DAD - adult (mg/kg-day)	SF_d [5] $(mg/kg\text{-}day)^{-1}$	RfD_d [5] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																								
Aluminum	7429-90-5	1010	0.00101	Max	1.0E-03	3.6E-01	--	--	1	0.15	0.0020	5.5E-07	7.2E-07	--	--	2.2E-04	1.8E-04	--	1	--	--	0.00022	58%	0.00018	58%
Cadmium	7440-43-9	ND U	ND U	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	2.9 J	0.0000029 J	Max	2.0E-04	5.4E-01	--	--	1	0.22	0.0006	3.1E-10	4.1E-10	--	--	1.3E-07	1.0E-07	--	0.0008	--	--	0.00016	41%	0.00013	41%
Zinc	7440-66-6	10.2 J	0.0000102 J	Max	6.0E-04	5.9E-01	--	--	1	0.24	0.0019	3.3E-09	4.3E-09	--	--	1.3E-06	1.1E-06	--	0.3	--	--	0.0000045	1.2%	0.0000036	1.2%
																				Cancer Risk		**Hazard Index**		**Hazard Index**	
																			Pathway Sums	--	--	0.00039	100%	0.00031	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.
(4) Chemical specific parameters shown in Table H.2.12.
(5) Human Health Toxicity Values shown in Table H.2.11.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.120
HUMAN HEALTH RISK EVALUATION SUMMARY FOR GROUNDWATER
UU/UE RECEPTOR
PAR-57-MW01
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_w [3] (µg/L)		C_w (mg/L)		UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Inorganics																	
Aluminum	7429-90-5	1010		1.01		Max	--	--	NC	--	0.050	0.00022	0.030	0.00018	NC	**0.05**	**0.03**
Cadmium	7440-43-9	ND	U	ND	U	ND	--	--	NC	--	--	--	--	--	NC	**0**	**0**
Nickel	7440-02-0	2.9	J	0.0029	J	Max	--	--	NC	--	0.0072	0.00016	0.0043	0.00013	NC	**0.007**	**0.004**
Zinc	7440-66-6	10.2	J	0.0102	J	Max	--	--	NC	--	0.0017	0.0000045	0.0010	0.0000036	NC	**0.002**	**0.001**
						Pathway Sum	--	--	--	--	**0.06**	**0.0004**	**0.04**	**0.0003**	--	--	--
									Total Risk	--					**Hazard Index**	**0.06**	**0.04**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7. -- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.121
RISK AND HAZARD ESTIMATES -- INGESTION OF GROUNDWATER
UU/UE RECEPTOR
PAR-57-MW02
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor	UU/UE RECEPTOR		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Groundwater	C_w	chemical-specific	mg/L
Age-adjusted Groundwater Ingestion Rate	IFW_{adj}	0.94	L-yr/kg-day
Groundwater Ingestion - child	IRW_{child}	0.78	L/day
Groundwater Ingestion - adult	IRW_{adult}	2.50	L/day
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	year
Exposure Duration - child	ED_{child}	6	year
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor (SF_o)	SFo	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day

Equations

Incidental ingestion of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$Ingestion_{age-adj} = \frac{(C_W)(IFW_{adj})(EF)}{(AT)}$$

where: $$IFW_{adj} = \frac{(ED_{child})(IRW_{child})}{(BW_{child})} + \frac{(ED_{adult})(IRW_{adult})}{(BW_{adult})}$$

Incidental ingestion of noncarcinogenic COPCs in groundwater for separate age groups:

$$Ingestion = \frac{(C_W)(ED)(IRW)(EF)}{(BW)(AT)}$$

Carcinogenic: $$Risk = (Ingestion)(SF_o)$$

Noncarcinogenic: $$HQ = Ingestion / RfD_o$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Carcinogenic Ingestion (mg/kg-day)	Noncarcinogenic Ingestion - Child (mg/kg-day)	Noncarcinogenic Ingestion - Adult (mg/kg-day)	SF_o [4] $(mg/kg\text{-}day)^{-1}$	RfD_o [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics															
Aluminum	7429-90-5	24600	24.6	Max	3.2E-01	1.2	0.74	--	1.0E+00	--	--	1.2	27%	0.74	27%
Cadmium	7440-43-9	15	0.015	Max	1.9E-04	0.00075	0.00045	--	5.0E-04	--	--	1.5	33%	0.90	33%
Nickel	7440-02-0	610	0.61	Max	7.8E-03	0.030	0.018	--	2.0E-02	--	--	1.5	33%	0.91	33%
Zinc	7440-66-6	1900	1.9	Max	2.4E-02	0.095	0.057	--	3.0E-01	--	--	0.3	6.9%	0.19	6.9%
										Cancer Risk		**Hazard Index**		**Hazard Index**	
									Pathway Sums:	--	--	4.6	100%	2.7	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.
(4) Human Health Toxicity Values shown in Table H.2.11.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.122
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH GROUNDWATER
UU/UE RECEPTOR
PAR-57-MW02
Parcel 57
Fort Monmouth, New Jersey

Exposure Assumptions

Receptor: UU/UE RECEPTOR

Parameter	Abbreviation	Value	Units
Age-adjusted Dermal Factor	SFW_{adj}	chemical-specific	events-cm^2/kg
Exposure Frequency	EF	350	days/year
Event Duration - child	t_{event} - child	0.54	hours/event
Event Duration - adult	t_{event} - adult	0.71	hours/event
0	t*	0	0
Event Frequency	EV	1	events/day
Exposure Duration - child	ED_{child}	6	year
Exposure Duration - adult	ED_{adult}	20	year
Exposed Skin Surface Area - child	SA_{child}	6378	cm^2
Exposed Skin Surface Area - adult	SA_{adult}	20900	cm^2
Permeability Constant	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	(mg/kg-day)$^{-1}$
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_{abs}	chemical-specific	mg/kg-day
Concentration in water	C_w	chemical-specific	mg/cm^3
Fraction absorbed	FA	Chemical-specific	unitless
Lag Time per Event	τ_{event}	Chemical-specific	hr/event
Relative contribution of permeability coefficient	B	Chemical-specific	unitless
Dermal Absorbed Dose	DAD	chemical-specific	mg/kg-day
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event

Equations

Dermal contact of carcinogenic COPCs in groundwater for multiple age groups simultaneously:

$$DAD = \frac{(EV)(EF)(SFW_{adj})}{(AT)}$$

where:

$$SFW_{adj} = \left[\frac{(ED_{child})(SA_{child})(DA_{event\text{-}child})}{(BW_{child})}\right] + \left[\frac{(ED_{adult})(SA_{adult})(DA_{event\text{-}adult})}{(BW_{adult})}\right]$$

Dermal contact of noncarcinogenic COPCs in groundwater for separate age groups:

$$DAD = \frac{(DA_{event})(EF)(ED)(EV)(SA)}{(BW)(AT)}$$

where for inorganic compounds:
Note: t_{event} is different for adult and child

$$DA_{event} = (K_p)(C_w)(t_{event})$$

where for organic compounds if $t_{event} \le t^*$, then:
Note: t_{event} is different for adult and child

$$DA_{event} = (2)(FA)(K_p)(C_w)\sqrt{\frac{((6)(\tau_{event})(t_{event}))}{\pi}}$$

where for organic compounds if $t_{event} > t^*$, then:

$$DA_{event} = (FA)(K_p)(C_w)\left[\left(\frac{(t_{event})}{(1+B)}\right) + ((2)(\tau_{event}))\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Note: t_{event} is different for adult and child

Carcinogenic: $Risk = (DAD)(SF_d)$

where: $SF_d = SF_o / GIABS$

Noncarcinogenic: $HQ = DAD / RfD_d$

where: $RfD_d = (RfD_o)(GIABS)$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t* [4] (hours)	For organic compounds, is $t_{event\text{-}child} \le t^*$? (Yes/No)	For organic compounds, is $t_{event\text{-}adult} \le t^*$? (Yes/No)	FA [4] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} - child (mg/cm^2-event)	DA_{event} - adult (mg/cm^2-event)	SFW_{adj} (events-cm^2/kg)	Carcinogenic DAD (mg/kg-day)	Noncarcinogenic DAD - child (mg/kg-day)	Noncarcinogenic DAD - adult (mg/kg-day)	SF_d [5] (mg/kg-day)$^{-1}$	RfD_d [5] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Inorganics																								
Aluminum	7429-90-5	24600	0.0246	Max	1.0E-03	3.6E-01	--	--	1	0.15	0.0020	1.3E-05	1.7E-05	--	--	5.4E-03	4.4E-03	--	1	--	--	0.0054	1.8%	0.0044	1.8%
Cadmium	7440-43-9	15	0.000015	Max	1.0E-03	1.1E+00	--	--	1	0.45	0.0041	8.1E-09	1.1E-08	--	--	3.3E-06	2.7E-06	--	0.0000125	--	--	0.26	87%	0.21	87%
Nickel	7440-02-0	610	0.00061	Max	2.0E-04	5.4E-01	--	--	1	0.22	0.0006	6.6E-08	8.7E-08	--	--	2.7E-05	2.2E-05	--	0.0008	--	--	0.034	11%	0.027	11%
Zinc	7440-66-6	1900	0.0019	Max	6.0E-04	5.9E-01	--	--	1	0.24	0.0019	6.2E-07	8.1E-07	--	--	2.5E-04	2.0E-04	--	0.3	--	--	0.00084	0.28%	0.00068	0.28%
																				Cancer Risk		**Hazard Index**		**Hazard Index**	
																			Pathway Sums	--	--	0.30	100%	0.25	100%

(1) COPC = Constituent of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7.
(4) Chemical specific parameters shown in Table H.2.12.
(5) Human Health Toxicity Values shown in Table H.2.11.
-- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.123
HUMAN HEALTH RISK EVALUATION SUMMARY FOR GROUNDWATER
UU/UE RECEPTOR
PAR-57-MW02
Parcel 57
Fort Monmouth, New Jersey

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Age -adjusted Ingestion Carcinogenic Risk	Age-adjusted Dermal Carcinogenic Risk	Age-adjusted Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Inorganics															
Aluminum	7429-90-5	24600	24.6	Max	--	--	NC	--	1.2	0.01	0.74	0.00	NC	**1**	**1**
Cadmium	7440-43-9	15	0.015	Max	--	--	NC	--	1.5	0.26	0.90	0.21	NC	**2**	**1**
Nickel	7440-02-0	610	0.61	Max	--	--	NC	--	1.5	0.03	0.91	0.03	NC	**2**	**1**
Zinc	7440-66-6	1900	1.9	Max	--	--	NC	--	0.3	0.00	0.19	0.00	NC	**0.3**	**0.2**
				Pathway Sum	--	--	--	--	**5**	**0.3**	**3**	**0.2**	--	--	--
							Total Risk	--					**Hazard Index**	**5**	**3**

(1) COPC = Constituent of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in Water (C_w) is the maximum detected concentration. See Table H.2.7. -- = value not calculated because analyte not detected, or because toxicity data not available.

Table H.2.124
SUMMARY OF RISK AND HAZARD FOR SOIL
Parcel 57
Fort Monmouth, New Jersey

Receptor and Medium	Cancer Risk [1]	Hazard Index - child [1]	Hazard Index - adolescent [1]	Hazard Index - adult [1]
UU/UE Receptor - Exposure Area 1				
Surface Soil (Incidental Ingestion, Dermal Contact, and Inhalation)	1E-04	2	--	0.3
Combined Surface and Subsurface Soil (Incidental Ingeston, Dermal Contact, and Inhalation)	8E-05	1	--	0.2
UU/UE Receptor - Exposure Area 2				
Surface Soil (Incidental Ingestion, Dermal Contact, and Inhalation)	1E-04	1	--	0.3
Combined Surface and Subsurface Soil (Incidental Ingeston, Dermal Contact, and Inhalation)	7E-05	0.9	--	0.2
UU/UE Receptor - Exposure Area 3				
Surface Soil (Incidental Ingestion, Dermal Contact, and Inhalation)	2E-05	0.9	--	0.1
Combined Surface and Subsurface Soil (Incidental Ingeston, Dermal Contact, and Inhalation)	3E-05	0.8	--	0.09
UU/UE Receptor - Exposure Area 4				
Surface Soil (Incidental Ingestion, Dermal Contact, and Inhalation)	3E-05	0.9	--	0.1
Combined Surface and Subsurface Soil (Incidental Ingeston, Dermal Contact, and Inhalation)	4E-05	1	--	0.1
UU/UE Receptor - Exposure Area 5				
Surface Soil (Incidental Ingestion, Dermal Contact, and Inhalation)	8E-05	1	--	0.2
Combined Surface and Subsurface Soil (Incidental Ingeston, Dermal Contact, and Inhalation)	8E-05	1	--	0.2
Utility Worker Receptor				
Surface Soil (Incidental Ingestion, Dermal Contact, and Inhalation)	9E-08	--	--	0.02
Combined Surface and Subsurface Soil (Incidental Ingeston, Dermal Contact, and Inhalation)	1E-07	--	--	0.03
Outdoor Worker Receptor				
Surface Soil (Incidental Ingestion, Dermal Contact, and Inhalation)	6E-06	--	--	0.08
Combined Surface and Subsurface Soil (Incidental Ingeston, Dermal Contact, and Inhalation)	--	--	--	--
Recreational User Receptor				
Surface Soil (Incidental Ingestion, Dermal Contact, and Inhalation)	2E-06		0.02	0.01
Combined Surface and Subsurface Soil (Incidental Ingeston, Dermal Contact, and Inhalation)	--	--	--	--

[1] HI and Cancer Risks were calculated by summing across exposure routes for each receptor.

[2] Groundwater is the maximum detected concentration of all wells in the exposure area.

-- Not calculated because receptor or pathway not present.

Table H.2.125
SUMMARY OF RISK AND HAZARD FOR GROUNDWATER
Parcel 57
Fort Monmouth, New Jersey

	UU/UE			Utility Worker		Outdoor Worker		Recreational User		
Well ID	Carcinogenic Risk	Hazard Quotient - Child	Hazard Quotient - Adult	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient - Adolescent	Hazard Quotient - Adult
Parcel 57 Maximum	--	5	3	--	0.01	--	--	--	--	--
800MW01	--	0.02	0.01	--	--	--	--	--	--	--
800MW02	--	0.08	0.05	--	--	--	--	--	--	--
PAR-57-MW01	--	0.06	0.04	--	--	--	--	--	--	--
PAR-57-MW02	--	5	3	--	--	--	--	--	--	--

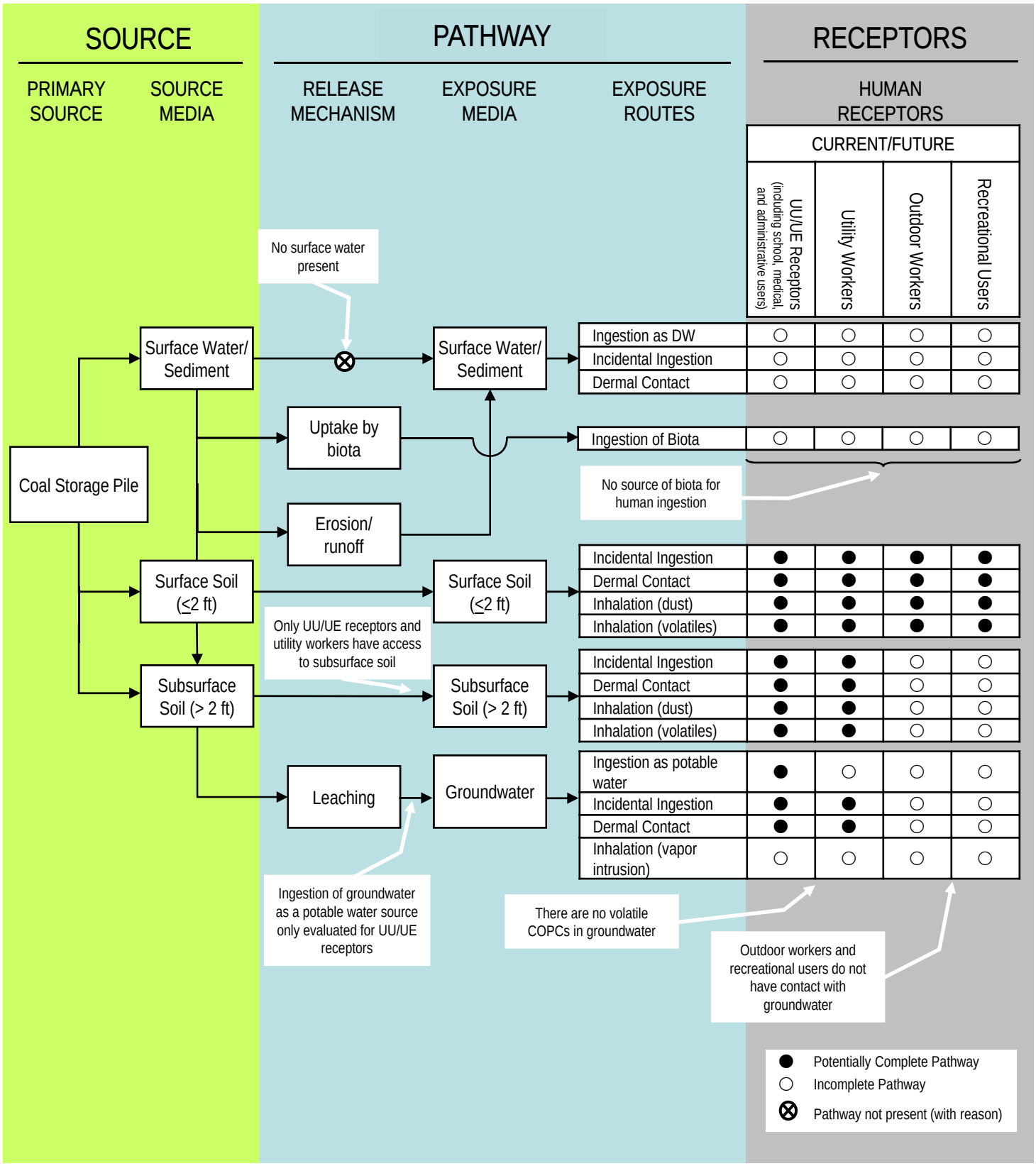
Notes:
-- indicates no risk/hazard calculated.
indicates cumulative hazard ratios greater than 1, or cumulative risk ratios greater than 1E-04

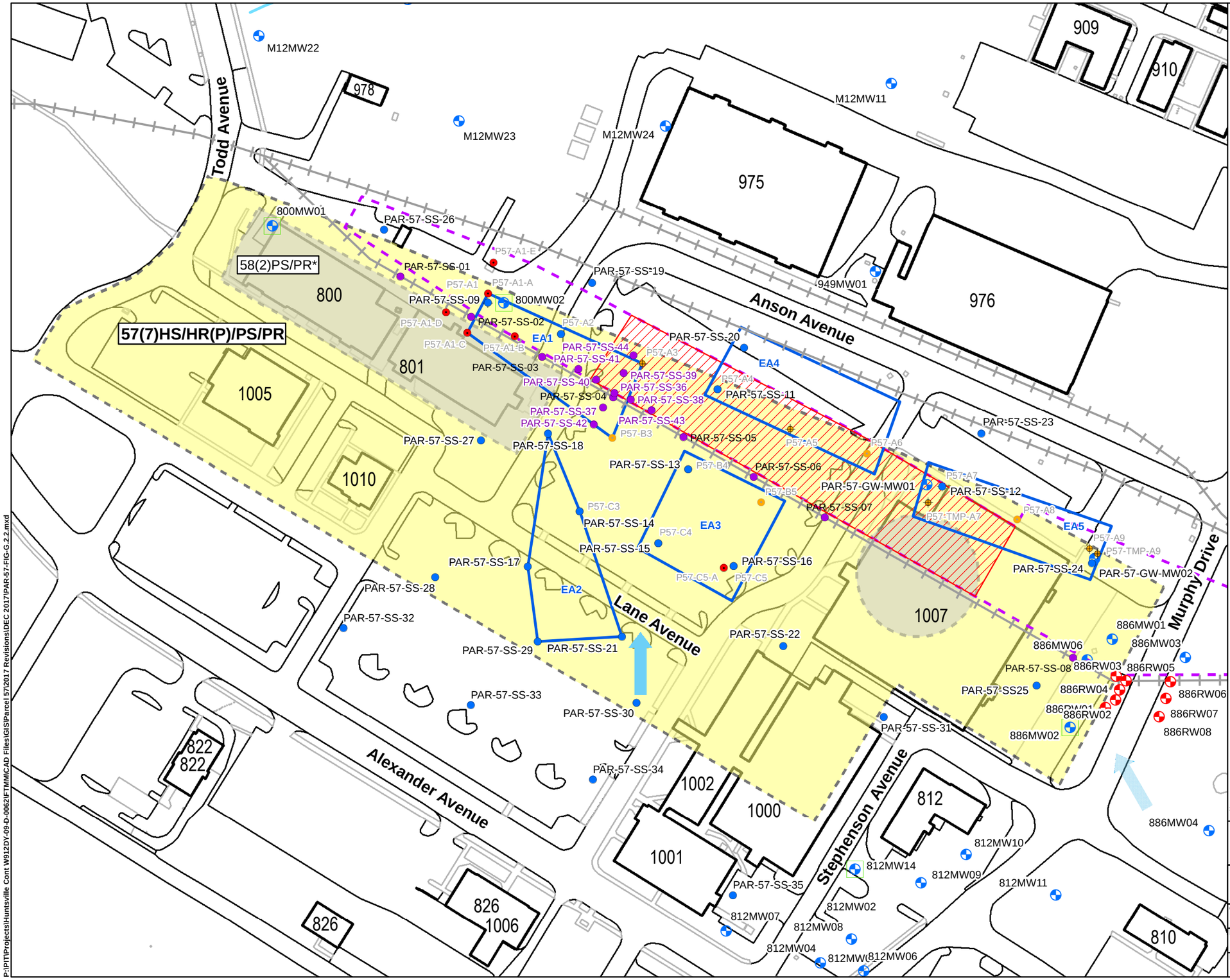
FIGURES

Figure H.2.1
CONCEPTUAL SITE MODEL DIAGRAM FOR PARCEL 57

Site Name: Fort Monmouth, New Jersey, Parcel 57 (Former Coal Storage & Railroad Unloading Area)

Completed By: Janelle Bartscherer - Parsons ***Date Completed:*** November 7, 2017





LEGEND:

- Soil Boring for PCB Analysis
- Soil Boring for PAH Analysis
- Historical Soil Sample Location (2007)
- Historical Soil Sample and Temporary 2" Monitoring Well Location (2007)
- Soil Sample Location (2010) for PAH
- Groundwater Sample for Metal Analysis
- Shallow Monitoring Well (various dates)
- Recovery Well
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Parcel 57 Boundary
- Approximate Extent of Former Coal Storage Area
- Former Concrete Coal Storage Pad
- UU/UE Exposure Area
- Generalized Groundwater Flow Direction

N

1 inch = 120 feet

0 60 120 240 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 57\2017 Revisions\DEC 2017\PAR-57-FIG-G.2.2.mxd

PARSONS 401 Diamond Drive NW, Huntsville AL	**Fort Monmouth** **New Jersey**
SOIL EXPOSURE AREAS FOR PARCEL 57	
CREATED BY: **RR**	REVIEWED BY: **JB**
DATE: **DEC. 2017**	FIGURE NUMBER: **FIGURE H.2.2**
PROJECT NUMBER: **748810-06018**	FILE: **PAR-57-FIG-G.2.2.mxd**

ATTACHMENT H.1

(included electronically on the CD of this report)

EA1 Surface Soil BaP

SampleID	SampleDepth	BaPEq	d_BaPEq
P57-SS-A1-1.0-1.5	1-1.5	1.6	1
P57-SS-A1-1.5-2.0	1.5-2	1.2	0
FTMM-57-SS09-0.5-1.0	0.5-1	1.4	1
FTMM-57-SS10-0.0-0.5	0-0.5	0.43	1
P57-A1-A	0.5-1	12	1
P57-A2-A	0-0.5	0.27	1
P57-A3-A	0.5-1	1.5	1
P57-B3-A	0.5-1	1.4	1

EA1 Subsurface Soil BaP

SampleID	SampleDep	BaPEq	d_BaPEq
P57-SS-A1-1.0-1.5	1-1.5	1.6	1
P57-SS-A1-1.5-2.0	1.5-2	1.2	0
FTMM-57-SS09-0.5-1.0	0.5-1	1.4	1
FTMM-57-SS09-2.0-2.5	2-2.5	0.0079	1
FTMM-57-SS09-5.5-6.0	5.5-6	12	1
FTMM-57-SS10-0.0-0.5	0-0.5	0.43	1
FTMM-57-SS10-3.0-3.5	3-3.5	0.011	1
FTMM-57-SS10-7.0-7.5	7-7.5	0.01	0
P57-A1-A	0.5-1	12	1
P57-A1-C	7.5-8	1.7	0
P57-SS-A1-A-6.5-7.0	6.5-7	1.4	0
P57-SS-A1-B-6.5-7.0	6.5-7	1.4	0
P57-SS-A1-C-8.0-8.5	8-8.5	1.5	0
P57-A2-A	0-0.5	0.27	1
P57-A2-C	5.5-6	1.7	0
P57-A3-A	0.5-1	1.5	1
P57-A3-C	4-4.5	1.4	0
P57-B3-A	0.5-1	1.4	1
P57-B3-C	7-7.5	1.6	0

EA1 Subsurface Soil Metals

SampleID	SampleDep	Arsenic	d_Arsenic	Cobalt	d_Cobalt	Vanadium	d_Vanadium
P57-A1-A	0.5-1	17.8	1	1.98	1	45.7	1
P57-A1-C	7.5-8	9.11	1	0.526	1	60.5	1
P57-A2-A	0-0.5	7.39	1	3.48	1	49.9	1
P57-A2-C	5.5-6	11.4	1	0.832	1	86.1	1
P57-A3-A	0.5-1	12.4	1	1.79	1	77.6	1
P57-A3-C	4-4.5	2.73	1	0.338	0	18.1	1
P57-B3-A	0.5-1	7.58	1	1.94	1	51.2	1
P57-B3-C	7-7.5	11	1	2.47	1	62.7	1

EA2 Surface Soil BaP

SampleID	SampleDepth	BaPEq	d_BaPEq
FTMM-57-SS14-0.0-0.5	0-0.5	1.5	1
FTMM-57-SS14-3.0-3.5	3-3.5	0.057	1
FTMM-57-SS14-5.0-5.5	5-5.5	0.0085	0
FTMM-57-SS17-0.0-0.5	0-0.5	7.3	1
FTMM-57-SS17-3.0-3.5	3-3.5	0.0092	0
FTMM-57-SS17-5.5-6.0	5.5-6	0.0072	1
FTMM-57-SS18-0.0-0.5	0-0.5	3.6	1
FTMM-57-SS18-5.0-5.5	5-5.5	0.053	1
FTMM-57-SS21-0.0-0.5	0-0.5	13	1
FTMM-57-SS21-3.0-3.5	3-3.5	0.23	1
P57-C3-A	0.5-1	2.7	1
P57-C3-C	6.5-7	0.21	1
PAR-57-SB-29-0.5-1	0.5-1	1.7	1
PAR-57-SB-29-3.5-4	3.5-4	0.01	1
PAR-57-SB-29-7.5-8	7.5-8	0.0093	1

EA3 Surface Soil BaP

SampleID	SampleDep	BaPEq	d_BaPEq
P57-SS-C5-1.0-1.5	1-1.5	1.3	0
P57-SS-C5-1.5-2.0	1.5-2	1.2	0
FTMM-57-SS13-0.0-0.5	0-0.5	1.3	1
FTMM-57-SS15-0.0-0.5	0-0.5	0.12	1
FTMM-57-SS16-0.0-0.5	0-0.5	0.94	1
FTMM-57-SS16-1.5-2.0	1.5-2	0.32	1
P57-B4-A	0.5-1	0.64	1
P57-B5-A	0.5-1	1.3	1
P57-C4-A	0.5-1	0.68	1
P57-C5-A	0.5-1	1.3	1

EA3 Subsurface Soil BaP

SampleID	SampleDep	BaPEq	d_BaPEq
P57-SS-C5-1.0-1.5	1-1.5	1.3	0
P57-SS-C5-1.5-2.0	1.5-2	1.2	0
FTMM-57-SS13-0.0-0.5	0-0.5	1.3	1
FTMM-57-SS13-3.0-3.5	3-3.5	0.009	0
FTMM-57-SS13-6.5-7.0	6.5-7	0.0095	0
FTMM-57-SS15-0.0-0.5	0-0.5	0.12	1
FTMM-57-SS15-3.0-3.5	3-3.5	0.009	0
FTMM-57-SS15-5.5-6.0	5.5-6	0.044	1
FTMM-57-SS16-0.0-0.5	0-0.5	0.94	1
FTMM-57-SS16-1.5-2.0	1.5-2	0.32	1
FTMM-57-SS16-6.0-6.5	6-6.5	0.009	0
P57-B4-A	0.5-1	0.64	1
P57-B4-C	6.5-7	1.4	0
P57-B5-A	0.5-1	1.3	1
P57-B5-C	6.5-7	1.6	0
P57-C4-A	0.5-1	0.68	1
P57-C4-C	6.5-7	1.4	0
P57-C5-A	0.5-1	1.3	1
P57-C5-C	7-7.5	1.4	0

EA3 Subsurface Soil Metals

SampleID	SampleDep	BaPEq	d_BaPEq	Arsenic	d_Arsenic	Cobalt	d_Cobalt	Vanadium	d_Vanadium
P57-B4-A	0.5-1	0.64	1	5.89	1	2.82	1	40.8	1
P57-B4-C	6.5-7	1.4	0	6.21	1	2.93	1	40	1
P57-B5-A	0.5-1	1.3	1	5.03	1	5.07	1	59.1	1
P57-B5-C	6.5-7	1.6	0	9.35	1	1.64	1	91.4	1
P57-C4-A	0.5-1	0.68	1	5.4	1	8.68	1	65.3	1
P57-C4-C	6.5-7	1.4	0	11.4	1	1.42	1	60	1
P57-C5-A	0.5-1	1.3	1	4.64	1	3.13	1	65.3	1
P57-C5-C	7-7.5	1.4	0	2.04	1	0.326	0	24.5	1

EA4 Subsurface Soil BaP

SampleID	SampleDepth	BaPEq	d_BaPEq
FTMM-57-SS11-0.0-0.5	0-0.5	0.33	1
FTMM-57-SS111-3.0-3.5	3-3.5	0.023	1
FTMM-57-SS11-7.0-7.5	7-7.5	0.0093	1
FTMM-57-SS20-0.0-0.5	0-0.5	0.47	1
FTMM-57-SS20-3.0-3.5	3-3.5	0.022	1
FTMM-57-SS20-5.0-5.5	5-5.5	0.42	1
P57-A4-A	0.5-1	0.54	1
P57-A4-C	6.5-7	1.4	0
P57-A5-A	0.5-1	1.3	1
P57-A5-C	7.5-8	1.6	0
P57-A6-A	0.5-1	1.4	1
P57-A6-C	7-7.5	1.2	1

EA5 Subsurface Soil BaP

SampleID	SampleDep	BaPEq	d_BaPEq
FTMM-57-SS12-0.0-0.5	0-0.5	5.7	1
FTMM-57-SS12-3.0-3.5	3-3.5	0.061	1
FTMM-57-SS12-7.0-7.5	7-7.5	0.03	1
FTMM-57-SS24-0.0-0.5	0-0.5	0.16	1
P57-A7-A	0-0.5	0.42	1
P57-A7-C	5.5-6	0.22	1
P57-A8-A	0.5-1	5.4	1
P57-A8-C	6-6.5	1.4	0
P57-A9-A	0-0.5	0.2	1
P57-A9-C	7.5-8	0.32	1

EA1 Surface Soil BaP

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 10:13:47 AM
From File	EA1-SS-BaP.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaPEq

General Statistics

Total Number of Observations	8	Number of Distinct Observations	7
Number of Detects	7	Number of Non-Detects	1
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.27	Minimum Non-Detect	1.2
Maximum Detect	12	Maximum Non-Detect	1.2
Variance Detects	17.26	Percent Non-Detects	12.5%
Mean Detects	2.657	SD Detects	4.155
Median Detects	1.4	CV Detects	1.564
Skewness Detects	2.552	Kurtosis Detects	6.636
Mean of Logged Detects	0.269	SD of Logged Detects	1.205

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.57	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.458	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.369	KM Standard Error of Mean	1.405
KM SD	3.678	95% KM (BCA) UCL	5.195
95% KM (t) UCL	5.03	95% KM (Percentile Bootstrap) UCL	4.989
95% KM (z) UCL	4.679	95% KM Bootstrap t UCL	14.01
90% KM Chebyshev UCL	6.583	95% KM Chebyshev UCL	8.492
97.5% KM Chebyshev UCL	11.14	99% KM Chebyshev UCL	16.35

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.813	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.733	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.375	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.322	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.833	k star (bias corrected MLE)	0.571
Theta hat (MLE)	3.19	Theta star (bias corrected MLE)	4.651
nu hat (MLE)	11.66	nu star (bias corrected)	7.998
Mean (detects)	2.657		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.326
Maximum	12	Median	1.4
SD	3.959	CV	1.702
k hat (MLE)	0.531	k star (bias corrected MLE)	0.415
Theta hat (MLE)	4.38	Theta star (bias corrected MLE)	5.602
nu hat (MLE)	8.498	nu star (bias corrected)	6.644
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (6.64, α)	1.978	Adjusted Chi Square Value (6.64, β)	1.4
95% Gamma Approximate UCL (use when n>=50)	7.816	95% Gamma Adjusted UCL (use when n<50)	11.04

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.369	SD (KM)	3.678
Variance (KM)	13.53	SE of Mean (KM)	1.405
k hat (KM)	0.415	k star (KM)	0.343
nu hat (KM)	6.636	nu star (KM)	5.481
theta hat (KM)	5.711	theta star (KM)	6.915
80% gamma percentile (KM)	3.737	90% gamma percentile (KM)	6.863
95% gamma percentile (KM)	10.37	99% gamma percentile (KM)	19.36

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.48, α)	1.381	Adjusted Chi Square Value (5.48, β)	0.929
95% Gamma Approximate KM-UCL (use when n>=50)	9.404	95% Gamma Adjusted KM-UCL (use when n<50)	13.98

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.367	Mean in Log Scale	0.0993
SD in Original Scale	3.933	SD in Log Scale	1.214
95% t UCL (assumes normality of ROS data)	5.002	95% Percentile Bootstrap UCL	5.002
95% BCA Bootstrap UCL	5.438	95% Bootstrap t UCL	13.25
95% H-UCL (Log ROS)	14.27		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.1	KM Geo Mean	1.106
KM SD (logged)	1.137	95% Critical H Value (KM-Log)	3.772
KM Standard Error of Mean (logged)	0.436	95% H-UCL (KM -Log)	10.68
KM SD (logged)	1.137	95% Critical H Value (KM-Log)	3.772
KM Standard Error of Mean (logged)	0.436		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.4	Mean in Log Scale	0.171
SD in Original Scale	3.915	SD in Log Scale	1.149
95% t UCL (Assumes normality)	5.022	95% H-Stat UCL	11.97

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	8.492

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EA1 Subsurface Soil BaP

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 12:09:34 PM
From File	EA1_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaPEq

General Statistics

Total Number of Observations	19	Number of Distinct Observations	11
Number of Detects	10	Number of Non-Detects	9
Number of Distinct Detects	8	Number of Distinct Non-Detects	6
Minimum Detect	0.0079	Minimum Non-Detect	0.01
Maximum Detect	12	Maximum Non-Detect	1.7
Variance Detects	22.58	Percent Non-Detects	47.37%
Mean Detects	3.062	SD Detects	4.752
Median Detects	1.4	CV Detects	1.552
Skewness Detects	1.702	Kurtosis Detects	1.256
Mean of Logged Detects	-0.499	SD of Logged Detects	2.509

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.622	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.421	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.743	KM Standard Error of Mean	0.866
KM SD	3.567	95% KM (BCA) UCL	3.18
95% KM (t) UCL	3.245	95% KM (Percentile Bootstrap) UCL	3.232
95% KM (z) UCL	3.168	95% KM Bootstrap t UCL	8.329
90% KM Chebyshev UCL	4.342	95% KM Chebyshev UCL	5.52
97.5% KM Chebyshev UCL	7.154	99% KM Chebyshev UCL	10.36

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.482	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.794	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.234	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.284	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.406	k star (bias corrected MLE)	0.351
Theta hat (MLE)	7.544	Theta star (bias corrected MLE)	8.729
nu hat (MLE)	8.117	nu star (bias corrected)	7.015
Mean (detects)	3.062		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0079	Mean	1.647
Maximum	12	Median	0.011
SD	3.695	CV	2.244
k hat (MLE)	0.259	k star (bias corrected MLE)	0.253
Theta hat (MLE)	6.36	Theta star (bias corrected MLE)	6.506
nu hat (MLE)	9.837	nu star (bias corrected)	9.618
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (9.62, α)	3.704	Adjusted Chi Square Value (9.62, β)	3.389
95% Gamma Approximate UCL (use when n>=50)	4.275	95% Gamma Adjusted UCL (use when n<50)	4.673

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.743	SD (KM)	3.567
Variance (KM)	12.72	SE of Mean (KM)	0.866
k hat (KM)	0.239	k star (KM)	0.236
nu hat (KM)	9.071	nu star (KM)	8.972
theta hat (KM)	7.301	theta star (KM)	7.382

80% gamma percentile (KM)	2.478	90% gamma percentile (KM)	5.25
95% gamma percentile (KM)	8.579	99% gamma percentile (KM)	17.51

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.97, α)	3.31	Adjusted Chi Square Value (8.97, β)	3.015
95% Gamma Approximate KM-UCL (use when n>=50)	4.724	95% Gamma Adjusted KM-UCL (use when n<50)	5.185

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.655	Mean in Log Scale	-1.639
SD in Original Scale	3.69	SD in Log Scale	2.293
95% t UCL (assumes normality of ROS data)	3.123	95% Percentile Bootstrap UCL	3.004
95% BCA Bootstrap UCL	3.634	95% Bootstrap t UCL	9.616
95% H-UCL (Log ROS)	35.6		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.699	KM Geo Mean	0.183
KM SD (logged)	2.566	95% Critical H Value (KM-Log)	5.275
KM Standard Error of Mean (logged)	0.769	95% H-UCL (KM -Log)	119.7
KM SD (logged)	2.566	95% Critical H Value (KM-Log)	5.275
KM Standard Error of Mean (logged)	0.769		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.925	Mean in Log Scale	-0.668
SD in Original Scale	3.583	SD in Log Scale	2.103
95% t UCL (Assumes normality)	3.35	95% H-Stat UCL	42.05

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

ı Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	5.185

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EA1 Subsurface Soil Metals

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 12:56:30 PM
From File	EA1_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	2.73	Mean	9.926
Maximum	17.8	Median	10.06
SD	4.405	Std. Error of Mean	1.557
Coefficient of Variation	0.444	Skewness	0.235

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	12.88	95% Adjusted-CLT UCL (Chen-1995)	12.63
		95% Modified-t UCL (Johnson-1978)	12.9

Gamma GOF Test

A-D Test Statistic	0.339	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.203	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.636	k star (bias corrected MLE)	2.981
Theta hat (MLE)	2.141	Theta star (bias corrected MLE)	3.33
nu hat (MLE)	74.17	nu star (bias corrected)	47.69
MLE Mean (bias corrected)	9.926	MLE Sd (bias corrected)	5.749
		Approximate Chi Square Value (0.05)	32.84
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	29.76

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	14.41	95% Adjusted Gamma UCL (use when n<50)	15.91

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.246	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.004	Mean of logged Data	2.183
Maximum of Logged Data	2.879	SD of logged Data	0.555

Assuming Lognormal Distribution

95% H-UCL	17.3	90% Chebyshev (MVUE) UCL	16.17
95% Chebyshev (MVUE) UCL	18.9	97.5% Chebyshev (MVUE) UCL	22.7
99% Chebyshev (MVUE) UCL	30.15		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	12.49	95% Jackknife UCL	12.88
95% Standard Bootstrap UCL	12.31	95% Bootstrap-t UCL	12.9
95% Hall's Bootstrap UCL	13.38	95% Percentile Bootstrap UCL	12.29
95% BCA Bootstrap UCL	12.44		
90% Chebyshev(Mean, Sd) UCL	14.6	95% Chebyshev(Mean, Sd) UCL	16.71
97.5% Chebyshev(Mean, Sd) UCL	19.65	99% Chebyshev(Mean, Sd) UCL	25.42

Suggested UCL to Use

95% Student's-t UCL	12.88

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cobalt

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	1
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.526	Minimum Non-Detect	0.338
Maximum Detect	3.48	Maximum Non-Detect	0.338
Variance Detects	0.976	Percent Non-Detects	12.5%
Mean Detects	1.86	SD Detects	0.988
Median Detects	1.94	CV Detects	0.531
Skewness Detects	0.248	Kurtosis Detects	0.136
Mean of Logged Detects	0.465	SD of Logged Detects	0.652

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.67	KM Standard Error of Mean	0.379
KM SD	0.993	95% KM (BCA) UCL	2.234
95% KM (t) UCL	2.388	95% KM (Percentile Bootstrap) UCL	2.188
95% KM (z) UCL	2.293	95% KM Bootstrap t UCL	2.373
90% KM Chebyshev UCL	2.807	95% KM Chebyshev UCL	3.322
97.5% KM Chebyshev UCL	4.037	99% KM Chebyshev UCL	5.442

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.358	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.711	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.26	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.368	k star (bias corrected MLE)	2.02
Theta hat (MLE)	0.552	Theta star (bias corrected MLE)	0.921
nu hat (MLE)	47.16	nu star (bias corrected)	28.28
Mean (detects)	1.86		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0806	Mean	1.637
Maximum	3.48	Median	1.865
SD	1.11	CV	0.678
k hat (MLE)	1.389	k star (bias corrected MLE)	0.951

Theta hat (MLE)	1.179	Theta star (bias corrected MLE)	1.721
nu hat (MLE)	22.22	nu star (bias corrected)	15.22
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (15.22, α)	7.417	Adjusted Chi Square Value (15.22, β)	6.092
95% Gamma Approximate UCL (use when n>=50)	3.361	95% Gamma Adjusted UCL (use when n<50)	4.091

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.67	SD (KM)	0.993
Variance (KM)	0.986	SE of Mean (KM)	0.379
k hat (KM)	2.828	k star (KM)	1.851
nu hat (KM)	45.25	nu star (KM)	29.61
theta hat (KM)	0.59	theta star (KM)	0.902
80% gamma percentile (KM)	2.522	90% gamma percentile (KM)	3.307
95% gamma percentile (KM)	4.059	99% gamma percentile (KM)	5.735

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (29.61, α)	18.19	Adjusted Chi Square Value (29.61, β)	15.97
95% Gamma Approximate KM-UCL (use when n>=50)	2.718	95% Gamma Adjusted KM-UCL (use when n<50)	3.097

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.286	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.67	Mean in Log Scale	0.271
SD in Original Scale	1.061	SD in Log Scale	0.815
95% t UCL (assumes normality of ROS data)	2.38	95% Percentile Bootstrap UCL	2.267
95% BCA Bootstrap UCL	2.274	95% Bootstrap t UCL	2.376
95% H-UCL (Log ROS)	4.583		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.271	KM Geo Mean	1.311
KM SD (logged)	0.763	95% Critical H Value (KM-Log)	2.869
KM Standard Error of Mean (logged)	0.291	95% H-UCL (KM -Log)	4.01
KM SD (logged)	0.763	95% Critical H Value (KM-Log)	2.869
KM Standard Error of Mean (logged)	0.291		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.648	Mean in Log Scale	0.184
SD in Original Scale	1.093	SD in Log Scale	0.997
95% t UCL (Assumes normality)	2.38	95% H-Stat UCL	7.159

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.388

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Vanadium

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	18.1	Mean	56.48
Maximum	86.1	Median	55.85
SD	20.83	Std. Error of Mean	7.366
Coefficient of Variation	0.369	Skewness	-0.473

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	70.43	95% Adjusted-CLT UCL (Chen-1995)	67.28
		95% Modified-t UCL (Johnson-1978)	70.23

Gamma GOF Test

A-D Test Statistic	0.437	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.718	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.229	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.236	k star (bias corrected MLE)	3.981
Theta hat (MLE)	9.056	Theta star (bias corrected MLE)	14.19
nu hat (MLE)	99.78	nu star (bias corrected)	63.69
MLE Mean (bias corrected)	56.48	MLE Sd (bias corrected)	28.31
		Approximate Chi Square Value (0.05)	46.33
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	42.61

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	77.64	95% Adjusted Gamma UCL (use when n<50)	84.41

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.268	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.896	Mean of logged Data	3.951
Maximum of Logged Data	4.456	SD of logged Data	0.479

Assuming Lognormal Distribution

95% H-UCL	88.74	90% Chebyshev (MVUE) UCL	86.88
95% Chebyshev (MVUE) UCL	100.2	97.5% Chebyshev (MVUE) UCL	118.7
99% Chebyshev (MVUE) UCL	155.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	68.59	95% Jackknife UCL	70.43
95% Standard Bootstrap UCL	67.84	95% Bootstrap-t UCL	69.83
95% Hall's Bootstrap UCL	70.19	95% Percentile Bootstrap UCL	67.65
95% BCA Bootstrap UCL	66.43		
90% Chebyshev(Mean, Sd) UCL	78.57	95% Chebyshev(Mean, Sd) UCL	88.58
97.5% Chebyshev(Mean, Sd) UCL	102.5	99% Chebyshev(Mean, Sd) UCL	129.8

Suggested UCL to Use

95% Student's-t UCL	70.43

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

EA2 Subsurface Soil BaP

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 12:53:37 PM
From File	EA2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaPEq

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Number of Detects	13	Number of Non-Detects	2
Number of Distinct Detects	13	Number of Distinct Non-Detects	2
Minimum Detect	0.0072	Minimum Non-Detect	0.0085
Maximum Detect	13	Maximum Non-Detect	0.0092
Variance Detects	14.73	Percent Non-Detects	13.33%
Mean Detects	2.337	SD Detects	3.838
Median Detects	0.23	CV Detects	1.643
Skewness Detects	2.186	Kurtosis Detects	4.788
Mean of Logged Detects	-1.176	SD of Logged Detects	2.653

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.679	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.272	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.026	KM Standard Error of Mean	0.947
KM SD	3.523	95% KM (BCA) UCL	3.907
95% KM (t) UCL	3.694	95% KM (Percentile Bootstrap) UCL	3.586
95% KM (z) UCL	3.584	95% KM Bootstrap t UCL	6.634
90% KM Chebyshev UCL	4.867	95% KM Chebyshev UCL	6.153
97.5% KM Chebyshev UCL	7.939	99% KM Chebyshev UCL	11.45

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.403	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.823	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.184	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.335	k star (bias corrected MLE)	0.309
Theta hat (MLE)	6.984	Theta star (bias corrected MLE)	7.57
nu hat (MLE)	8.699	nu star (bias corrected)	8.025
Mean (detects)	2.337		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0072	Mean	2.026
Maximum	13	Median	0.21
SD	3.647	CV	1.8
k hat (MLE)	0.295	k star (bias corrected MLE)	0.281
Theta hat (MLE)	6.858	Theta star (bias corrected MLE)	7.216
nu hat (MLE)	8.865	nu star (bias corrected)	8.425
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (8.43, α)	2.984	Adjusted Chi Square Value (8.43, β)	2.599
95% Gamma Approximate UCL (use when n>=50)	5.722	95% Gamma Adjusted UCL (use when n<50)	6.57

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.026	SD (KM)	3.523
Variance (KM)	12.41	SE of Mean (KM)	0.947
k hat (KM)	0.331	k star (KM)	0.309
nu hat (KM)	9.92	nu star (KM)	9.269
theta hat (KM)	6.127	theta star (KM)	6.557

80% gamma percentile (KM)	3.129	90% gamma percentile (KM)	5.954
95% gamma percentile (KM)	9.18	99% gamma percentile (KM)	17.54

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.27, α)	3.49	Adjusted Chi Square Value (9.27, β)	3.067
95% Gamma Approximate KM-UCL (use when n>=50)	5.38	95% Gamma Adjusted KM-UCL (use when n<50)	6.124

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.025	Mean in Log Scale	-1.82
SD in Original Scale	3.647	SD in Log Scale	2.987
95% t UCL (assumes normality of ROS data)	3.684	95% Percentile Bootstrap UCL	3.573
95% BCA Bootstrap UCL	4.101	95% Bootstrap t UCL	6.206
95% H-UCL (Log ROS)	2605		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.677	KM Geo Mean	0.187
KM SD (logged)	2.695	95% Critical H Value (KM-Log)	5.95
KM Standard Error of Mean (logged)	0.724	95% H-UCL (KM -Log)	513.7
KM SD (logged)	2.695	95% Critical H Value (KM-Log)	5.95
KM Standard Error of Mean (logged)	0.724		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.026	Mean in Log Scale	-1.742
SD in Original Scale	3.647	SD in Log Scale	2.875
95% t UCL (Assumes normality)	3.684	95% H-Stat UCL	1400

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

ı Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	6.124

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EA3 Surface Soil BaP

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 2:30:24 PM
From File	EA3.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaPEq

General Statistics

Total Number of Observations	10	Number of Distinct Observations	7
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	6	Number of Distinct Non-Detects	2
Minimum Detect	0.12	Minimum Non-Detect	1.2
Maximum Detect	1.3	Maximum Non-Detect	1.3
Variance Detects	0.214	Percent Non-Detects	20%
Mean Detects	0.825	SD Detects	0.463
Median Detects	0.81	CV Detects	0.561
Skewness Detects	-0.319	Kurtosis Detects	-1.404
Mean of Logged Detects	-0.421	SD of Logged Detects	0.84

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.223	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.768	KM Standard Error of Mean	0.152
KM SD	0.423	95% KM (BCA) UCL	1.006
95% KM (t) UCL	1.047	95% KM (Percentile Bootstrap) UCL	1.006
95% KM (z) UCL	1.018	95% KM Bootstrap t UCL	1.042
90% KM Chebyshev UCL	1.224	95% KM Chebyshev UCL	1.431
97.5% KM Chebyshev UCL	1.718	99% KM Chebyshev UCL	2.282

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.495	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.207	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.342	k star (bias corrected MLE)	1.547
Theta hat (MLE)	0.352	Theta star (bias corrected MLE)	0.533
nu hat (MLE)	37.47	nu star (bias corrected)	24.75
Mean (detects)	0.825		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.12	Mean	0.768
Maximum	1.3	Median	0.66
SD	0.425	CV	0.554
k hat (MLE)	2.706	k star (bias corrected MLE)	1.961
Theta hat (MLE)	0.284	Theta star (bias corrected MLE)	0.392
nu hat (MLE)	54.12	nu star (bias corrected)	39.22
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (39.22, α)	25.87	Adjusted Chi Square Value (39.22, β)	24.01
95% Gamma Approximate UCL (use when n>=50)	1.164	95% Gamma Adjusted UCL (use when n<50)	1.255

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.768	SD (KM)	0.423
Variance (KM)	0.179	SE of Mean (KM)	0.152
k hat (KM)	3.289	k star (KM)	2.369
nu hat (KM)	65.79	nu star (KM)	47.38
theta hat (KM)	0.233	theta star (KM)	0.324

80% gamma percentile (KM)	1.127	90% gamma percentile (KM)	1.436
95% gamma percentile (KM)	1.728	99% gamma percentile (KM)	2.37

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (47.38, α)	32.59	Adjusted Chi Square Value (47.38, β)	30.47
95% Gamma Approximate KM-UCL (use when n>=50)	1.117	95% Gamma Adjusted KM-UCL (use when n<50)	1.194

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.238	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.745	Mean in Log Scale	-0.508
SD in Original Scale	0.442	SD in Log Scale	0.763
95% t UCL (assumes normality of ROS data)	1.001	95% Percentile Bootstrap UCL	0.961
95% BCA Bootstrap UCL	0.972	95% Bootstrap t UCL	1.019
95% H-UCL (Log ROS)	1.576		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.503	KM Geo Mean	0.605
KM SD (logged)	0.793	95% Critical H Value (KM-Log)	2.696
KM Standard Error of Mean (logged)	0.298	95% H-UCL (KM -Log)	1.688
KM SD (logged)	0.793	95% Critical H Value (KM-Log)	2.696
KM Standard Error of Mean (logged)	0.298		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.785	Mean in Log Scale	-0.431
SD in Original Scale	0.417	SD in Log Scale	0.741
95% t UCL (Assumes normality)	1.027	95% H-Stat UCL	1.627

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.047

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EA3 Subsurface Soil BaP

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 2:31:25 PM
From File	EA3_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaPEq

General Statistics

Total Number of Observations	19	Number of Distinct Observations	12
Number of Detects	9	Number of Non-Detects	10
Number of Distinct Detects	7	Number of Distinct Non-Detects	6
Minimum Detect	0.044	Minimum Non-Detect	0.009
Maximum Detect	1.3	Maximum Non-Detect	1.6
Variance Detects	0.255	Percent Non-Detects	52.63%
Mean Detects	0.738	SD Detects	0.505
Median Detects	0.68	CV Detects	0.684
Skewness Detects	-0.131	Kurtosis Detects	-1.648
Mean of Logged Detects	-0.721	SD of Logged Detects	1.195

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.482	KM Standard Error of Mean	0.143
KM SD	0.505	95% KM (BCA) UCL	0.714
95% KM (t) UCL	0.73	95% KM (Percentile Bootstrap) UCL	0.707
95% KM (z) UCL	0.718	95% KM Bootstrap t UCL	0.744
90% KM Chebyshev UCL	0.912	95% KM Chebyshev UCL	1.106
97.5% KM Chebyshev UCL	1.376	99% KM Chebyshev UCL	1.906

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.536	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.22	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.285	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.339	k star (bias corrected MLE)	0.967
Theta hat (MLE)	0.551	Theta star (bias corrected MLE)	0.763
nu hat (MLE)	24.11	nu star (bias corrected)	17.41
Mean (detects)	0.738		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.472
Maximum	1.3	Median	0.32
SD	0.454	CV	0.962
k hat (MLE)	0.884	k star (bias corrected MLE)	0.78
Theta hat (MLE)	0.534	Theta star (bias corrected MLE)	0.606
nu hat (MLE)	33.6	nu star (bias corrected)	29.63
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (29.63, α)	18.2	Adjusted Chi Square Value (29.63, β)	17.42
95% Gamma Approximate UCL (use when n>=50)	0.769	95% Gamma Adjusted UCL (use when n<50)	0.803

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.482	SD (KM)	0.505
Variance (KM)	0.255	SE of Mean (KM)	0.143
k hat (KM)	0.912	k star (KM)	0.803
nu hat (KM)	34.64	nu star (KM)	30.51
theta hat (KM)	0.529	theta star (KM)	0.601

80% gamma percentile (KM)	0.788	90% gamma percentile (KM)	1.172
95% gamma percentile (KM)	1.563	99% gamma percentile (KM)	2.486

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (30.51, α)	18.89	Adjusted Chi Square Value (30.51, β)	18.09
95% Gamma Approximate KM-UCL (use when n>=50)	0.779	95% Gamma Adjusted KM-UCL (use when n<50)	0.813

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.83	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.258	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.432	Mean in Log Scale	-1.537
SD in Original Scale	0.465	SD in Log Scale	1.308
95% t UCL (assumes normality of ROS data)	0.617	95% Percentile Bootstrap UCL	0.614
95% BCA Bootstrap UCL	0.636	95% Bootstrap t UCL	0.666
95% H-UCL (Log ROS)	1.305		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.037	KM Geo Mean	0.13
KM SD (logged)	2.058	95% Critical H Value (KM-Log)	4.355
KM Standard Error of Mean (logged)	0.601	95% H-UCL (KM -Log)	8.971
KM SD (logged)	2.058	95% Critical H Value (KM-Log)	4.355
KM Standard Error of Mean (logged)	0.601		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.569	Mean in Log Scale	-1.594
SD in Original Scale	0.452	SD in Log Scale	2.172
95% t UCL (Assumes normality)	0.749	95% H-Stat UCL	22.17

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.73

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EA3 Subsurface Soil Metals

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 2:32:22 PM
From File	EA3_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	2.04	Mean	6.245
Maximum	11.4	Median	5.645
SD	2.898	Std. Error of Mean	1.025
Coefficient of Variation	0.464	Skewness	0.673

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.255	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.186	95% Adjusted-CLT UCL (Chen-1995)	8.191
		95% Modified-t UCL (Johnson-1978)	8.227

Gamma GOF Test

A-D Test Statistic	0.342	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.195	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.943	k star (bias corrected MLE)	3.173
Theta hat (MLE)	1.263	Theta star (bias corrected MLE)	1.968
nu hat (MLE)	79.09	nu star (bias corrected)	50.77
MLE Mean (bias corrected)	6.245	MLE Sd (bias corrected)	3.506
		Approximate Chi Square Value (0.05)	35.4
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	32.19

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.955	95% Adjusted Gamma UCL (use when n<50)	9.849

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.229	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.713	Mean of logged Data	1.727
Maximum of Logged Data	2.434	SD of logged Data	0.514

Assuming Lognormal Distribution

95% H-UCL	10.19	90% Chebyshev (MVUE) UCL	9.778
95% Chebyshev (MVUE) UCL	11.35	97.5% Chebyshev (MVUE) UCL	13.53
99% Chebyshev (MVUE) UCL	17.82		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	7.93	95% Jackknife UCL	8.186
95% Standard Bootstrap UCL	7.846	95% Bootstrap-t UCL	9.259
95% Hall's Bootstrap UCL	13.7	95% Percentile Bootstrap UCL	7.839
95% BCA Bootstrap UCL	8.016		
90% Chebyshev(Mean, Sd) UCL	9.319	95% Chebyshev(Mean, Sd) UCL	10.71
97.5% Chebyshev(Mean, Sd) UCL	12.64	99% Chebyshev(Mean, Sd) UCL	16.44

Suggested UCL to Use

95% Student's-t UCL	8.186

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cobalt

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	1
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	1.42	Minimum Non-Detect	0.326
Maximum Detect	8.68	Maximum Non-Detect	0.326
Variance Detects	6.301	Percent Non-Detects	12.5%
Mean Detects	3.67	SD Detects	2.51
Median Detects	2.93	CV Detects	0.684
Skewness Detects	1.587	Kurtosis Detects	2.562
Mean of Logged Detects	1.126	SD of Logged Detects	0.623

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.832	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.299	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.252	KM Standard Error of Mean	0.931
KM SD	2.439	95% KM (BCA) UCL	4.753
95% KM (t) UCL	5.017	95% KM (Percentile Bootstrap) UCL	4.741
95% KM (z) UCL	4.784	95% KM Bootstrap t UCL	6.514
90% KM Chebyshev UCL	6.046	95% KM Chebyshev UCL	7.312
97.5% KM Chebyshev UCL	9.069	99% KM Chebyshev UCL	12.52

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.35	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.712	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.244	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.028	k star (bias corrected MLE)	1.826
Theta hat (MLE)	1.212	Theta star (bias corrected MLE)	2.01
nu hat (MLE)	42.39	nu star (bias corrected)	25.56
Mean (detects)	3.67		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.213
Maximum	8.68	Median	2.875
SD	2.66	CV	0.828
k hat (MLE)	0.786	k star (bias corrected MLE)	0.574

Theta hat (MLE)	4.09	Theta star (bias corrected MLE)	5.594
nu hat (MLE)	12.57	nu star (bias corrected)	9.188
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (9.19, α)	3.441	Adjusted Chi Square Value (9.19, β)	2.613
95% Gamma Approximate UCL (use when n>=50)	8.578	95% Gamma Adjusted UCL (use when n<50)	11.3

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.252	SD (KM)	2.439
Variance (KM)	5.949	SE of Mean (KM)	0.931
k hat (KM)	1.778	k star (KM)	1.194
nu hat (KM)	28.44	nu star (KM)	19.11
theta hat (KM)	1.829	theta star (KM)	2.723
80% gamma percentile (KM)	5.152	90% gamma percentile (KM)	7.167
95% gamma percentile (KM)	9.155	99% gamma percentile (KM)	13.71

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (19.11, α)	10.2	Adjusted Chi Square Value (19.11, β)	8.601
95% Gamma Approximate KM-UCL (use when n>=50)	6.094	95% Gamma Adjusted KM-UCL (use when n<50)	7.226

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.293	Mean in Log Scale	0.932
SD in Original Scale	2.557	SD in Log Scale	0.795
95% t UCL (assumes normality of ROS data)	5.006	95% Percentile Bootstrap UCL	4.796
95% BCA Bootstrap UCL	5.348	95% Bootstrap t UCL	6.573
95% H-UCL (Log ROS)	8.44		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.845	KM Geo Mean	2.328
KM SD (logged)	0.918	95% Critical H Value (KM-Log)	3.228
KM Standard Error of Mean (logged)	0.351	95% H-UCL (KM -Log)	10.88
KM SD (logged)	0.918	95% Critical H Value (KM-Log)	3.228
KM Standard Error of Mean (logged)	0.351		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.232	Mean in Log Scale	0.759
SD in Original Scale	2.634	SD in Log Scale	1.189
95% t UCL (Assumes normality)	4.996	95% H-Stat UCL	25.03

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	5.017

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Vanadium

General Statistics

Total Number of Observations	8	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	24.5	Mean	55.8
Maximum	91.4	Median	59.55
SD	20.46	Std. Error of Mean	7.234
Coefficient of Variation	0.367	Skewness	0.199

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	69.51	95% Adjusted-CLT UCL (Chen-1995)	68.24
		95% Modified-t UCL (Johnson-1978)	69.59

Gamma GOF Test

A-D Test Statistic	0.349	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.717	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.236	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.694	k star (bias corrected MLE)	4.892
Theta hat (MLE)	7.253	Theta star (bias corrected MLE)	11.41
nu hat (MLE)	123.1	nu star (bias corrected)	78.27
MLE Mean (bias corrected)	55.8	MLE Sd (bias corrected)	25.23
		Approximate Chi Square Value (0.05)	58.89
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	54.65

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	74.17	95% Adjusted Gamma UCL (use when n<50)	79.91

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.199	Mean of logged Data	3.955
Maximum of Logged Data	4.515	SD of logged Data	0.406

Assuming Lognormal Distribution

95% H-UCL	79.49	90% Chebyshev (MVUE) UCL	80.39
95% Chebyshev (MVUE) UCL	91.4	97.5% Chebyshev (MVUE) UCL	106.7
99% Chebyshev (MVUE) UCL	136.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	67.7	95% Jackknife UCL	69.51
95% Standard Bootstrap UCL	66.5	95% Bootstrap-t UCL	70.15
95% Hall's Bootstrap UCL	69.59	95% Percentile Bootstrap UCL	67.23
95% BCA Bootstrap UCL	67.44		
90% Chebyshev(Mean, Sd) UCL	77.5	95% Chebyshev(Mean, Sd) UCL	87.33
97.5% Chebyshev(Mean, Sd) UCL	101	99% Chebyshev(Mean, Sd) UCL	127.8

Suggested UCL to Use

95% Student's-t UCL	69.51

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EA4 Subsurface Soil BaP

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 2:34:02 PM
From File	EA4.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaPEq

General Statistics

Total Number of Observations	12	Number of Distinct Observations	11
Number of Detects	10	Number of Non-Detects	2
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	0.0093	Minimum Non-Detect	1.4
Maximum Detect	1.4	Maximum Non-Detect	1.6
Variance Detects	0.292	Percent Non-Detects	16.67%
Mean Detects	0.571	SD Detects	0.54
Median Detects	0.445	CV Detects	0.945
Skewness Detects	0.597	Kurtosis Detects	-1.271
Mean of Logged Detects	-1.483	SD of Logged Detects	1.88

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.856	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.223	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.563	KM Standard Error of Mean	0.168
KM SD	0.508	95% KM (BCA) UCL	0.834
95% KM (t) UCL	0.864	95% KM (Percentile Bootstrap) UCL	0.851
95% KM (z) UCL	0.839	95% KM Bootstrap t UCL	0.938
90% KM Chebyshev UCL	1.067	95% KM Chebyshev UCL	1.295
97.5% KM Chebyshev UCL	1.611	99% KM Chebyshev UCL	2.233

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.596	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.208	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.278	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.66	k star (bias corrected MLE)	0.529
Theta hat (MLE)	0.866	Theta star (bias corrected MLE)	1.081
nu hat (MLE)	13.2	nu star (bias corrected)	10.57
Mean (detects)	0.571		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0093	Mean	0.541
Maximum	1.4	Median	0.415
SD	0.494	CV	0.912
k hat (MLE)	0.766	k star (bias corrected MLE)	0.63
Theta hat (MLE)	0.706	Theta star (bias corrected MLE)	0.859
nu hat (MLE)	18.38	nu star (bias corrected)	15.12
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (15.12, α)	7.346	Adjusted Chi Square Value (15.12, β)	6.535
95% Gamma Approximate UCL (use when n>=50)	1.114	95% Gamma Adjusted UCL (use when n<50)	1.252

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.563	SD (KM)	0.508
Variance (KM)	0.258	SE of Mean (KM)	0.168
k hat (KM)	1.229	k star (KM)	0.977
nu hat (KM)	29.49	nu star (KM)	23.45
theta hat (KM)	0.458	theta star (KM)	0.576

80% gamma percentile (KM)	0.908	90% gamma percentile (KM)	1.304
95% gamma percentile (KM)	1.701	99% gamma percentile (KM)	2.623

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (23.45, α)	13.43	Adjusted Chi Square Value (23.45, β)	12.29
95% Gamma Approximate KM-UCL (use when n>=50)	0.983	95% Gamma Adjusted KM-UCL (use when n<50)	1.075

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.827	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.279	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.508	Mean in Log Scale	-1.512
SD in Original Scale	0.51	SD in Log Scale	1.703
95% t UCL (assumes normality of ROS data)	0.773	95% Percentile Bootstrap UCL	0.752
95% BCA Bootstrap UCL	0.772	95% Bootstrap t UCL	0.835
95% H-UCL (Log ROS)	8.64		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.502	KM Geo Mean	0.223
KM SD (logged)	1.783	95% Critical H Value (KM-Log)	4.493
KM Standard Error of Mean (logged)	0.594	95% H-UCL (KM -Log)	12.24
KM SD (logged)	1.783	95% Critical H Value (KM-Log)	4.493
KM Standard Error of Mean (logged)	0.594		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.601	Mean in Log Scale	-1.284
SD in Original Scale	0.494	SD in Log Scale	1.763
95% t UCL (Assumes normality)	0.857	95% H-Stat UCL	13.97

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.864

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EA5 Subsurface Soil BaP

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/17/2017 2:35:02 PM
From File	EA5.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaPEq

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	1
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.03	Minimum Non-Detect	1.4
Maximum Detect	5.7	Maximum Non-Detect	1.4
Variance Detects	5.582	Percent Non-Detects	10%
Mean Detects	1.39	SD Detects	2.363
Median Detects	0.22	CV Detects	1.7
Skewness Detects	1.613	Kurtosis Detects	0.745
Mean of Logged Detects	-1.093	SD of Logged Detects	1.786

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.59	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.437	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.271	KM Standard Error of Mean	0.719
KM SD	2.143	95% KM (BCA) UCL	2.421
95% KM (t) UCL	2.589	95% KM (Percentile Bootstrap) UCL	2.376
95% KM (z) UCL	2.454	95% KM Bootstrap t UCL	19.7
90% KM Chebyshev UCL	3.428	95% KM Chebyshev UCL	4.406
97.5% KM Chebyshev UCL	5.762	99% KM Chebyshev UCL	8.426

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.989	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.779	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.338	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.296	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.453	k star (bias corrected MLE)	0.376
Theta hat (MLE)	3.066	Theta star (bias corrected MLE)	3.694
nu hat (MLE)	8.161	nu star (bias corrected)	6.774
Mean (detects)	1.39		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.03	Mean	1.262
Maximum	5.7	Median	0.21
SD	2.264	CV	1.794
k hat (MLE)	0.449	k star (bias corrected MLE)	0.381
Theta hat (MLE)	2.81	Theta star (bias corrected MLE)	3.312
nu hat (MLE)	8.982	nu star (bias corrected)	7.621
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (7.62, α)	2.518	Adjusted Chi Square Value (7.62, β)	2.038
95% Gamma Approximate UCL (use when n>=50)	3.82	95% Gamma Adjusted UCL (use when n<50)	4.719

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.271	SD (KM)	2.143
Variance (KM)	4.594	SE of Mean (KM)	0.719
k hat (KM)	0.352	k star (KM)	0.313
nu hat (KM)	7.035	nu star (KM)	6.258
theta hat (KM)	3.614	theta star (KM)	4.063

80% gamma percentile (KM)	1.969	90% gamma percentile (KM)	3.73
95% gamma percentile (KM)	5.737	99% gamma percentile (KM)	10.93

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.26, α)	1.773	Adjusted Chi Square Value (6.26, β)	1.391
95% Gamma Approximate KM-UCL (use when n>=50)	4.487	95% Gamma Adjusted KM-UCL (use when n<50)	5.72

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.27	Mean in Log Scale	-1.153
SD in Original Scale	2.26	SD in Log Scale	1.694
95% t UCL (assumes normality of ROS data)	2.58	95% Percentile Bootstrap UCL	2.388
95% BCA Bootstrap UCL	2.881	95% Bootstrap t UCL	22.77
95% H-UCL (Log ROS)	18.48		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.173	KM Geo Mean	0.309
KM SD (logged)	1.639	95% Critical H Value (KM-Log)	4.531
KM Standard Error of Mean (logged)	0.558	95% H-UCL (KM -Log)	14.08
KM SD (logged)	1.639	95% Critical H Value (KM-Log)	4.531
KM Standard Error of Mean (logged)	0.558		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.321	Mean in Log Scale	-1.02
SD in Original Scale	2.238	SD in Log Scale	1.7
95% t UCL (Assumes normality)	2.619	95% H-Stat UCL	21.66

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	5.762	99% KM (Chebyshev) UCL	8.426

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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APPENDIX I

Remedial Action Completion Report

Soil Remedial Action Completion Report Parcel 57 – Former Coal Storage and Railroad Unloading Area

NJDEP PI#G000000032

Environmental Services and Remedial Actions (Various Sites)
Fort Monmouth
Oceanport, Monmouth County, NJ

US Army Corps of Engineers
New York District
& Huntsville Engineering and Support Center



Contract No. W912DY-17-D-0002
Delivery Order No. W912DY19F0053

July 2020

Prepared for:

US Army Corps of Engineers
New York District & Huntsville Engineering and Support Center
Contract No. W912DY-17-D-0002
Delivery Order No. W912DY19F0053

Prepared by:

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Attachment 2 AECOM Field Memorandum 1/08/2020

Attachment 3 Analytical Data Packages

Attachment 4 Clean Fill Certification

Attachment 5 Waste Manifests

List of Acronyms

AOC	Area of Concern
AST	Above Ground Storage Tank
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DIGWSSL	Default Impact to Groundwater Soil Screening Level
EPH	extractable petroleum hydrocarbons
FSPM	NJDEP Field Sampling Procedures Manual
ft	feet
FMERA	Fort Monmouth Economic Revitalization Authority
FTMM	Fort Monmouth
GWQS	Ground Water Quality Standards
IRP	Installation Restoration Program
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PI#	NJDEP Program Interest Number
QAPP	Quality Assurance Project Plan
RACR	Remedial Action Completion Report
RAWP	Remedial Action Work Plan
RDCSRS	Residential Direct Contact Soil Remediation Standard
RSRC	Residential Soil Remediation Criterion (EPH)
SRS	Soil Remediation Standards, (N.J.A.C. 7:26D et seq.)
TRSR	Technical Requirements for Site Remediation
USACE	US Army Corps of Engineers
USAESCH	US Army Engineering and Support Center Huntsville
USC	United States Code
VOCs	Volatile Organic Compounds

1.0 Introduction

This Remedial Action Completion Report (RACR) was prepared by AECOM on behalf of the United States Army Base Realignment and Closure Division (BRAC), as contracted through the Corps of Engineers (USACE) New York District and the U.S. Army Engineering and Support Center, Huntsville (USAESCH). The work was performed under Contract W912DY17D0002, Delivery Order W912DY19F0053 dated January 31, 2019 and AECOM's proposal dated October 4, 2018.

The purpose of this RACR is to present a detailed description of soil Removal Action activities conducted at Parcel 57, located at Fort Monmouth (FTMM), Oceanport, Monmouth County, New Jersey (**Figure 1**), as proposed in the Soil Remedial Action Work Plan (RAWP) dated July 2019 (AECOM, 2019), which was coordinated with the New Jersey Department of Environmental Protection (NJDEP) on August 5, 2019.

With regard to the Removal Action , the U.S. Army is the lead agency for Fort Monmouth in accordance with the Comprehensive Environmental Response, Compensation and Liability Act, (42 United States Code (USC) §§ 9601 et. seq.), as amended (CERCLA) and Executive Order (EO) 12580 and makes remedial decisions for FTMM in consultation with the New Jersey Department of Environmental Protection (NJDEP), the state support agency. As such, this RACR has been prepared in general accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 CFR Part 300) and New Jersey's Technical Requirements for Site Remediation (NJAC 7:26E) as well as Environmental Protection Agency guidance and current NJDEP guidance. This RACR addresses only polycyclic aromatic hydrocarbon (PAH) impacted soils within Parcel 57. The U.S. Army made the determination that an unacceptable risk was present at the site because of PAH contamination which was associated with historic Army operations and a Time Critical Removal Action was identified as the most efficient authority to address the contamination while supporting the pending transfer activities.

1.1 Background

Parcel 57 is approximately 14.5 acres, located in the south-central portion of the Main Post (**Figure 1**) near the former commissary. A coal storage area and fuel unloading area formerly existed along the former railroad corridor in the vicinity of Buildings 800, 801, and 1007. FTMM real property records indicate that the T-805 coal storage concrete slab was constructed in 1945 and was replaced by new parking lots and a building in 1977.

Multiple fuel oil underground storage tanks (USTs), a bulk fuel oil aboveground storage tank (AST), and several structures related to fuel storage or transfer were once present at or near Parcel 57 (**Figure 2**). A 250,000-gallon bulk fuel oil AST was located at an adjacent Installation Restoration Program (IRP) site, FTMM-66, situated east of Parcel 57. Former gasoline USTs were located at adjacent IRP Site FTMM-64 to the southeast, as was a pipeline to a fuel loading/unloading pump house area along the southern spur of the former railroad tracks. Approximately 4,000 cubic yards of petroleum-contaminated soil were removed during construction of the Parcel 57 Commissary (Building 1007) in January 1997 (Department of the Army, 2017). FTMM-64 and FTMM-66 are being remediated separately from Parcel 57, and therefore are not addressed in this RAWP.

Approximately 40% of Parcel 57 is currently covered by Buildings 800, 801, 1005, 1007, and 1010, and by portions of Building 1000 and 1002 (**Figure 2**). Asphalt pavement for parking areas and roads covers approximately half of the Parcel 57 and a relatively small portion of Parcel 57 (about 10 percent) consists of landscaped areas.

Parcel 57 is currently unoccupied. Anticipated future land use includes low-to-medium-density residential housing and some supporting retail, office, and civic/institutional uses (education-medical campus) (Department of the Army, 2018).

1.2 Summary of Previous Remedial Investigation(s)

Soil and groundwater remedial investigations (non-petroleum) at Parcel 57 have been on-going since 2007.

Previous analytical results and reports indicate the presence of five PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene) are present in soil above NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS) and/or NJDEP Default Impact to Groundwater Soil Screening Levels (DIGWSSL). PAH exceedances have been delineated horizontally and vertically in soil, to depths of approximately 5.5-6.0 feet below ground surface (bgs).

No exceedances of the RDCSRS for metals or volatile organic compounds (VOCs) were observed in soils, and additional sampling for these compounds was not proposed in the approved RAWP (AECOM, 2019).

Polychlorinated biphenyls (PCBs) and extractable petroleum hydrocarbons (EPH) have also been investigated at Parcel 57. PCB concentrations above NJDEP RDCSRS were identified and delineated. The Army performed an Interim Removal Action via a small (approximately 7.6 feet wide x 5.5 feet long x 5.0 feet deep) excavation in July 2016. One confirmation post-excavation sample was collected from the bottom of the excavation and analyzed for PCB and EPH. PCBs were not detected. EPH was detected at 120 mg/kg, which is below current NJDEP residential EPH trigger concentration for additional analysis of 1,000 mg/kg for a Category 1 Discharge (Number 2 Fuel Oil only), and also below the NJDEP Residential EPH Soil Remediation Criterion (RSRC) of 5,100 mg/kg (NJDEP, 2019).

Groundwater investigations, which are ongoing, have indicated the presence of some metals in groundwater above NJDEP Groundwater Quality Standards (GWQS) (Parsons, 2016) and are likely related to background conditions. Metals rich glauconitic sands have been documented throughout former Fort Monmouth which are known to exhibit elevated concentrations in soils, which could impact natural groundwater quality in the area.

This RACR has been prepared to specifically address the excavation and off-site disposal of the PAH contaminated soils at ten “Hot Spot” locations, as depicted on **Figure 2**. Groundwater at Parcel 57 is being addressed by the Army separate from this submission.

1.3 Technical Requirements

This soil RAWP was prepared in accordance with the following technical requirements and guidance:

- *Technical Requirements for Site Remediation (TRSR)*, N.J.A.C. 7:26E, last amended August 6, 2018 (NJDEP, 2018);
- N.J.A.C. 7:26D – *Remediation Standards*, last amended September 18, 2017 (NJDEP, 2017a);
- NJDEP *Field Sampling Procedures Manual* (FSPM) (NJDEP, 2011);
- *Development of Impact to Ground Water Soil Remediation Standards Using the Soil-Water Partition Equation*, Version 2.0, dated November 2013 (NJDEP, 2013a);
- *Development of Site-Specific Impact to Ground Water Soil Remediation Standards Using the Synthetic Precipitation Leaching Procedure,* Version 3.0, November 2013. (NJDEP 2013b);
- *Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil*, Version 1.2, revised March 2015 (NJDEP, 2015a);

- *Analytical Laboratory Data Generation, Assessment and Usability Technical Guidance*, Version 1.0, April 2014 (NJDEP, 2014a);
- *Data of Known Quality Protocols Technical Guidance*, Version 1.0, April 2014 (NJDEP, 2014b);
- *Data Quality Assessment and Data Usability Evaluation Technical Guidance*, Version 1.0, April 2014 (NJDEP, 2014c).

1.4 Remediation Standards

Soil analytical results were compared to the current NJDEP Default Impact to Ground Water Soil Screening Levels (DIGWSSL), Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standard (NRDCSRS), as per NJDEP Remediation Standards N.J.A.C. 7:26D (NJDEP, 2017a).

2.0 Remedial Action

2.1 Detailed Description of Remedial Action

As depicted on **Figure 2 and Figures 3a and 3b**, a total of 10 PAH hot-spot excavation locations were identified by Parsons, each approximately 6.0 foot wide by 6.0 foot in length and varying from 0.5-6.5 feet in depth (Parsons, 2018).

On August 16, 2019, initial excavation limits were surveyed and staked by a licensed surveyor and excavation areas were screened for the presence of buried utilities or other obstructions using ground penetrating radar (GPR). Pre-excavation waste classification soil samples were collected using a direct-push sampling rig.

Removal Action activities were initiated on September 30, 2019 and completed on October 4, 2019. The work was completed under the authorities for a Time Critical Removal Action, as described in the 40 CFR 300.415(b). Excavation areas were cleared of vegetation, asphalt and/or concrete, as necessary. Asphalt and concrete were stockpiled for subsequent transport and off-site disposal.

Soil at each location was excavated and direct loaded for off-site transport and disposal. Each area was excavated to the designated minimum excavation depth based on previous sampling results. Sidewall samples were collected at the depths corresponding to 1) the depth of the previous exceedances; 2) the bottom of each sidewall; and, 3) the excavation bottom, pursuant to AECOM's Field Memorandum dated September 26, 2019 (AECOM, 2019) included as **Attachment 1**. Soil samples were forwarded to SGS America, Inc.in Dayton New Jersey for SVOC Analysis via EPA Method SW846 8270D.

As indicated in **Table 1**, analytical results showed compliance with NJDEP DIGWSSL and RDCSRS at all excavation sample locations except SS-12, SS-13, SS-14 and SS-18. These areas were re-excavated on January 15, 2020 and additional post-excavation soil samples were collected pursuant to AECOM's Field Memorandum dated January 8, 2020 (AECOM, 2020) included as **Attachment 2**. As a contingency measure, soil samples were also collected for Synthetic Precipitation Leaching Procedure (SPLP) analysis, in the event that exceedances of DIGWSSL were observed and the calculation of a site-specific impact to groundwater soil remediation standard was needed. As indicated in **Table 1**, all post-excavation soil sample results from the second round of excavation were compliant with NJDEP DIGWSSL and RDCSRS. Analytical data packages for all soil samples are provided in **Attachment 3**.

2.2 Remedial Action Effectiveness

The overall objective for soil at Parcel 57 was to complete a Removal Action to address all unacceptable risks associated with historic contamination at the site. Achieving Unlimited Use/Unrestricted Exposure levels will not require the continued use of either engineering or institutional controls to meet the established health risk and environmental standards.

Although Removal Actions do not need to meet the standards identified as Applicable or Relevant and Appropriate Regulations, the excavation was intended to be the final remedial action for the site and comparison to the NJDEP regulations was conducted. Following excavation of the PAH impacted soils the results of confirmation soil sampling and analysis indicated compliance with NJDEP DIGWSSL and RDCSRS and demonstrated the effectiveness of the remedial action in protecting public health, safety and the environment. No further remedial action for soil at Parcel 57 is proposed.

2.3 Quality Assurance/Quality Control

Based on AECOM's review of the laboratory analytical data packages, the data is useable for its intended purpose. All samples were extracted and analyzed by the laboratory within the maximum sample holding time. All method detection limits/reporting limits indicated by the laboratory were below applicable NJDEP remediation standards.

2.4 Restoration Activities and Clean Fill Documentation

Restoration activities for each excavated area included placement and compaction of clean backfill (DGA) to surface grade. Asphalt and concrete removed as part of the remedial action was not restored. Clean fill was obtained from Stavola Construction Materials, Inc located in Bridgewater, NJ and transported to the Site by Maddox Materials, LLC located in Spotswood, NJ. Clean fill certification documentation is included in **Attachment 4** of this report.

2.5 Waste Generated by Remedial Action

Approximately 156.88 tons of waste soil was transported to Bayshore Soil Management, LLC, located at 75 Crows Mill Road in Keasbey, NJ for disposal. Disposal documentation is provided in **Attachment 5** of this report.

3.0 Certification Statement

Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this RACR, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

William R. Colvin
BRAC Environmental Coordinator
U.S. Army Fort Monmouth

13 July 2020
Date

4.0 References

AECOM, 2019. *Soil Remedial Action Work Plan, Parcel 57 – Former Coal Storage and Railroad Unloading Area*. July 2019

AECOM, 2019. *Field Memorandum – FTMM Parcel 57 Hot Spot Remedial Excavation and Post-Excavation Sampling*. September 26, 2019

AECOM, 2020. *Field Memorandum – FTMM Parcel 57 Additional Remedial Excavation and Post-Excavation Soil Sampling (including SPLP) Samples and Analysis.* January 8, 2020

Department of the Army, 2017. *Parcel 57 Round 3 Letter Work Plan Addendum, Fort Monmouth, New Jersey*, August 28, 2017

Department of the Army, 2018. *Remedial Investigation Letter Report, Parcel 57-Former Coal Storage and Railroad Unloading Area, Fort Monmouth, NJ*. July 2018

NJDEP, 2013. *Development of Impact to Ground Water Soil Remediation Standards Using the Soil-Water Partition Equation,* Version 2.0, dated November 2013.

NJDEP, 2014a. *Analytical Laboratory Data Generation, Assessment and Usability Technical Guidance*, Version 1.0, April 2014.

NJDEP, 2014b. *Data of Known Quality Protocols Technical Guidance*, Version 1.0, April 2014.

NJDEP, 2014c. *Data Quality Assessment and Data Usability Evaluation Technical Guidance*, Version 1.0, April 2014.

NJDEP, 2015a. *Technical Guidance for Site Investigation of Soil, Remedial Investigation of Soil, and Remedial Action Verification Sampling for Soil*, Version 1.2, revised March 2015.

NJDEP, 2015b. *Fill Material Guidance for SRP Sites* Version 3.0, revised April 2015.

NJDEP, 2017a. N.J.A.C. 7:26D – *Remediation Standards*. Last Updated September 18, 2017.

NJDEP, 2017b. NJDEP GPS Data Collection Standards for GIS Data Development, dated April 24, 2017.

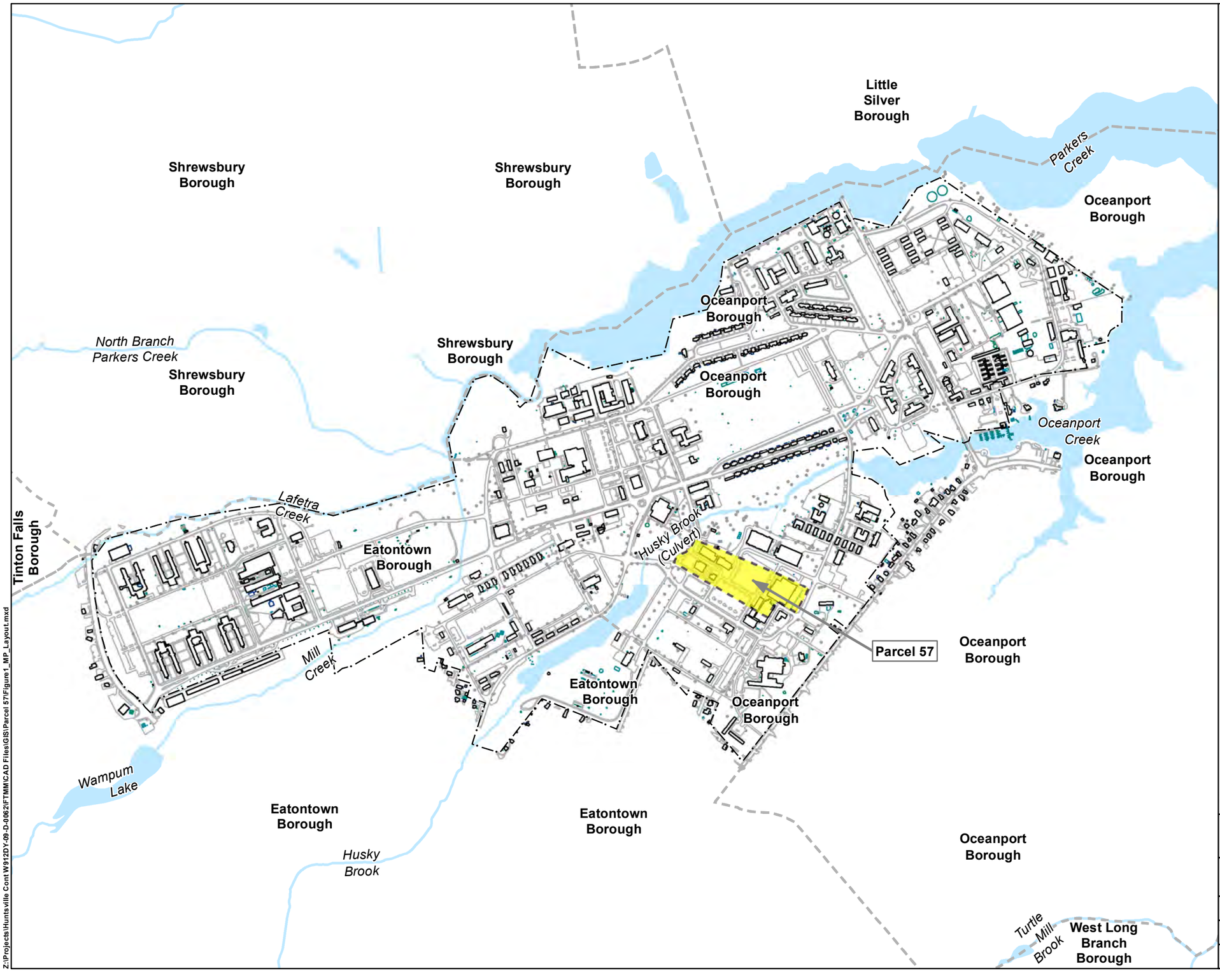
NJDEP, 2018. N.J.A.C. 7:26E – *Technical Requirements for Site Remediation. Last amended* August 6, 2018.

NJDEP, 2019. *Evaluation of Extractable Petroleum Hydrocarbons in Soil Technical Guidance.* Version 1.0, June 2019.

Parsons, 2016. *Final ECP Parcel 57 Round 2 Work Plan Addendum, Fort Monmouth, Oceanport, New Jersey*, March 2016.

Parsons, 2018. *Action Memorandum for Parcel 57, Fort Monmouth, Oceanport, New Jersey.* September 2018.

Figures



LEGEND:

- Parcel Boundary
- Municipal Boundary
- Installation Boundary
- Surface Water Feature

N

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

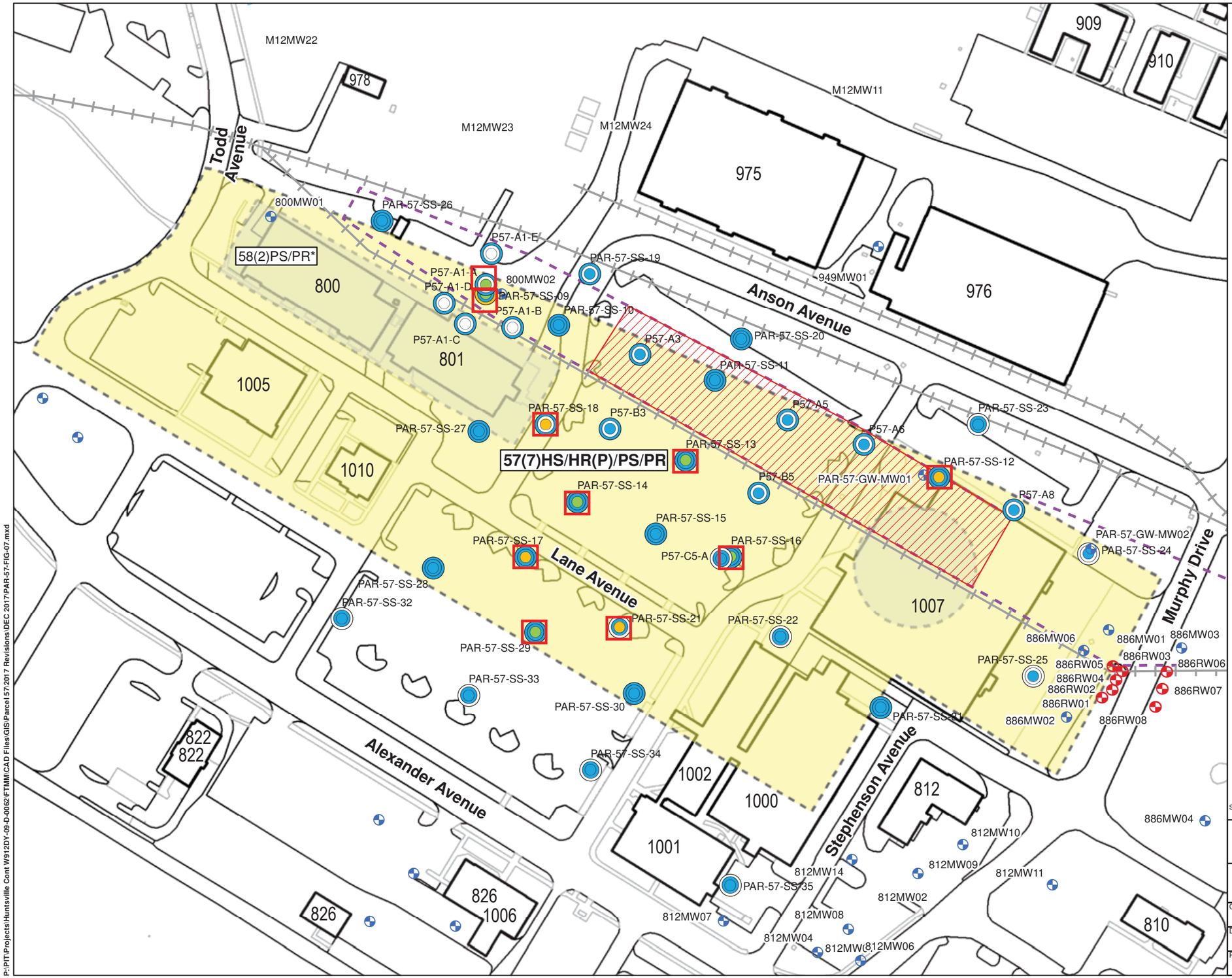
Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008; ESRI Data and Maps 2011; USGS NHD, 2012.

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey

PARCEL 57 LOCATION

CREATED BY: RR	REVIEWED BY: RF
DATE: MAY. 2017	FIGURE NUMBER: FIGURE 1
PROJECT NUMBER: 748810-01000	FILE: Figure1_MP_Layout.mxd

Z:\Projects\Huntsville Cont\W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 57\Figure1_MP_Layout.mxd



LEGEND:

- Shallow Monitoring Well
- Recovery Well
- Parcel 57 Boundary
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Approximate Extent of Former Coal Storage
- Former Concrete Coal Storage Pad
- Not analyzed for PAHs
- PAHs not detected or detected below RDCSRS
- PAHs exceeded RDCSRS
- PAHs exceeded both RDCSRS and NRDCSRS
- Water Table (approx. 5-7.5 ft. bgs)
  Intermediate (approx. 2-3.5 ft. bgs)
  Shallow (approx. 0-1 ft. bgs)
- PAH Hotspot Excavation Location

NOTES:

1. RDCSRS = Residential Direct Contact Soil Remediation Standard
2. NRDCSRS = Non-Residential Direct Contact Soil Remediation Standard
3. 2007 Sample Results are not shown if a 2010, 2015, or 2016 sample was collected in the same location.

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description
  - HS – Hazardous Substance Storage
  - HR – Hazardous Substance Release
  - PS – Petroleum Storage
  - PR – Petroleum Release
  - (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 120 feet

0 60 120 240 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

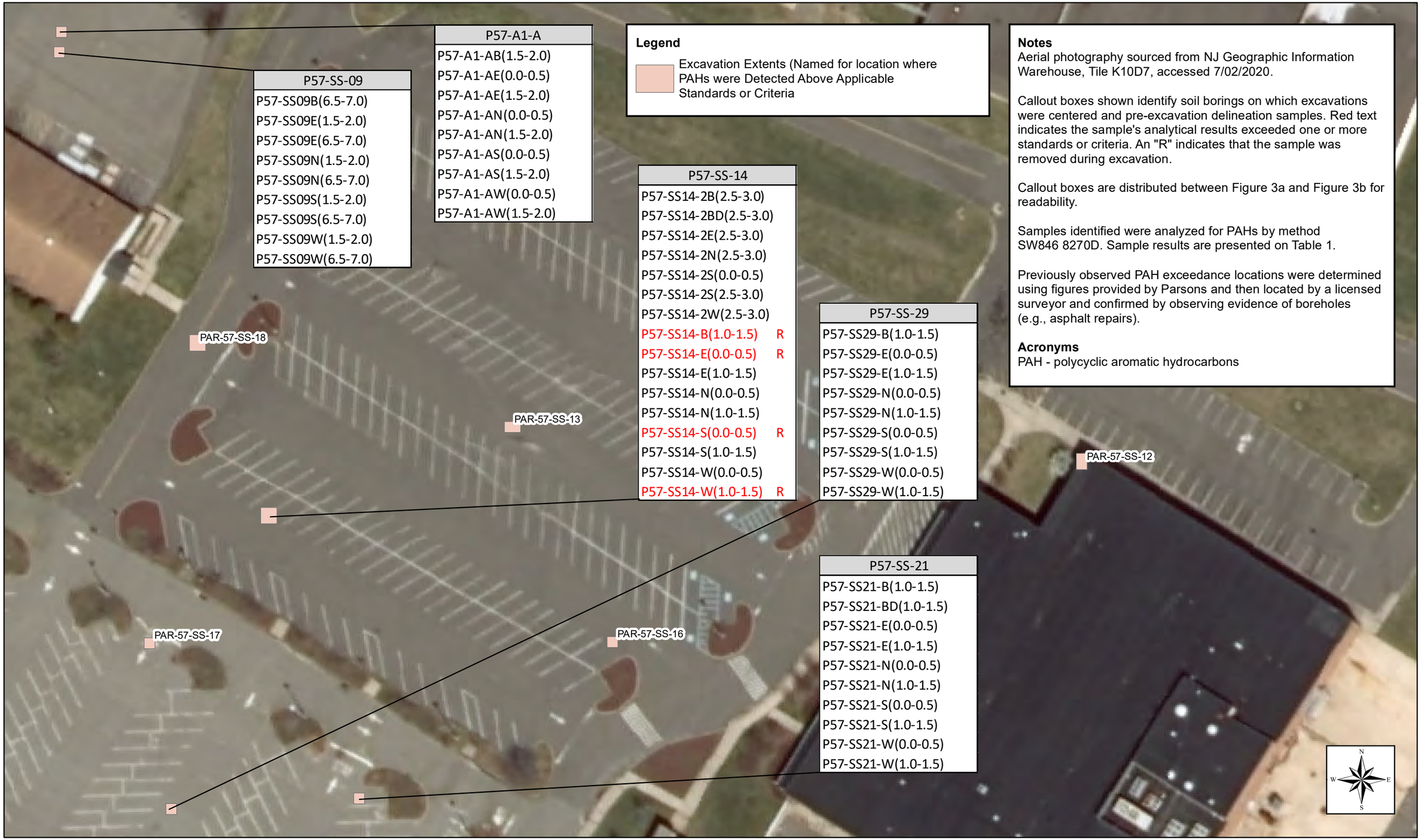
PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

COMPARISON OF SOIL RESULTS FOR PAHS TO NJDEP DIRECT CONTACT STANDARDS

CREATED BY:	REVIEWED BY:
RR	JB
DATE:	FIGURE NUMBER:
MAR. 2018	FIGURE 2
PROJECT NUMBER:	FILE:
748810-02110	PAR-57-FIG-07.mxd

P:\PIT Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 57-2017 Revisions\DEC 2017\PAR-57-FIG-07.mxd



Legend

Excavation Extents (Named for location where PAHs were Detected Above Applicable Standards or Criteria

Notes

Aerial photography sourced from NJ Geographic Information Warehouse, Tile K10D7, accessed 7/02/2020.

Callout boxes shown identify soil borings on which excavations were centered and pre-excavation delineation samples. Red text indicates the sample's analytical results exceeded one or more standards or criteria. An "R" indicates that the sample was removed during excavation.

Callout boxes are distributed between Figure 3a and Figure 3b for readability.

Samples identified were analyzed for PAHs by method SW846 8270D. Sample results are presented on Table 1.

Previously observed PAH exceedance locations were determined using figures provided by Parsons and then located by a licensed surveyor and confirmed by observing evidence of boreholes (e.g., asphalt repairs).

Acronyms

PAH - polycyclic aromatic hydrocarbons

AECOM

0 25 50 100

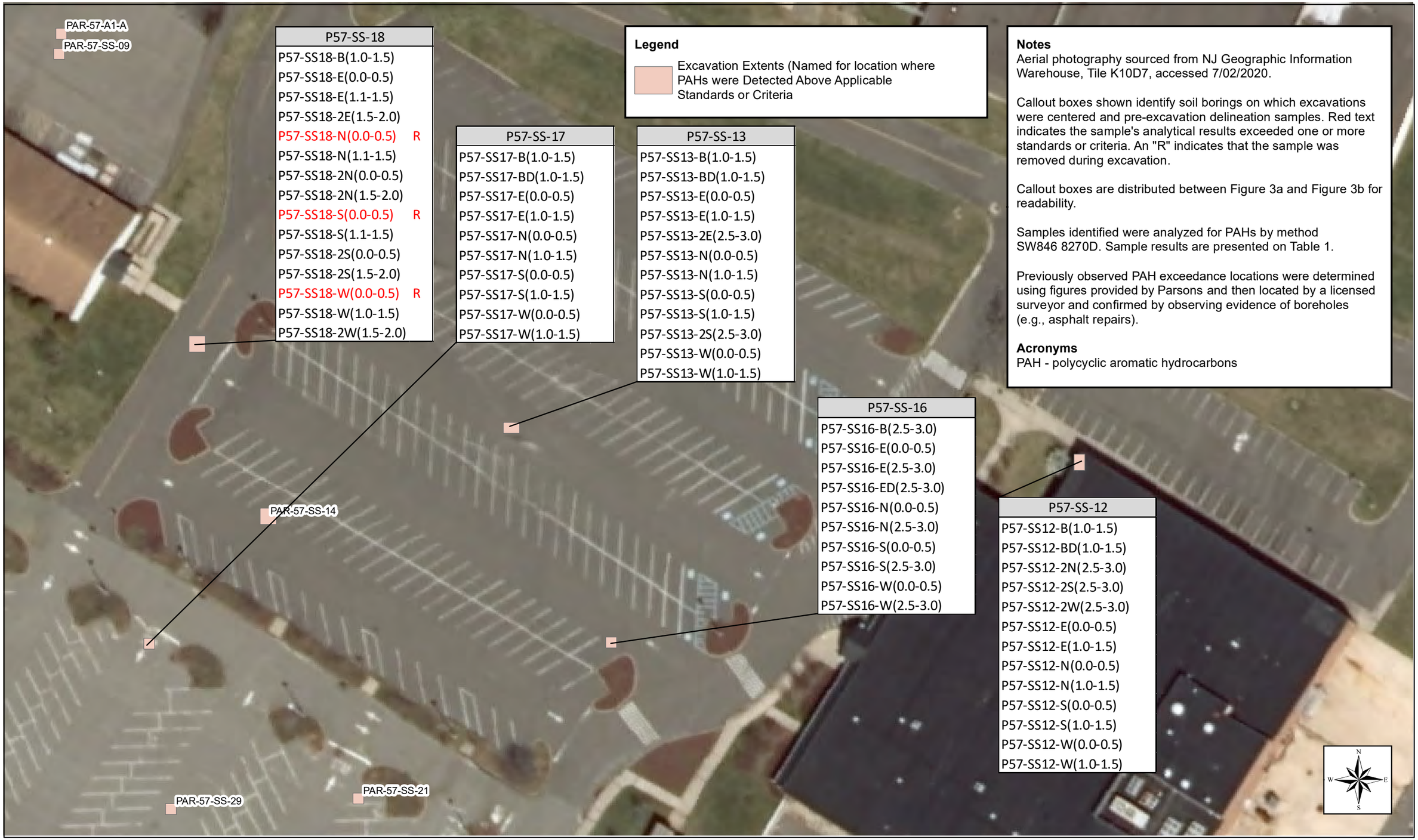
Scale in Feet

Parcel - 57 Former Coal Storage and Railroad Unloading Area
Fort Monmouth
Oceanport, Monmouth County, NJ

DATE: 07/07/2020 | DRAWN BY: AC | CHECKED BY: AL

Figure 3a
Soil Sample Locations

Path: N:\900 CAD\910 GIS\MXD\FTMM VS\RAR Parcel 57 Figure 3a.mxd



P57-SS-18
P57-SS18-B(1.0-1.5)
P57-SS18-E(0.0-0.5)
P57-SS18-E(1.1-1.5)
P57-SS18-2E(1.5-2.0)
P57-SS18-N(0.0-0.5) R
P57-SS18-N(1.1-1.5)
P57-SS18-2N(0.0-0.5)
P57-SS18-2N(1.5-2.0)
P57-SS18-S(0.0-0.5) R
P57-SS18-S(1.1-1.5)
P57-SS18-2S(0.0-0.5)
P57-SS18-2S(1.5-2.0)
P57-SS18-W(0.0-0.5) R
P57-SS18-W(1.0-1.5)
P57-SS18-2W(1.5-2.0)

P57-SS-17
P57-SS17-B(1.0-1.5)
P57-SS17-BD(1.0-1.5)
P57-SS17-E(0.0-0.5)
P57-SS17-E(1.0-1.5)
P57-SS17-N(0.0-0.5)
P57-SS17-N(1.0-1.5)
P57-SS17-S(0.0-0.5)
P57-SS17-S(1.0-1.5)
P57-SS17-W(0.0-0.5)
P57-SS17-W(1.0-1.5)

P57-SS-13
P57-SS13-B(1.0-1.5)
P57-SS13-BD(1.0-1.5)
P57-SS13-E(0.0-0.5)
P57-SS13-E(1.0-1.5)
P57-SS13-2E(2.5-3.0)
P57-SS13-N(0.0-0.5)
P57-SS13-N(1.0-1.5)
P57-SS13-S(0.0-0.5)
P57-SS13-S(1.0-1.5)
P57-SS13-2S(2.5-3.0)
P57-SS13-W(0.0-0.5)
P57-SS13-W(1.0-1.5)

P57-SS-16
P57-SS16-B(2.5-3.0)
P57-SS16-E(0.0-0.5)
P57-SS16-E(2.5-3.0)
P57-SS16-ED(2.5-3.0)
P57-SS16-N(0.0-0.5)
P57-SS16-N(2.5-3.0)
P57-SS16-S(0.0-0.5)
P57-SS16-S(2.5-3.0)
P57-SS16-W(0.0-0.5)
P57-SS16-W(2.5-3.0)

P57-SS-12
P57-SS12-B(1.0-1.5)
P57-SS12-BD(1.0-1.5)
P57-SS12-2N(2.5-3.0)
P57-SS12-2S(2.5-3.0)
P57-SS12-2W(2.5-3.0)
P57-SS12-E(0.0-0.5)
P57-SS12-E(1.0-1.5)
P57-SS12-N(0.0-0.5)
P57-SS12-N(1.0-1.5)
P57-SS12-S(0.0-0.5)
P57-SS12-S(1.0-1.5)
P57-SS12-W(0.0-0.5)
P57-SS12-W(1.0-1.5)

Legend

Excavation Extents (Named for location where PAHs were Detected Above Applicable Standards or Criteria

Notes

Aerial photography sourced from NJ Geographic Information Warehouse, Tile K10D7, accessed 7/02/2020.

Callout boxes shown identify soil borings on which excavations were centered and pre-excavation delineation samples. Red text indicates the sample's analytical results exceeded one or more standards or criteria. An "R" indicates that the sample was removed during excavation.

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Acronyms

PAH - polycyclic aromatic hydrocarbons

AECOM

0 25 50 100

Scale in Feet

Parcel - 57 Former Coal Storage and Railroad Unloading Area
Fort Monmouth
Oceanport, Monmouth County, NJ

DATE: 07/07/2020 | DRAWN BY: AC | CHECKED BY: AL

Figure 3b
Soil Sample Locations

Path: N:\900 CAD\910 GIS\MXD\FTMM VSIRAR Parcel 57 Figure 3b.mxd

Table

Table 1
Comparison of Soil Results for PAHs to DIGWSSL, RDCSRS, and NRDCSRS
Parcel 57 - Former Coal Storage and Railroad Unloading Area
Fort Monmouth
Oceanport, Monmouth County, NJ

					Analyte Name	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Dibenzo(a,h)anthracene	Indeno(1,2,3-c,d)pyrene
					CAS RN	56-55-3	205-99-2	207-08-9	53-70-3	193-39-5
					Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					NJDEP DIGWSSL	0.8	2	25	0.8	7
					NJDEP RDCSRS	*5*	*5*	*45*	*0.5*	*5*
					NJDEP NRDCSRS	17	17	170	2	17
Location ID (G1)	Sample ID	Lab ID	Sample Date	Removed? (G2)	Depth (ft bgs) (G3)					
P57-A1-A	P57-A1-AB(1.5-2.0)	JC95903-18	9/30/2019		1.5 - 2	< 0.041 U	< 0.041 U	< 0.041 U	< 0.041 U	< 0.041 U
P57-A1-A-E	P57-A1-AE(0.0-0.5)	JC95903-14	9/30/2019		0 - 0.5	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-A1-A-E	P57-A1-AE(1.5-2.0)	JC95903-15	9/30/2019		1.5 - 2	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U
P57-A1-A-N	P57-A1-AN(0.0-0.5)	JC95903-10	9/30/2019		0 - 0.5	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-A1-A-N	P57-A1-AN(1.5-2.0)	JC95903-11	9/30/2019		1.5 - 2	< 0.041 U	< 0.041 U	< 0.041 U	< 0.041 U	< 0.041 U
P57-A1-A-S	P57-A1-AS(0.0-0.5)	JC95903-12	9/30/2019		0 - 0.5	0.0100 J	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-A1-A-S	P57-A1-AS(1.5-2.0)	JC95903-13	9/30/2019		1.5 - 2	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U
P57-A1-A-W	P57-A1-AW(0.0-0.5)	JC95903-16	9/30/2019		0 - 0.5	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-A1-A-W	P57-A1-AW(1.5-2.0)	JC95903-17	9/30/2019		1.5 - 2	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U	< 0.04 U
P57-SS-09	P57-SS09B(6.5-7.0)	JC95903-7	9/30/2019		6.5 - 7	< 0.044 U	< 0.044 U	< 0.044 U	< 0.044 U	< 0.044 U
P57-SS-09-E	P57-SS09E(1.5-2.0)	JC95903-3	9/30/2019		1.5 - 2	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-SS-09-E	P57-SS09E(6.5-7.0)	JC95903-5	9/30/2019		6.5 - 7	< 0.043 U	< 0.043 U	< 0.043 U	< 0.043 U	< 0.043 U
P57-SS-09-N	P57-SS09N(1.5-2.0)	JC95903-1	9/30/2019		1.5 - 2	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-09-N	P57-SS09N(6.5-7.0)	JC95903-6	9/30/2019		6.5 - 7	< 0.043 U	< 0.043 U	< 0.043 U	< 0.043 U	< 0.043 U
P57-SS-09-S	P57-SS09S(1.5-2.0)	JC95903-2	9/30/2019		1.5 - 2	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U
P57-SS-09-S	P57-SS09S(6.5-7.0)	JC95903-9	9/30/2019		6.5 - 7	< 0.044 U	< 0.044 U	< 0.044 U	< 0.044 U	< 0.044 U
P57-SS-09-W	P57-SS09W(1.5-2.0)	JC95903-4	9/30/2019		1.5 - 2	0.0274 J	0.0315 J	< 0.035 U	< 0.035 U	0.0371
P57-SS-09-W	P57-SS09W(6.5-7.0)	JC95903-8	9/30/2019		6.5 - 7	< 0.044 U	< 0.044 U	< 0.044 U	< 0.044 U	< 0.044 U
P57-SS-12	P57-SS12-B(1.0-1.5)	JC96270-19	10/4/2019		1 - 1.5	0.185	0.205	0.0692	0.0515	0.175
P57-SS-12	P57-SS12-BD(1.0-1.5)	JC96270-20	10/4/2019		1 - 1.5	0.0963	0.116	0.0343 J	0.0241 J	0.112
P57-SS-12-E	P57-SS12-E(0.0-0.5)	JC96270-15	10/4/2019		0 - 0.5	0.124	0.169	0.0572	0.0257 J	0.156
P57-SS-12-E	P57-SS12-E(1.0-1.5)	JC96270-16	10/4/2019		1 - 1.5	0.209	0.246	0.0761	0.0390	0.161
P57-SS-12-N	P57-SS12-N(0.0-0.5)	JC96270-11	10/4/2019		0 - 0.5	0.145	0.189	0.0635	0.0267 J	0.133
P57-SS-12-N	P57-SS12-N(1.0-1.5)	JC96270-12	10/4/2019		1 - 1.5	0.378	0.51	0.132	0.118	0.406
P57-SS-12-N2	P57-SS12-2N(2.5-3.0)	JD1903-1	1/15/2020		2.5 - 3	0.0571	0.0841	0.0271 J	< 0.036 U	0.0459
P57-SS-14-W2	P57-SS14-2W(2.5-3.0)	JD1903-10	1/16/2020		2.5 - 3	0.0324 J	0.0330 J		< 0.036 U	
P57-SS-12-S	P57-SS12-S(0.0-0.5)	JC96270-13	10/4/2019		0 - 0.5	0.111	0.171	0.0499	0.0262 J	0.133
P57-SS-12-S	P57-SS12-S(1.0-1.5)	JC96270-14	10/4/2019		1 - 1.5	0.528	0.676	0.176	0.155	0.527
P57-SS-14	P57-SS14-2B(2.5-3.0)	JD1903-11	1/16/2020		2.5 - 3	0.0213 J	0.0253 J		< 0.036 U	
P57-SS-12-W	P57-SS12-W(0.0-0.5)	JC96270-17	10/4/2019		0 - 0.5	0.199	0.241	0.0914	0.0399	0.188
P57-SS-12-W	P57-SS12-W(1.0-1.5)	JC96270-18	10/4/2019		1 - 1.5	0.425	0.506	0.141	0.152	0.425
P57-SS-14	P57-SS14-2BD(2.5-3.0)	JD1903-12	1/16/2020		2.5 - 3	0.0253 J	0.0316 J		< 0.036 U	
P57-SS-13	P57-SS13-B(1.0-1.5)	JC96270-9	10/4/2019		1 - 1.5	< 0.039 U	< 0.039 U	< 0.039 U	< 0.039 U	< 0.039 U
P57-SS-13	P57-SS13-BD(1.0-1.5)	JC96270-10	10/4/2019		1 - 1.5	< 0.039 U	< 0.039 U	< 0.039 U	< 0.039 U	< 0.039 U
P57-SS-13-E	P57-SS13-E(0.0-0.5)	JC96270-5	10/4/2019		0 - 0.5	0.252	0.288	0.109	0.0475	0.203
P57-SS-13-E	P57-SS13-E(1.0-1.5)	JC96270-6	10/4/2019		1 - 1.5	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U
P57-SS-13-N	P57-SS13-N(0.0-0.5)	JC96270-1	10/4/2019		0 - 0.5	0.216	0.242	0.0956	0.0343 J	0.174
P57-SS-13-N	P57-SS13-N(1.0-1.5)	JC96270-2	10/4/2019		1 - 1.5	0.0273 J	0.0175 J	< 0.038 U	< 0.038 U	0.0468

Table 1
Comparison of Soil Results for PAHs to DIGWSSL, RDCSRS, and NRDCSRS
Parcel 57 - Former Coal Storage and Railroad Unloading Area
Fort Monmouth
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					Analyte Name	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Dibenzo(a,h)anthracene	Indeno(1,2,3-c,d)pyrene
					CAS RN	56-55-3	205-99-2	207-08-9	53-70-3	193-39-5
					Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					NJDEP DIGWSSL	0.8	2	25	0.8	7
					NJDEP RDCSRS	*5*	*5*	*45*	*0.5*	*5*
					NJDEP NRDCSRS	17	17	170	2	17
Location ID (G1)	Sample ID	Lab ID	Sample Date	Removed? (G2)	Depth (ft bgs) (G3)					
P57-SS-13-S	P57-SS13-S(0.0-0.5)	JC96270-3	10/4/2019		0 - 0.5	0.299	0.354	0.146	0.0571	0.243
P57-SS-13-S	P57-SS13-S(1.0-1.5)	JC96270-4	10/4/2019		1 - 1.5	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U
P57-SS-13-W	P57-SS13-W(0.0-0.5)	JC96270-7	10/4/2019		0 - 0.5	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-SS-13-W	P57-SS13-W(1.0-1.5)	JC96270-8	10/4/2019		1 - 1.5	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U
P57-SS-13-S2	P57-SS13-2S(2.5-3.0)	JD1903-5	1/15/2020		2.5-3.0		< 0.040 U			
P57-SS-13-E2	P57-SS13-2E(2.5-3.0)	JD1903-4	1/15/2020		2.5-3.0		< 0.040 U			
P57-SS-18-N2	P57-SS18-2N(0.0-0.5)	JD1903-14	1/16/2020		0 - 0.5	0.0397	0.0537	0.0197 J	< 0.038 U	0.0334 J
P57-SS-18-S2	P57-SS18-2S(0.0-0.5)	JD1903-15	1/16/2020		0 - 0.5	0.0384	0.0569	0.0213 J	< 0.037 U	0.0376
P57-SS-14	P57-SS14-B(1.0-1.5)	JC95957-28	10/1/2019	Yes (S1)	1 - 1.5	1.21	1.29	0.451	0.164	0.783
P57-SS-14-E	P57-SS14-E(0.0-0.5)	JC95957-24	10/1/2019	Yes (S1)	0 - 0.5	1.27	1.26	0.484	0.155	0.712
P57-SS-14-E	P57-SS14-E(1.0-1.5)	JC95957-25	10/1/2019		1 - 1.5	0.157	0.166	0.0643	0.0254 J	0.103
P57-SS-18-N2	P57-SS18-2N(1.5-2.0)	JD1903-16	1/16/2020		1.5 - 2	0.0339 J	0.0397		< 0.038 U	
P57-SS-14-N	P57-SS14-N(0.0-0.5)	JC95957-20	10/1/2019		0 - 0.5	0.544	0.732	0.271	0.107	0.493
P57-SS-14-N	P57-SS14-N(1.0-1.5)	JC95957-21	10/1/2019		1 - 1.5	0.0634	0.0830	0.0306 J	< 0.036 U	0.0525
P57-SS-14-S	P57-SS14-S(0.0-0.5)	JC95957-22	10/1/2019	Yes (S1)	0 - 0.5	4.6	*5.04*	1.79	*0.709*	3.08
P57-SS-14-S	P57-SS14-S(1.0-1.5)	JC95957-23	10/1/2019		1 - 1.5	0.239	0.285	0.111	0.0326 J	0.171
P57-SS-18-S2	P57-SS18-2S(1.5-2.0)	JD1903-17	1/16/2020		1.5 - 2	0.0407	0.0509		< 0.037 U	
P57-SS-18-E2	P57-SS18-2E(1.5-2.0)	JD1903-18	1/16/2020		1.5 - 2	0.0339 J	0.0369		< 0.036 U	
P57-SS-14-W	P57-SS14-W(0.0-0.5)	JC95957-26	10/1/2019		0 - 0.5	0.403	0.497	0.18	0.0628	0.293
P57-SS-14-W	P57-SS14-W(1.0-1.5)	JC95957-27	10/1/2019	Yes (S1)	1 - 1.5	1.65	1.77	0.607	0.231	1.06
P57-SS-18-W2	P57-SS18-2W(1.5-2.0)	JD1903-19	1/16/2020		1.5 - 2	0.0396	0.0575		< 0.038 U	
P57-SS-16	P57-SS16-B(2.5-3.0)	JC95957-19	10/1/2019		2.5 - 3	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U
P57-SS-16-E	P57-SS16-E(0.0-0.5)	JC95957-14	10/1/2019		0 - 0.5	0.0216 J	0.0283 J	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-16-E	P57-SS16-E(2.5-3.0)	JC95957-15	10/1/2019		2.5 - 3	0.0154 J	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-SS-16-E	P57-SS16-ED(2.5-3.0)	JC95957-16	10/1/2019		2.5 - 3	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-SS-16-N	P57-SS16-N(0.0-0.5)	JC95957-10	10/1/2019		0 - 0.5	0.107	0.131	0.0472	0.0187 J	0.0758
P57-SS-16-N	P57-SS16-N(2.5-3.0)	JC95957-11	10/1/2019		2.5 - 3	0.0139 J	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-16-S	P57-SS16-S(0.0-0.5)	JC95957-12	10/1/2019		0 - 0.5	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-16-S	P57-SS16-S(2.5-3.0)	JC95957-13	10/1/2019		2.5 - 3	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-16-W	P57-SS16-W(0.0-0.5)	JC95957-17	10/1/2019		0 - 0.5	0.172	0.237	0.0836	0.0307 J	0.144
P57-SS-16-W	P57-SS16-W(2.5-3.0)	JC95957-18	10/1/2019		2.5 - 3	0.0346 J	0.0352 J	< 0.036 U	< 0.036 U	0.0219 J
P57-SS-17	P57-SS17-B(1.0-1.5)	JC95957-47	10/1/2019		1 - 1.5	0.119	0.186	0.0576	0.0324 J	0.142
P57-SS-17	P57-SS17-BD(1.0-1.5)	JC95957-48	10/1/2019		1 - 1.5	0.0302 J	0.0454	0.0165 J	< 0.035 U	0.0496
P57-SS-17-E	P57-SS17-E(0.0-0.5)	JC95957-43	10/1/2019		0 - 0.5	< 0.033 U	< 0.033 U	< 0.033 U	< 0.033 U	0.0265 J
P57-SS-17-E	P57-SS17-E(1.0-1.5)	JC95957-44	10/1/2019		1 - 1.5	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U
P57-SS-17-N	P57-SS17-N(0.0-0.5)	JC95957-39	10/1/2019		0 - 0.5	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-17-N	P57-SS17-N(1.0-1.5)	JC95957-40	10/1/2019		1 - 1.5	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U
P57-SS-17-S	P57-SS17-S(0.0-0.5)	JC95957-41	10/1/2019		0 - 0.5	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U

Table 1
Comparison of Soil Results for PAHs to DIGWSSL, RDCSRS, and NRDCSRS
Parcel 57 - Former Coal Storage and Railroad Unloading Area
Fort Monmouth
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					Analyte Name	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Dibenzo(a,h)anthracene	Indeno(1,2,3-c,d)pyrene
					CAS RN	56-55-3	205-99-2	207-08-9	53-70-3	193-39-5
					Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					NJDEP DIGWSSL	0.8	2	25	0.8	7
					NJDEP RDCSRS	*5*	*5*	*45*	*0.5*	*5*
					NJDEP NRDCSRS	17	17	170	2	17
Location ID (G1)	Sample ID	Lab ID	Sample Date	Removed? (G2)	Depth (ft bgs) (G3)					
P57-SS-17-S	P57-SS17-S(1.0-1.5)	JC95957-42	10/1/2019		1 - 1.5	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-SS-17-W	P57-SS17-W(0.0-0.5)	JC95957-45	10/1/2019		0 - 0.5	0.0186 J	< 0.034 U	< 0.034 U	< 0.034 U	0.0207 J
P57-SS-17-W	P57-SS17-W(1.0-1.5)	JC95957-46	10/1/2019		1 - 1.5	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-18	P57-SS18-B(1.0-1.5)	JC95957-9	10/1/2019		1 - 1.5	0.0739	0.11	0.0400	0.0292 J	0.0920
P57-SS-18-E	P57-SS18-E(0.0-0.5)	JC95957-5	10/1/2019		0 - 0.5	0.432	0.468	0.151	0.0646	0.255
P57-SS-18-E	P57-SS18-E(1.1-1.5)	JC95957-6	10/1/2019		1.1 - 1.5	0.0245 J	0.0257 J	< 0.036 U	< 0.036 U	0.0181 J
P57-SS-12-S2	P57-SS12-2S(2.5-3.0)	JD1903-2	1/15/2020		2.5 - 3	0.164	0.224	0.0789	0.0450	0.155
P57-SS-18-N	P57-SS18-N(0.0-0.5)	JC95957-1	10/1/2019	Yes (S1)	0 - 0.5	3.68	3.68	1.29	0.433	1.91
P57-SS-18-N	P57-SS18-N(1.1-1.5)	JC95957-2	10/1/2019		1.1 - 1.5	0.0797	0.106	0.0348 J	0.0185 J	0.0640
P57-SS-12-W2	P57-SS12-2W(2.5-3.0)	JD1903-3	1/15/2020		2.5 - 3	0.137	0.185	0.0658	0.0368	0.124
P57-SS-14-S2	P57-SS14-2S(0.0-0.5)	JD1903-6	1/16/2020		0 - 0.5	0.0684	0.0745	0.0271 J	< 0.037 U	0.0391
P57-SS-18-S	P57-SS18-S(0.0-0.5)	JC95957-3	10/1/2019	Yes (S1)	0 - 0.5	4.65	4.85	1.75	*0.653*	2.94
P57-SS-18-S	P57-SS18-S(1.1-1.5)	JC95957-4	10/1/2019		1.1 - 1.5	0.0262 J	0.0289 J	< 0.038 U	< 0.038 U	< 0.038 U
P57-SS-12-N2	P57-SS14-2N(2.5-3.0)	JD1903-7	1/16/2020		2.5 - 3	0.0597	0.0764	0.0225 J	< 0.036 U	0.0481
P57-SS-14-S2	P57-SS14-2S(2.5-3.0)	JD1903-8	1/16/2020		2.5 - 3	0.0108 J	< 0.037 U		< 0.037 U	
P57-SS-18-W	P57-SS18-W(0.0-0.5)	JC95957-7	10/1/2019	Yes (S1)	0 - 0.5	2.53	2.61	0.944	0.331	1.48
P57-SS-18-W	P57-SS18-W(1.0-1.5)	JC95957-8	10/1/2019		1 - 1.5	0.0234 J	0.0238 J	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-14-E2	P57-SS14-2E(2.5-3.0)	JD1903-9	1/16/2020		2.5 - 3	0.0162 J	0.0185 J		< 0.036 U	
P57-SS-21	P57-SS21-B(1.0-1.5)	JC95957-37	10/1/2019		1 - 1.5	0.0106 J	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-21	P57-SS21-BD(1.0-1.5)	JC95957-38	10/1/2019		1 - 1.5	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U
P57-SS-21-E	P57-SS21-E(0.0-0.5)	JC95957-33	10/1/2019		0 - 0.5	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-21-E	P57-SS21-E(1.0-1.5)	JC95957-34	10/1/2019		1 - 1.5	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.038 U
P57-SS-21-N	P57-SS21-N(0.0-0.5)	JC95957-29	10/1/2019		0 - 0.5	0.0542	0.0614	0.0257 J	< 0.035 U	0.0419
P57-SS-21-N	P57-SS21-N(1.0-1.5)	JC95957-30	10/1/2019		1 - 1.5	0.0122 J	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U
P57-SS-21-S	P57-SS21-S(0.0-0.5)	JC95957-31	10/1/2019		0 - 0.5	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U	< 0.035 U
P57-SS-21-S	P57-SS21-S(1.0-1.5)	JC95957-32	10/1/2019		1 - 1.5	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-21-W	P57-SS21-W(0.0-0.5)	JC95957-35	10/1/2019		0 - 0.5	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-21-W	P57-SS21-W(1.0-1.5)	JC95957-36	10/1/2019		1 - 1.5	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U	< 0.036 U
P57-SS-29	P57-SS29-B(1.0-1.5)	JC95957-57	10/1/2019		1 - 1.5	0.0163 J	< 0.035 U	< 0.035 U	< 0.035 U	0.0242 J
P57-SS-29-E	P57-SS29-E(0.0-0.5)	JC95957-53	10/1/2019		0 - 0.5	0.106	0.151	0.0500	0.0336 J	0.128
P57-SS-29-E	P57-SS29-E(1.0-1.5)	JC95957-54	10/1/2019		1 - 1.5	0.0320 J	0.0197 J	< 0.037 U	< 0.037 U	0.0284 J
P57-SS-29-N	P57-SS29-N(0.0-0.5)	JC95957-49	10/1/2019		0 - 0.5	< 0.033 U	< 0.033 U	< 0.033 U	< 0.033 U	< 0.033 U
P57-SS-29-N	P57-SS29-N(1.0-1.5)	JC95957-50	10/1/2019		1 - 1.5	0.0240 J	0.0236 J	< 0.036 U	< 0.036 U	0.0312 J
P57-SS-29-S	P57-SS29-S(0.0-0.5)	JC95957-51	10/1/2019		0 - 0.5	0.0265 J	0.0215 J	< 0.033 U	< 0.033 U	0.0274 J
P57-SS-29-S	P57-SS29-S(1.0-1.5)	JC95957-52	10/1/2019		1 - 1.5	0.0681	0.0572	0.0193 J	< 0.036 U	0.0478
P57-SS-29-W	P57-SS29-W(0.0-0.5)	JC95957-55	10/1/2019		0 - 0.5	0.0164 J	< 0.035 U	< 0.035 U	< 0.035 U	0.0242 J
P57-SS-29-W	P57-SS29-W(1.0-1.5)	JC95957-56	10/1/2019		1 - 1.5	0.0195 J	< 0.037 U	< 0.037 U	< 0.037 U	0.0238 J

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Abbreviations:

CAN RN	Chemical Abstract Service Registry Number
NJDEP	New Jersey Department of Environmental Protection
DIGWSSL	Default Impact to Groundwater Soil Screening Level
ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
NRDCSRS	Non-Residential Direct Contact Soil Remediation Standard
PAHs	polycyclic aromatic hydrocarbons
RDCSRS	Residential Direct Contact Soil Remediation Standard

Qualifiers:

J	The result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
U	The analyte was not detected above the sample reporting limit shown.

General Table Notes:

G1. Location IDs, for example “P57-SS-09-N”, are composed of the Site name (e.g., P57 for Parcel 57), original Boring ID where a PAH exceedance was detected (e.g., SS-09), and a cardinal direction (e.g., for “N” for north step out, or “N2” for second north step out). The cardinal direction shown is the direction of a step out from the boring location where a PAH exceedance was detected.

G2. Soil represented by any sample is remaining in placed unless otherwise indicated. Where a delineation sample contained one or more PAH exceedances (e.g., P57-SS-14-S), a second step off sample was collected (e.g., P57-SS-14-S2). Excavations were bounded by clean delineation samples; therefore, the excavations extended to the second step out sample where necessary and any PAH exceedances detected as part of post-excavation sampling were removed.

G3. The depth in feet below ground surface is measure from the ground surface regardless of whether the ground surface was paved or unpaved.

Specific Table Notes:

S1. This sample was removed during the excavation.

Attachments

Attachment 1

AECOM Field Memorandum 9/26/2019

AECOM
100 Red Schoolhouse Road, Suite B-1
Chestnut Ridge, NY 10977

845.425.4980 tel

Field Memorandum

Today's Date:	September 26, 2019
Job #:	60587637
Task #:	Parcel 57 F
To:	Christine De Ambrosio, AECOM
From:	Al LoPilato, AECOM
Subject:	**FTMM Parcel 57 Hot Spot Remedial Excavation and Post-Excavation Soil Sampling**

Summary

This memo has been prepared to outline field activities to be conducted during "Hot Spot" soil remedial excavation activities planned for Fort Monmouth Parcel 57. The work is currently scheduled for Monday September 30, 2019.

The overall objective is to remove Polycyclic Aromatic Hydrocarbon (PAH) 'Hot spot" exceedances identified during previous remedial investigation activities conducted by Parsons and collect post-excavation confirmation soil samples.

Excavation Procedures

In summary, as depicted on **Figure 1** attached, a total of ten (10) approximately 6-foot by 6-foot excavation areas will be uncovered (i.e. asphalt removed where necessary) and excavated to the required depths as per the approved Remedial Action Work Plan (RAWP). The minimum excavation depths are presented on **Figure 1** and in **Table 1** (attached). Excavated soil and asphalt will be direct loaded into vehicles for transport to the disposal facility (Bayshore Recycling, Keasby, NJ).

Sidewalls at deeper excavations should be extended outward and sloped as needed based on soil type and overall depth of the excavation, as per the AECOM's Excavation SOP (S3AM-303-PR1) included in the APP and attached herein, and at the direction of the on-site OSHA Excavation/Trenching Competent Person (Dan Gitler/EISCO).

Sheeting and/or trench boxes are not planned for use during excavation activities. Personnel shall not enter excavations, and a minimum working distance (at least equal to the depth of excavation) shall be maintained around the excavation perimeter. Please complete the attached *Trenching & Excavation Permit* and *Daily Excavation Checklist* for retention in project folder.

Waste Manifests/Bills of Lading

EISCO will have pre-prepared waste disposal paperwork for signature by the generator (US Army/Bill Colvin). Bill will be on-site at USACE office on Monday for signature.

Post-Excavation Soil Sample Collection and Analysis

A minimum of 9 post-excavation soil samples will be collected from each excavation as follows:

- One sample from the top of each excavation sidewall (4 samples), collected at the depth that corresponds to the previous exceedance depth interval (as per Table 1);

- One sample from the bottom of each excavation sidewall (4 samples), and;
- One bottom sample.

Samples should be assigned a Field ID using the following general approach:

- FTMMP57-AECOM SS-XX

You can also assign a field ID to each individual excavation and add to the sample ID nomenclature if you wish – just note on the Figure and in your field notes.

The location and depth of each sample collected at each excavation should be noted in the field note book and on **Figure 1**. Please also photo document each excavation area.

Samples should be analyzed for the following five PAH's via Method 8270:

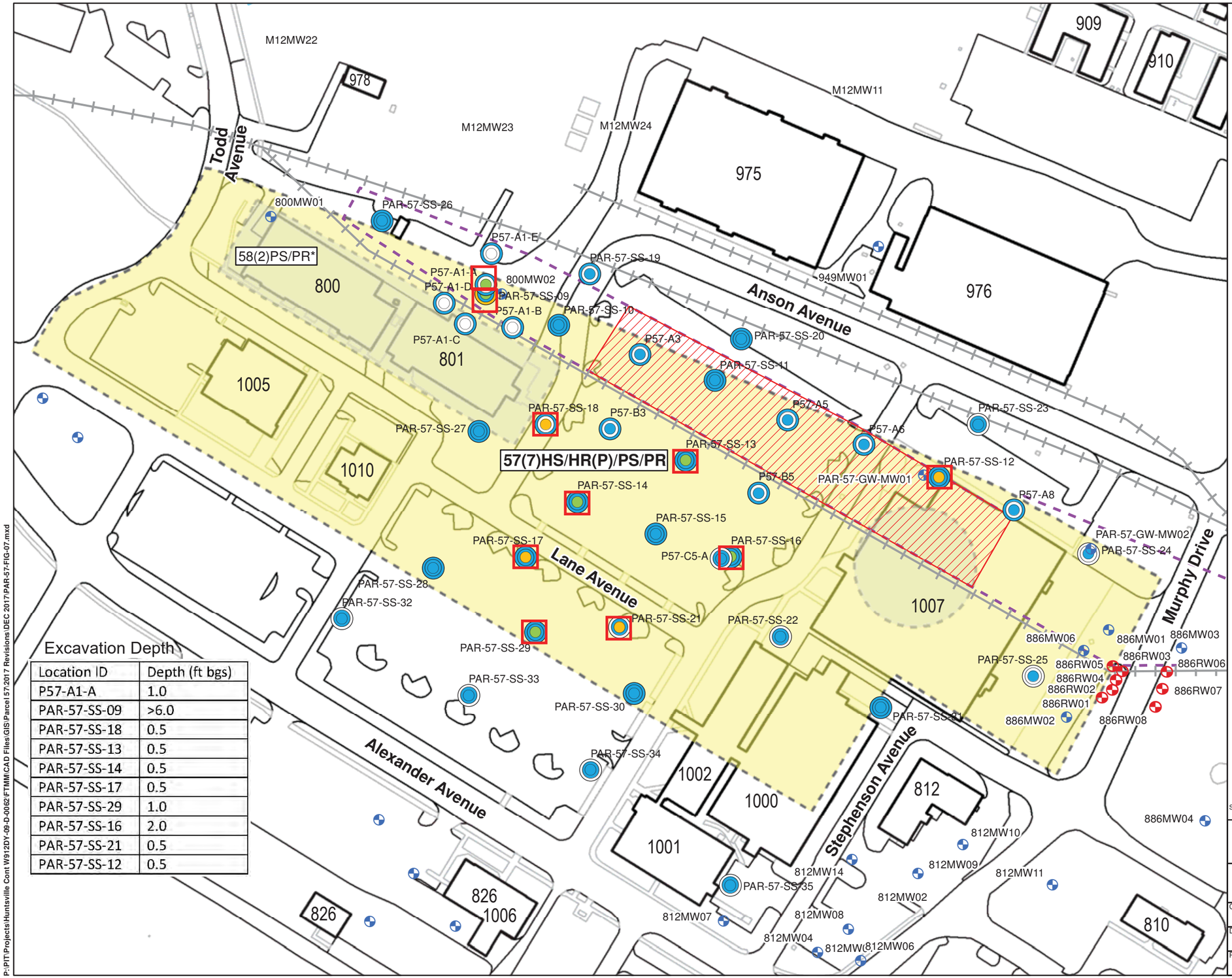
- benzo(a)anthracene
- benzo(a)pyrene
- benzo(b)fluoranthene
- dibenz(a,h)anthracene
- indeno(1,2,3-cd)pyrene

Backfill Material

Dense Grade Aggregate (DGA) for a NJ Licensed Quarry/Mine has been proposed for use as excavation backfill material. EISCO will provide the Certification from the Quarry that the material meets New Jersey's requirements for clean fill material as per the NJDEP's *Fill Material Guidance for SRP Sites (April 2015).*

H&S/Air Monitoring

Daily Safety Meetings etc. as per APP should be conducted. Please monitor dust downwind of the work areas using a MiniRam. Action level for respirable particulates is 5 mg/m3 (sustained) 10 mg/m3 total dust, at which point dust suppression measures (wetting) should be implemented or work stopped. VOC monitoring is not necessary unless evidence of VOC impacts is observed during excavation activity. PID will be on-site as a contingency.



Excavation Depth

Location ID	Depth (ft bgs)
P57-A1-A	1.0
PAR-57-SS-09	>6.0
PAR-57-SS-18	0.5
PAR-57-SS-13	0.5
PAR-57-SS-14	0.5
PAR-57-SS-17	0.5
PAR-57-SS-29	1.0
PAR-57-SS-16	2.0
PAR-57-SS-21	0.5
PAR-57-SS-12	0.5

LEGEND:

- Shallow Monitoring Well
- Recovery Well
- Parcel 57 Boundary
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Approximate Extent of Former Coal Storage
- Former Concrete Coal Storage Pad
- Not analyzed for PAHs
- PAHs not detected or detected below RDCSRS
- PAHs exceeded RDCSRS
- PAHs exceeded both RDCSRS and NRDCSRS
- Water Table (approx. 5-7.5 ft. bgs)
  Intermediate (approx. 2-3.5 ft. bgs)
  Shallow (approx. 0-1 ft. bgs)
- PAH Hotspot Excavation Location

NOTES:

1. RDCSRS = Residential Direct Contact Soil Remediation Standard
2. NRDCSRS = Non-Residential Direct Contact Soil Remediation Standard
3. 2007 Sample Results are not shown if a 2010, 2015, or 2016 sample was collected in the same location.

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description: HS – Hazardous Substance Storage; HR – Hazardous Substance Release; PS – Petroleum Storage; PR – Petroleum Release; (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 120 feet

0 60 120 240 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

COMPARISON OF SOIL RESULTS FOR PAHS TO NJDEP DIRECT CONTACT STANDARDS

CREATED BY:	REVIEWED BY:
RR	JB
DATE:	FIGURE NUMBER:
MAR. 2018	FIGURE 2
PROJECT NUMBER:	FILE:
748810-02110	PAR-57-FIG-07.mxd

P:\PIT Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 57\2017 Revisions\DEC 2017\PAR-57-FIG-07.mxd

TABLE 1: Parcel 57 - Excavation Locations and Depths

Sample ID	Depth Interval of Exceedance	Depth Interval of next deepest confirmed Clean sample	Minimum Excavation Depth (Initial)	Contingency Excavation Depth if needed after initial results	x	y
P57-A1-A	0.5-1.0	7.5-8.0	1.0-1.5	1.5-2.0	620211.1	538750.8
PAR-57-SS-09	5.5-6.0	Unknown	6.0-6.5	6.5-7.0	620209.9	538739.7
PAR-57-SS-18	0.0-0.5	5.0-5.5	0.5-1.0	1.0-1.5	620284.8	538578.0
PAR-57-SS-13	0.0-0.5	3.0-3.5	0.5-1.0	1.0-1.5	620458.5	538533.1
PAR-57-SS-14	0.0-0.5	3.0-3.5	0.5-1.0	1.0-1.5	620324.1	538482.9
PAR-57-SS-17	0.0-0.5	3.0-3.5	0.5-1.0	1.0-1.5	620259.7	538414.0
PAR-57-SS-29	0.5-1.0	3.5-4.0	0.5-1.0	1.0-1.5	620271.8	538322.6
PAR-57-SS-16	1.5-2.0	6.0-6.5	2.0-2.5	2.5-3.0	620515.3	538414.6
PAR-57-SS-21	0.0-0.5	3.0-3.5	0.5-1.0	1.0-1.5	620375.5	538328.5
PAR-57-SS-12	0.0-0.5	3.0-3.5	0.5-1.0	1.0-1.5	620774.3	538512.7

Americas

Excavation

S3AM-303-PR1

1.0 Purpose and Scope

1.1 To evaluate all excavation operations to provide proper protective systems for employee protection from associated hazards.

1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

2.1 **Benching (Benching system)** – One or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels to protect employee from cave-ins.

2.2 **Cave-in (collapse)** – The separation of a mass of soil or rock material from the side of an excavation or the loss of soil from under a trench shield or support system and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

2.3 **Competent person** – Person, who, by way of training, knowledge, and/or experience, is capable of classifying soils and is also capable of identifying existing and predictable hazards in excavation/trenching work area and who has the authority to take prompt corrective measures to eliminate them. The person shall also be familiar with the requirements in the regulation.

2.4 **Excavation** – A manmade cut, cavity, trench, or depression in an earth surface formed by earth removal. Examples include trenches, tunnels, shafts, caissons and open cut holes.

2.5 **Faces (or sides) –** The vertical or inclined earth surfaces formed as a result of excavation work.

2.6 **Failure** – A structural member's integrity and supportive capabilities is compromised, causing a breakage, displacement, or permanent deformation.

2.7 **Hazardous Atmosphere** – An atmosphere that by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen-deficient, toxic, or otherwise harmful may cause death, illness, or injury.

2.8 **Protective Systems** – Devices or methods in protecting employees in an excavation from cave-ins, a collapse or falling material. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

2.9 **Ramp** – An inclined walking or working surface that is used to gain access to one point from another and is constructed from earth or from structural materials such as steel or wood.

2.10 **Professional Engineer** – A registered engineer who can authorize any state of work by his professional designation. A **Professional Engineer** registered in the State, Province, or territory is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

2.11 **Shield (Shield system)** – A structure that is able to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built. Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

2.12 **Shoring (Shoring system) –** A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and that is designed to prevent cave-ins.

2.13 **Sloping (Sloping system)** – An alternative to shoring is trench sloping. This means that the trench walls are cut back to decrease the possibility of cave-ins. The angle of incline required to prevent a cave-in varies with such factors as soil type, environmental conditions of exposure, and application of surcharge loads.

2.14 **Stable rock** – A natural solid mineral material that can be excavated with vertical side wall; unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against cave-in or movement by rock bolts or by another protective system that has been designed by a **Professional Engineer**.

2.15 **Support system** – A structure such as underpinning, bracing, or shoring that provides support to an adjacent structure, underground installation, or the sides of an excavation.

2.16 **Trench** – An open narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width (measured at the bottom) is often not greater than 15 feet (4.57 meters). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.57 meters) or less (measured at the bottom of the excavation), the excavation is also considered a trench.

2.17 **Trench Box –** A trench box is a unit of shoring that is an engineered shoring system capable of protecting workers in case of cave-in of trench walls. The space between the trench wall and the trench box shall be backfilled.

3.0 References

3.1 S3AM-003-PR1 SH&E Training

3.2 S3AM-202-PR1 Competent Person Designation

3.3 S3AM-218-PR1 Permit to Work

3.4 S3AM-322-PR1 Overhead Lines

3.5 S3AM-331-PR1 Underground Utilities

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Managers**

- Shall confirm that all projects under their direct control or authority and which involve excavations or trenching are conducted in a safe and efficient manner and in accordance with the requirements of this procedure and local legislation.
- Shall confirm that all projects under their direct control or authority have a written Safe Work Plan (SWP)/Health and Safety Plan (HASP) prepared for the activity.
- Confirm the applicable *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* or equivalent has been completed and is reviewed prior to commencing any excavation activities.

4.1.2 **Professional Engineer**

- The professional status and the actual practice of professional engineering is legally defined and protected by law. In some jurisdictions, only licensed engineers (sometimes called registered engineers) are permitted to "practice engineering.
- For the purposes of this procedure, determination of soil condition and the safe management of the shoring, sloping or benching may require consultation, specifications and/or design by a Professional Engineer.

4.1.3 **Competent Person**

- Shall be present during all work that involves entry by AECOM personnel into trenches or excavations greater than 5 feet (1.52 meters) in depth (as above).
- Does not have to be an AECOM employee; however, an AECOM competent person shall be qualified per *S3AM-202-PR1 Competent Person Designation*.
- Shall identify prompt corrective measures to eliminate recognized present or anticipated hazards.
- The competent person shall be identified in the SH&E Plan for the location or project, and the Task Hazard Assessment for the particular task.
- The competent person:
  - Will determine the maximum allowable slope for the walls of the trench or excavation.
  - Will classify the soil in the trench or excavation in accordance with the requirements specified in the applicable legislation prior to determining that a maximum allowable slope, other than 34 degrees with the horizontal is selected.
  - Will inspect the excavation or trench on a daily basis when the potential for employee exposure to the hazards of the trench or excavation exists (*S3AM-303-FM1 Daily Excavation Checklist*).

4.1.4 **Employees**

- Maintain appropriate training for the excavation and the applicable tasks, and competency in the associated procedures (e.g. communication, rescue, etc.) and use of the necessary personal protective equipment (PPE). Refer to *S3AM-003-PR1 SH&E Training* and *S3AM-208-PR1 Personal Protective Equipment.*
- Know the location specific Emergency Response Plan and be able to recognize the potential for real hazards associated with the Excavation.
- Refrain from making any attempt to enter an excavation without approval and first meeting the requirements of this procedure and the applicable SH&E Plan (SWP)/Health and Task Hazard Assessment (THA).

4.2 Restrictions

4.2.1 Because of their inherent dangers, entry into trenches and excavations shall not be performed if there are means other than entry to perform the work. Where entry into trenches and excavations is necessary, strict adherence to the procedures specified below is extremely important. Whenever there are questions regarding the safety of trench or excavation entry, contact shall be made with the Competent Person or the SH&E Manager.

4.2.2 No one shall enter any trench or excavation until the walls have been adequately cut back or temporary protective structures have been installed unless the trench or excavation is shallower than stabilized.

4.2.3 Excavation work shall be completed and inspected in accordance with the written instructions of a qualified professional and in accordance with jurisdictional legislative regulations.

4.3 Excavation and Trenching Permit

4.3.1 If required by the applicable jurisdiction, confirm notification of the proposed excavation is provided within the required timeframe to the appropriate agencies or governing bodies prior to commencing excavation (e.g. California – CAL/ASHA Excavation Permit for the construction of trenches or excavations that are 5 feet (1.5 meters) or deeper that will be entered; Manitoba WHS Branch notification in order to obtain registration number, etc.).

4.3.2 An Excavation and Trenching Permit (*S3AM-303-FM2 Excavation & Trenching Permit* or equivalent) shall be completed prior to all excavation or trenching activities

4.3.3 The Excavation and Trenching Permit shall be completed and signed by all applicable parties as indicated on the permit. The Project Manager shall determine which signatures are required.

4.3.4 Excavation and Trenching Permits may be valid for up to one week; however the permit shall be reviewed at the beginning of each shift.

4.3.5 Refer also to *S3AM-218-PR1 Permit to Work* for additional guidance related to Safe Work Permits.

4.4 Planning and Preparation

4.4.1 Prior to beginning any excavation work at a site, the location of all underground and overhead utilities shall be identified and work locations will be carefully planned to avoid any potential for inadvertent contact with them.

4.4.2 Clearance, including hand exposure, of underground utilities shall be completed in accordance with *S3AM-331-PR1 Underground Utilities*. The associated *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* or equivalent shall be available and reviewed with all employees expected to be involved in the excavation prior to commencing any excavation activities.

4.4.3 Identify any overhead power lines and de-energize or protect by other appropriate means. Refer to *S3AM-322-PR1 Overhead Lines*.

4.5 Excavation Requirements

4.5.1 A Professional Engineer shall be engaged if specified by the applicable jurisdiction and as appropriate to the soil conditions and proposed excavation considerations (e.g. wall slope, shoring requirements, load calculations, etc.).

4.5.2 All personnel involved in the excavation activities shall be appropriately trained to their respective activities and associated hazards. Refer to *S3AM-003-PR1 SH&E Training*.

4.5.3 All personnel involved in the excavation activities shall wear the required PPE, including reflective clothing if mobile equipment or vehicular traffic. Refer to *S3AM-208-PR1 Personal Protective Equipment.*

4.5.4 The Task Hazard Assessment (THA) or Safe Work Plan (SWP) identifying applicable hazards and appropriate control measures shall be completed and clearly communicated to all involved personnel as well as to any concurrent operations potentially affected. The work environment shall be monitored for changing conditions and the THA / SWP updated accordingly.

4.5.5 Excavation shall be conducted in a manner that minimizes environmental impact.

4.5.6 Excavated (spoil) material shall be kept at least 3.2 feet (1 meter) from the edge of the excavation, or further if local regulations are more stringent.

- Excavated (spoil) material shall be piled in a manner to prevent sloughing of loose material. Various jurisdictions provide specific spoil pile sloping requirements.

4.5.7 If the walls of an excavation or trench are not sloped or cutback, barriers shall be placed around the perimeter. The barrier shall be at least 3.6 feet (1.10 meters) in height.

4.5.8 If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored regularly to confirm proper operation.

4.5.9 If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require regular inspections.

4.5.10 All excavations shall be appropriately secured at the end of the day to prevent unauthorized entry or inadvertent entry into the excavation. This may require a protective covering, barriers, fencing, signage or other measures appropriate to the excavation and associated conditions.

4.5.11 Backfill trenches as soon as reasonably possible after work is complete.

4.6 Soils Classifications

4.6.1 Soil classification shall be conducted to confirm appropriate measures are taken to protect workers and to secure excavation walls. Measures may include, but are not limited to:

- Sloping, shoring or shielding.
- Relocation of equipment or materials.
- Scheduling to minimize concurrent operations.

4.6.2 Soil characteristics evaluated when classifying include, but are not limited to:

- Cohesiveness / compaction / compressive strengths (e.g. fissured, hardpan, fractured rock, etc.).
- Composition (sand, clay, gravel, layered, etc.).
- Moisture content / submersion.
- Compaction.
- Exposure to vibration (e.g. traffic, pile driving, etc.).
- Previous disturbances.

4.6.3 Consult the applicable jurisdictional requirements as classification methods, definitions and terms can vary. In general classifications or types include:

- Stable soil that is dense and heavy and consists primarily of clay.
- Soil with a medium level of stability and generally includes soils such as silt, sandy loam, and medium clay.
- Unstable soil which generally includes gravel, loamy sand, and soft clay.

4.7 Protective System Requirements

4.7.1 Protective systems shall be used to protect workers entering an excavation when there is a potential for cave in, and is required when:

- An excavation is greater than 4 feet (1.22 meters) in depth and is not entirely in stable rock.
- A worker is required to be closer to a trench wall than the height of the trench wall.
- A worker will approach closer to the side or edge of the excavation that the distance equal to the depth of the excavation.

4.7.2 The protective system may include sloping the excavation walls, shoring the excavation walls, and/or installing a shielding system. The protective system(s) chosen shall have the capacity to resist, without failure, all loads to be applied to the system.

4.7.3 Slope angle, or type of shoring or shielding shall be determined by:

- Soil classification – including structure, strength, moisture content.
- Depth of the excavation
- Weather and environmental conditions.
- Anticipated duration of excavation activities.
- Loading of soil and soil stress (e.g. proximity of structures, location of equipment, stored material, anticipated vibration, etc.)

Factor	Description / Examples
Soil Structure and Strength	Proper classification of soil is necessary in order to select appropriate protection methods. Trench walls, at first glance, may appear to have strength, particularly if rock is encountered. Fractures in the rock can develop because of construction and soil strength may fail when subjected to undercutting or high-energy impacts. Irregular slopes on stratified soils that appear stable can fail if lower materials do not have adequate strength.
Excavation Depth	Jurisdictional requirements may specify the type of protective methods that are required at given depths. Additionally, consultation of a professional engineer may be necessary.
Soil Moisture Content	Soil may be moist even though the weather has been dry. Care shall be taken and appropriate protection methods employed if the soil appears to be moist.
Weather and Humidity	These can have a significant impact on excavation wall stability and effectiveness of protection methods. Frozen stable soil may collapse if warm mild weather persists. Percolation of water into the soil can increase the load on shoring due to the increased weight and mobility of saturated soils. Frozen ground does not preclude the need to appropriately slope, shore or shield unless the freezing process is designed and approved by a Professional Engineer.
Loading and Soil Stress	Stress can originate from many sources. Heavy machinery passing close to the excavation creates vibrations that decrease the soil strength and can result in wall collapse or shoring failure if it is inadequate to these conditions. Stationary equipment at the edges of the excavation can transmit loads and additional stresses to the excavation wall and method of protection.
Trench Depth and Width	These directly influence the choice of materials and the spacing of support bracing. The shoring requirements of a wide and deep trench differ substantially from those of a narrower trench.
Erosion Time	If excavations are to be left for extended periods, different methods of protection may be required and shoring materials may have to be increased.

4.7.4 If an excavation may affect the stability of an adjacent building or structure, precautions shall be taken to prevent damage to the structure. The precautions shall be specified in writing by a Professional Engineer.

4.7.5 All sloping, shielding, or shoring shall be conducted in accordance with applicable Federal, State, Provincial, Territorial or Legislative regulations.

4.7.6 Exceptions. Each individual in an excavation shall be protected from cave-ins and trench collapse by an adequate protective system except when:

- Excavations are made entirely in stable rock.
- Excavations are less than 4 feet (1.22 meters) in depth and an examination of the excavation by a Competent Person reveals no indication of a potential cave-in.

4.7.7 The depth of the excavation or trench is to be measured at its greatest vertical dimension. Be aware that crouching or kneeling in a trench that is less than 3 feet (0.91 meter) in depth may still pose significant hazard for the employee involved.

4.7.8 Consult the applicable jurisdiction's requirements concerning the standards that protective systems shall meet; this may include design and certification by a Professional Engineer.

4.7.9 A Professional Engineer can properly assess the need for and the type of shoring required for specific applications. Shoring may not be needed in all cases, but failure to recognize the need for shoring can be catastrophic.

4.8 Use of Sloping as a Means of Protection

4.8.1 Sloping the walls of the trench or excavation is the preferred, and typically simplest, means of protecting employees who shall enter trenches or excavations which are greater than 4 feet (1.22 meters) in depth or where there is danger of collapse.

4.8.2 If sloping is used as the means of protection, the trench or excavation walls shall be sloped back so that the ratio of the horizontal distance to the vertical rise (H:V ratio) of the sloped wall or degree from horizontal is appropriate to the soil type and in compliance with jurisdictional requirements.

4.8.3 In many cases, determining the maximum allowable slope may allow the use of a steeper slope, which will result in a narrower excavation. However, determination of soil classification is complicated and requires that the Competent Person be familiar with the manual and visual tests. Since incorrect soil classification may result in the use of a steeper, and potentially unsafe, slope, it

is recommended that an angle of 34 degrees (or less given specific jurisdictional requirements and unstable soil types) with the horizontal typically be selected.

4.9 Use of Shoring or Shielding as a Means of Protection

4.9.1 Where sloping the walls of the trench or excavation is unfeasible (e.g., when there are dimensional constraints or adjacent structures), the use of shoring or shield systems (e.g., trench boxes) may be necessary.

4.9.2 Soil classification is required. The excavation shall comply with one of the four options below:

- The soil shall be classified and the timber shoring be constructed in accordance with applicable legislative regulations.
- Other protective systems meeting applicable legislative regulations shall be utilized (e.g., shield systems, trench jacks, aluminum hydraulic shoring, etc.) and the manufacturer's data shall be explicitly followed.
- A protective system meeting applicable legislative regulations shall be utilized based on tabulated data which has been approved by a Professional Engineer.
- A protective system meeting applicable jurisdictional requirements and designed by a Professional Engineer shall be utilized and installed in accordance with the engineer’s written plans.

4.9.3 In all cases listed above, the SH&E Manager shall be contacted before proceeding.

4.9.4 Workers shall be protected whenever shoring is being installed or removed.

4.9.5 Shoring, stringers or bracing shall be installed from the top of the trench or excavation down. Removal shall be completed from the bottom up unless conditions exist that would make doing so unsafe. A removal method shall be developed that does not require worker entry.

4.9.6 Check hydraulic shoring once per shift at a minimum (leaking hoses and/or cylinders, broken connections, cracked nipples, bent bases, other damaged or defective parts) and more frequently as required.

4.9.7 Hydraulic or pneumatic trench jacks shall have a means of ensuring that they will not collapse in the event of loss of internal pressure.

4.9.8 Shielding and Trench Boxes differ from shoring in that their design is intended primarily to protect workers from cave-ins and similar incidents. They may be used in combination with sloping and benching.

- The excavated area between the outside of the trench box and the face of the trench should be as small as possible and may be backfilled to prevent lateral movement of the shield.
- The box shall extend at least 18 inches (0.45m) above the surrounding area, or as specified by the applicable jurisdiction, if there is sloping toward excavation. This can be accomplished by providing a benched area adjacent to the box.
- Earth excavation below the shield is permitted only if:
  - The excavation does not exceed a depth of 2ft (0.61m) below the shield,
  - The shield is capable of withstanding the forces calculated for the full depth of the trench, and
  - There are no indications while the trench is open of possible loss of soil from behind or below the bottom of the support system.
- A shield shall not be subjected to loads exceeding those for which it was designed to withstand.

4.9.9 Bell-bottom pier holes that are to be entered by workers shall be designed and supported according to written instructions of a registered professional engineer.

- Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, should wear a harness with a retrieval line securely attached to it.
    - Retrieval lines shall not be used to handle materials.
    - Rescue equipment shall be individually attended at all times while the employee wearing the retrieval line is in the excavation.

4.10 Work Around the Trench/Excavation

4.10.1 Structural ramps used for excavation access or egress of equipment shall be constructed in accordance with jurisdictional requirements and the instructions or designs of an individual competent and qualified in structural design.

4.10.2 If the ramp has an open side, it shall have a curb or a restraining device.

4.10.3 Confirm equipment placement does not compromise the integrity of the excavation wall and optimizes visibility of work zone and any contact hazards (spoil placement should also take these into consideration). Use wheel chocking or barricades as necessary to prevent encroachment of edge.

4.10.4 If the appropriate setback of equipment is not possible confirm appropriate blocking or matting is used to disperse weight. These requirements may need to be determined by a professional engineer.

4.10.5 While workers are in a trench, an aboveground observer or spotter shall be present to warn of earth movements and to advise equipment operators of the presence and location of those in the trench so as to avoid vibrating equipment near trenches or excavations.

4.10.6 If there is a danger of a worker or equipment falling into an excavation, or whenever the edge is not clearly visible, identify the trench or excavation perimeter with visual markers (e.g., barricade tape, wooden railings, stop logs, etc). If the trench or excavation is 4 feet (1.22 meters) or greater in depth, the visual barrier shall be a minimum of 6 feet (1.83 meters) from the edge.

4.10.7 Personnel shall notify workers of the excavation through flagging, marking, safeguards, or other appropriate and effective means.

4.10.8 If walkways are permitted over excavations or trenches (e.g. trench over 6 feet [1.8 meters] in depth and wider than 30 inches [76 centimeters]), the installation shall be in such a manner as to not compromise the stability of the excavation.

4.10.9 Walkways shall be equipped with guardrails and constructed in accordance with jurisdictional requirements.

4.10.10 If vehicle crossings over excavations are required, they shall be designed by and installed under the direction of a Professional Engineer.

4.10.11 Precautions shall be taken to isolate or remove loose rocks, trees, or other materials that may slide, roll, or fall into the trench and onto workers prior to entry by workers into an excavation.

4.10.12 While operating heavy equipment in the work area, the equipment operator shall maintain communication with a designated signal person through either direct voice contact or approved standard hand signals.

4.10.13 When mobile equipment is operated adjacent to an excavation or when such equipment is required to approach the edge of an excavation and the operator does not have a clear and direct view of the edge of the excavation, a warning system such as barricades, hand or mechanical signals, or stop logs shall be used. If possible, the grade should be away from the excavation.

4.10.14 All site personnel should maintain a safe distance and remain clear of the swing of operating excavation equipment.

4.10.15 Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles

being loaded or unloaded when the vehicles are equipped to provide adequate protection for the operator during loading and unloading operations.

4.10.16 All materials such as pipe, rebar, etc., shall be kept out of traffic lanes and access ways. Materials and equipment shall be stored in a designated area so as not to endanger personnel at any time.

4.10.17 A flagman with roadwork, signs, cones, and high-level warning signs shall be provided when it is necessary to control normal vehicular traffic due to vehicles, such as end-dumps, entering, or leaving the site.

4.11 Work Within the Trench/Excavation

4.11.1 Personnel shall not be permitted on the faces of sloped or benched excavations at levels above other workers unless those workers at lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

4.11.2 Employees shall not work in excavations in which there is accumulated water or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and retrieval line.

4.11.3 A stairway, ladder, ramp, or other safe means of egress shall be located in excavations or trenches that are 4 feet (1.22 meters) or more in depth so as to minimize lateral travel for employees. Jurisdictional maximum lateral travel distances vary between 25 feet (7.6 meters) and 49 feet (15 meters). In the absence of jurisdictional specification, travel distance shall not exceed 25 feet (7.6 meters). Ladders should extend at least 3 feet (0.91 meters) above the trench top.

4.11.4 Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design and shall be constructed in accordance with the design.

4.11.5 Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement. Structural members used for ramps and runways shall be of uniform thickness. Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping. Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

4.12 Confined Spaces and Hazardous Atmospheres

4.12.1 An excavation may contain hazardous gases, vapors, dusts, fumes or an oxygen deficient or enriched atmosphere.

- To prevent exposure to harmful levels of atmospheric contaminants, the hazard assessment shall evaluate atmospheric hazards when workers are required to enter trenches and excavations:
  - Greater than 4 feet (1.22 meters) in depth in which a hazardous atmosphere exists, or could reasonably be expected to exist, such as in excavations in landfill areas, where equipment is exhausting nearby, or where hazardous substances are stored nearby.
  - Less than 4 feet (1.22 meters) in depth if workers could be exposed to a hazardous atmosphere (e.g. crouching).
- Appropriate atmospheric testing is necessary to accurately identify these hazards. Ongoing atmospheric monitoring, use of attendants and rescue equipment may be necessary to address the identified hazards.

4.12.2 Confined spaces may exist in excavations where there is limited access or egress and in which a hazardous gas, vapor, dust, or fume or an oxygen-deficient atmosphere may occur. Confined

space entry shall be performed in accordance with the requirements specified in *S3AM-301-PR1 Confined Spaces*. Consult the applicable jurisdictional requirements as the excavation may or may not be subject to confined space requirements.

4.12.3 Adequate precautions, such as mechanical ventilation or appropriate respiratory protection, shall be taken prior to entry into trenches and excavations in which hazardous atmospheres exist or could reasonably be expected to exist.

4.12.4 When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to confirm that the atmosphere remains safe. Atmospheric testing will be conducted in the anticipated breathing zone of the work area to determine oxygen content, combustible gas, and toxic gases and vapors, if applicable.

4.12.5 Appropriate respiratory protection shall be donned prior to entry into any trench or excavation in which airborne levels of toxic substances are present at concentrations in excess of their Threshold Limit Value/Occupational Exposure Limit or Permissible Exposure Limit.

4.12.6 Confirm appropriate emergency response measures are in place as necessary, including but not limited to:

- Location Specific Emergency Response Plan shall include procedures applicable to the potential emergencies the excavation work may present.
- Communication methods shall be established.
- Equipment such as spill kits, breathing apparatus, and retrieval equipment, shall be readily available.
- Where hazardous atmospheres are present rescue equipment shall be attended when workers have entered the excavation.

4.13 Stability of Adjacent Structures

4.13.1 Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to confirm the stability of such structures for the protection of employees.

4.13.2 Excavation below the level of the base or footing of any foundation or retaining wall that could reasonably be expected to pose a hazard to employees shall not be permitted except when:

- A support system, such as underpinning, is provided to confirm the safety of employees and the stability of the structure; or
- The excavation is in stable rock; or
- A Professional Engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or
- A Professional Engineer has approved the determination that such excavation work will not pose a hazard to employees.

4.13.3 In addition, sidewalks, pavements, and secondary structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

4.14 Inspections

4.14.1 Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a Competent Person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. Refer to *S3AM-303-FM1 Daily Excavation Checklist.*

4.14.2 An inspection shall be conducted by the Competent Person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard-

increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

4.14.3 Where the Competent Person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to confirm their safety and the permit reissued or revised.

4.15 Backfilling

4.15.1 Perform any required notifications within the necessary timeframes prior to backfilling.

4.15.2 Confirm accurate classification of soil types of backfill material and absence of signs of contamination, discoloration and smell.

4.15.3 Confirm the re-establishment of the original soil integrity using the original material (if suitable) or designated fill material(s). A small cap of material on top of the ditch/hole should be left to allow for sloughing and settling of material.

4.15.4 Backfilling shall be done with care to prevent damage to any exposed utilities or facilities.

4.15.5 A spotter may be necessary to avoid encroachment (e.g. working around other equipment, traveling under overhead lines, working in close conjunction to underground facilities and other workers, compromised line of vision) and to watch for any rocks falling into the excavation, which may damage exposed facilities. If fill contains rocks or hard material, a shield or alternate fill material may be used to protect the facilities

4.15.6 Confirm piping or facilities are properly supported prior to backfilling.

4.15.7 If shoring was used, remove from the bottom up.

4.15.8 If a trench box has been used it should be placed no more than 24” above the base of the excavation or a sub-trench bed containing the pipe.

4.15.9 Appropriate measures shall be taken to confirm proper backfilling and compaction of the soil below the trench box. Removing and reinserting the trench box multiple times may be necessary to accomplish this.

4.15.10 Dragging of a trench box shall only be permitted if it will not damage facility or disturb the backfill, otherwise it shall be lifted vertically. No worker shall occupy a trench box while it is being moved.

4.15.11 If compaction is required confirm the appropriate method is employed and compaction testing is conducted in a manner that does not damage any facilities or pipelines in the excavation.

4.15.12 Final grading and cover of the ground disturbance should confirm corrosion control. Original state of the area and access shall be considered in completion of backfilling.

4.15.13 Any excess excavation material shall be properly disposed of.

5.0 Records

5.1 Completed Daily Excavation Checklist, Permits and applicable notifications shall be retained in the project files for +1 year.

6.0 Attachments

6.1 S3AM-303-FM1 Daily Excavation Checklist

6.2 S3AM-303-FM2 Excavation & Trenching Permit

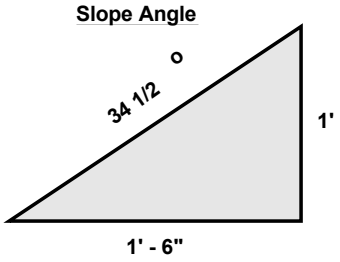
Americas

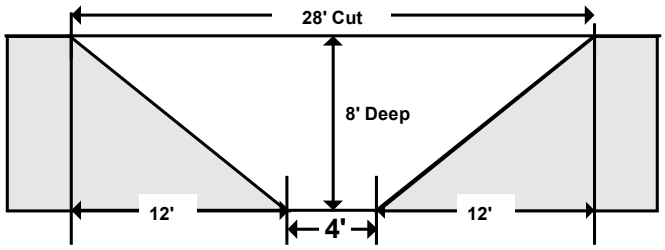
Daily Excavation Checklist

S3AM-303-FM1

Daily Excavation Checklist			
Competent Person Name:	Date:		
Competent Person Signature:			
Site Location:	Project Number:		
Soil Type: Excavation Depth:	Excavation Width:		
Type of Protective System Used:			
Indicate for each item: Yes – No – or N/A for not applicable:			
1. General Information:	**Yes**	**No**	**N/A**
a. Is there a potential for a cave-in? ***IF YES, excavation must be sloped, shored, or shielded.**			
b. Is excavation deeper than (enter jurisdictional requirement)? *** IF YES, excavation must be sloped, shored, or shielded.**			
c. Is sloping used as your protective system?			

Slope information to keep in mind:





Example of a Simple 34-degree Slope commonly used around the site for cave-in protection.

d. Was a manual method utilized to determine Soil Classification? Type			
e. Was a visual method utilized to determine Soil Classification?			
Soil classification comments:			

2. Training:	Yes	No	N/A
a. Have all individuals had Excavation Safety Awareness Training?			
b. Have all individuals reviewed the site specific Emergency Response Plan?			
3. Inspection of Job Site	**Yes**	**No**	**N/A**
a. Are excavations, adjacent areas, and protective systems inspected by a competent person daily before the start of work?			
b. Does the competent person has the authority to remove all individuals from the excavation immediately?			
c. Are surface encumbrances removed or supported?			
d. Are all individuals protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation?			
e. Are hard hats, safety-toed boots, and safety glasses worn by all individuals?			
f. Is spoil pile set back at least 3.2 feet (1.0 m) from the edge of the excavation and sloped to prevent sloughing and according to jurisdictional requirements?			
g. Are adequate barriers provided at all excavations, wells, pits, shafts, etc.?			
h. Are warning vests or other highly visible clothing provided and worn by all individuals?			
i. Are all individuals required to stand away from vehicles being loaded / unloaded?			
j. Are warning system established and utilized when mobile equipment is operating near the edge of the excavation (e.g., barricade tape, signalpersons, stop logs, etc)?			
k. Are all individuals prohibited from going under suspended loads?			
l. Are materials and equipment set back 3.2 feet (1.0 m) or greater from the edge of the excavation?			
4. Utilities	**Yes**	**No**	**N/A**
a. Are locations of utilities marked. *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* available and reviewed?			
b. Prior to the use of equipment, have underground utilities been located by hand exposure?			
c. Are underground utilities protected, supported, or removed when excavation is open?			
d. Are overhead lines are de-energizes or protected by other appropriate means?			
5. Means of Access and Egress:	**Yes**	**No**	**N/A**
a. Is travel distance to means of egress no greater than (enter jurisdictional requirement) in excavations 4 feet (1.2m) or more in depth?			
b. Do straight ladders used in excavations extend at least 3 feet (0.9m) above the edge of the trench?			
c. Have ramps being used for employee access been designed by the competent person?			
d. Are all individuals are protected from cave-ins when entering / exiting the excavation?			
Protection description:			

6. Wet Conditions:	Yes	No	N/A
a. Have precautions been taken to protect workers from the accumulation of water?			
b. Is water removal equipment monitored by a competent person?			
c. Is surface water or runoff diverted or controlled to prevent accumulation in the excavation?			
d. Have inspections have been conducted after every rainstorm or other hazard-increasing occurrence (freeze/thaw, local demolition, rerouting of traffic, etc)?			
7. Hazardous Atmosphere: The atmosphere within the excavation must be tested where there is a reasonable possibility of an oxygen deficiency or a combustible or other harmful contaminant exposing any individual to a hazard.	**Yes**	**No**	**N/A**
a. Are there exposed sewer or natural gas lines in excavation?			
b. Is equipment operating nearby that may produce introduce exhaust into the excavation?			
c. Is the excavation near a landfill area, or are hazardous substances being stored close to the excavation?			
If you answered YES to A,B, or C then treat the excavation as a confined space. **See *S3AM-301-PR1 Confined Spaces***			
d. Has an emergency rescue plan been developed and are rescue services in place?			
8. Support Systems:	**Yes**	**No**	**N/A**
a. Are materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads?			
b. Have materials and equipment used for protective systems been inspected and are they in good condition?			
c. Have materials and equipment in unsatisfactory condition have been removed from service?			
d. Are protective systems installed without exposing all individuals to the hazards of cave-ins, collapses, or the threat of being struck by materials or equipment?			
e. Are members of support system securely fastened to prevent failure?			
f. Are support systems provided to ensure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.?			
g. Have excavations below the level of the base of a footing been approved by a registered Professional Engineer?			
h. Does removal of support systems progress from the bottom, and are members released slowly to allow for detection of any indications of possible failure?			
i. Does backfilling progress with the removal of the support system?			
j. Is material excavated to a level no greater than 2 feet (0.6m) below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth?			
k. Has a shield system been placed to prevent lateral movement?			
l. Are all individuals prohibited from remaining in the shield system during movement?			

Americas

Excavation & Trenching Permit

S3AM-303-FM2

Authorization No.: _____ Date & Time Permit Valid: _____

Competent Person: _____ Date & Time Permit Expires: _____

Project Name: _____ Excavation/Trench Location: _____

Description or Job Special Procedures:

_____

_____

_____

ESTIMATED DIMENSIONS:	**DEPTH =**	_____	
	TOP =	W _____	L _____
	BOTTOM =	W _____	L _____

SOIL ANALYSIS METHOD(S) USED:

☐ Visual ☐ Manual ☐ Tabulated Data

SOIL TYPE:

☐ Stable Rock ☐ Type A
☐ Type B ☐ Type C
☐ Avg. Compression Strength _____ tsf
☐ Compressed Strength Data _____

SOIL CHARACTERISTICS:

☐ Cemented ☐ Cohesive ☐ Layered
☐ Fissured ☐ Granular ☐ Plastic
☐ Dry ☐ Moist ☐ Saturated ☐ Submerged

MANUAL TEST USED:

☐ Plasticity ☐ Dry Strength ☐ Ribbon
☐ Thumb Penetration ☐ Pocket Penetrometer
☐ Dry Testing ☐ Other

PROTECTIVE SYSTEMS:

☐ Prof. Engineered Protective System Required

SLOPING/BENCHING:

☐ **Vertical (90°)** ☐ **3/4 :1 (53°)** ☐ **1:1 (45°)**
☐ **1 ½:1 (34°)** ☐ **2:1 (26°)** ☐ **Other**

SHORING:

☐ Timber ☐ Trench Shield/Trench Box
☐ Aluminum Hydraulic

OTHER:

☐ Means of Egress Required
☐ Confined Space Permit Required
☐ Mechanical Ventilation Required
☐ Owner / Designate Required to be Present
☐ Surveys, drawings, Plot Plans, etc. Attached
☐ Landowner Consent Obtained
☐ Other

UTILITIES (underground/overhead):

☐ One Call Service Notified
☐ Search Zone Established
☐ Utilities Marked by Public Utilities Locator
☐ Property Owner Contacted
☐ Utility Drawings Reviewed
☐ Utilities Marked by Private Locator

LIST OF KNOWN OBSTRUCTIONS:

☐ Electrical ☐ Telephone ☐ Water
☐ Sewer ☐ Steam ☐ Natural Gas
☐ Drain ☐ Process ☐ Alarm
☐ Concrete Encasement ☐ Pilings
☐ Footings ☐ Other

UTILITIES (hand exposure requirements):

☐ Radius Established –
☐ Exposure Interval Established –
☐ Other

SPECIAL INSTRUCTIONS and WORK INSTRUCTIONS

All unsafe conditions shall be corrected prior to excavation entry. If any hazardous conditions are observed, the excavation shall be evacuated immediately, and no one is permitted to re-enter until corrective action has been taken.

Signature and Dates
(Manager shall determine which signatures are required)

	Print Name	Signature	Date
Excavation Competent Person (Required)			
Supervisor			
SH&E Representative			
Registered Professional Engineer (if applicable)			
Other			

Americas

Underground Utilities

S3AM-331-PR1

1.0 Purpose and Scope

1.1 Provides procedures designed to help prevent injuries to personnel working on the location and pedestrians, property damage, and adverse environmental impact as a result of potential hazards associated with encountering underground utilities, subsurface installations, and potential overhead hazards.

1.2 Provides the minimum requirements to be followed for underground work (e.g., excavations, drilling, boring, and probing work) to ensure that underground installations, and subsurface structures, are identified properly before work commences.

1.3 This procedure applies to all Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

1.4 The Manager is responsible for meeting all the requirements in this procedure.

1.5 AECOM's clients may have specific procedures which shall be followed to identify and map utility and subsurface structures on their properties or facilities. Provided the client's procedures meet or exceed those of AECOM, approval shall be obtained from the Manager and the SH&E Manager to follow the client's procedures.

2.0 Terms and Definitions

2.1 **Underground Utilities –** All utility systems located beneath grade level, including, but not limited to, gas, electrical, water, compressed air, sewage, signaling and communications, etc.

2.2 **Clearance** – includes the following:

- The positive locating of underground utilities or subsurface installations in or near the work area.
- A signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.

2.3 **Ground Disturbance (GD) –** Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work that results in the penetration of the ground.

2.4 **Hand Clearance Zone –** The area on either side of the locate marks of a utility that shall be maintained in order to expose the utility through the use of non-destructive ground disturbance techniques acceptable to the owner of the buried utility. Visual exposure is required before mechanical excavation equipment may be used.

2.5 **Intrusive Activities –** Examples: Excavation of soil borings, installations of monitoring wells, installation of soil gas sampling probes, excavation of test pits/trenches or other man-made cuts, cavity, trench or depression in an earth surface formed by earth removal.

2.6 **Non-Destructive Ground Disturbance Technique –** A safe and acceptable excavation method that is used to visually expose an underground utility without causing damage. Non-destructive ground disturbance techniques may include, but are not limited to:

- Hand digging.
- Use of non-conductive tools.
- Hydro-vacuum.

2.7 **Subsurface Installation –** Examples: Subterranean tunnels, underground parking garages and other structures beneath the surface.

2.8 **Utility Strikes –** Unplanned contact with utilities resulting in damage to the utility or its protective coating.

3.0 References

3.1 S3AM-003-PR1 SH&E Training

3.2 S3AM-303-PR1 Excavation

3.3 S3AM-321-PR1 Drilling, Boring & Direct-Push Probing

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Manager**

- Administer this procedure and the development of the SH&E Plan.
- Confirm the appropriate equipment and materials are available to conduct the underground utility and/or subsurface installation clearance.
- Confirm all employees involved and affected by the task review the SH&E Plan and Task Hazard Assessment (THA) prior to work commencing
- Authorize work to proceed using the *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist*.
- Confirm that employees conducting underground utilities and subsurface clearance processes possess all required training, registrations or certifications.
- Provide authorization (with the concurrence of the Site Supervisor and SH&E Manager) for work to resume if interrupted due to unexpected conditions or events.

4.1.2 **Safety, Health & Environment (SH&E) Manager**

- Assist AECOM management as needed by providing guidance and clarification as to issues that may arise.
- Review the SH&E Plan to confirm compliance with jurisdictional regulations. Provide technical guidance as needed when a variance is pursued related to this procedure.

4.1.3 **Employees**

- Maintain training as appropriate to the work to be completed (e.g. ground disturbance, lockout tagout, equipment operation, etc.). Refer to *S3AM-003-PR1 SH&E Training*.
- Review the SH&E Plan and Task Hazard Assessment (THA) prior to work commencing.
- As appropriate to the anticipated or encountered hazards and as addressed in the applicable planning documentation, utilize appropriate personal protective equipment (PPE) and applicable training, practices and operating procedures.
- Immediately notify the Manager of any unanticipated conditions or events. If assigned equipment, perform appropriate inspections and confirmations of maintenance and/or repairs.

4.2 Training

4.2.1 All on-site employees involved with the underground utility and subsurface identification and associated clearance process shall be trained, at a minimum, in these procedures.

4.2.2 Employees shall complete all required training associated with their tasks in accordance with the SH&E Training Matrix and any training assessments developed at the business group.

- Refer to *S3AM-003-PR1 SH&E Training.*
- This training may include, but is not limited to, Excavation / Trenching (Ground Disturbance), HAZWOPER, Petroleum Safety Training (or Construction Safety Training), and H2S Alive as appropriate.

4.2.3 As applicable, employees shall receive client-required training.

4.3 Planning

4.3.1 Health and Safety Plan – At a minimum, a SH&E Plan and task hazard assessments (THAs) shall be prepared prior to any underground utilities and subsurface installations clearance activities.

- The SH&E Plan will address any required environmental monitoring including gas monitoring, dust, noise, metals, radiation or other monitoring as may be appropriate for site conditions.
- Employees shall comply with all SH&E Plan requirements.
- The location specific emergency response plan shall be in place, contain procedures applicable to the potential emergencies presented by the operations, and be reviewed with all personnel potentially affected.

4.3.2 *S3AM-331-ATT2 Underground Utilities & Subsurface Installation Clearance Flow Chart* provides a summary of the key requirements addressed in this procedure.

4.3.3 Underground utilities and subsurface installations shall be investigated as being present, including the following, but not limited to:

- Steam, gas and electric.
- Sewer and water.
- Subterranean tunnels.
- Fibre optics (note: routine geophysical surveys will not identify fibre optic cables).
- Traffic control cables.

4.3.4 Location of underground utilities and subsurface installations will be confirmed by cross-referencing available information:

- Maps, as-built drawings and issued for construction (IFC) drawings.
- Plot plans, permits, crossing/encroachment agreements.
- One-Call information, locator and provided surveys.
- Private utility information, locator and provided surveys (e.g. ground penetrating radar (GPR), electromagnetic, etc.).
- Owner supplied documentation.
- Site walks.

4.3.5 As applicable, emergency shut-off locations of utilities shall be verified before work activities commence.

4.3.6 Jurisdictional, land owner, client and utility owner requirements shall be consulted to determine the minimum search zone dimensions and appropriate clearance distances.

4.3.7 As necessary and if possible, adjust locations of excavations or intrusive subsurface work away from subsurface utilities and installations

4.3.8 Prior to any excavation or intrusive subsurface work, the *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist* shall be completed. The form shall be reviewed and signed by the Manager.

- If the answer to any question in Part 1 of the checklist is “No” or “N/A”, no ground disturbance may take place without review by the Manager, in consultation with SH&E Manager, of the circumstances related to the particular item. The Manager shall initial beside each “No” or “N/A” item to indicate review and authorization.

4.4 Permits, Notifications and Access Agreements

4.4.1 Any required notifications shall be provided within the appropriate timeframe to the applicable organization (e.g. owner, utility company, agency, governing body, etc.).

4.4.2 All applicable permits (e.g. client, government, working near rail road, etc.) will be identified, obtained, and adhered to.

4.4.3 All access agreements will be obtained and adhered to.

4.5 Locating Underground Utilities and Subsurface Installations

4.5.1 Utilize the appropriate call/click-before-you-dig provider. Refer to *S3AM-331-ATT1 One-Call System*.

4.5.2 Federal/State/Provincial/Territorial and other "One Call" providers shall be contacted at least two working days and no more than ten working days prior to commencing the ground disturbance. Jurisdictional requirements shall be consulted to verify the appropriate advance notice. (e.g. 24 hours, two full working days, three to ten business days, etc.).

4.5.3 If the location of proposed excavation or intrusive subsurface work cannot be clearly and adequately identified, the route and/or area of the proposed ground disturbance shall be identified using white flags, paint or stakes prior to the arrival of the locator. Consult jurisdictional requirements as white-lining may be a mandatory requirement on all ground disturbances.

4.5.4 One Call providers shall appropriately identify and mark the subsurface utilities or installations, or otherwise provide written notification they do not have any facilities near the proposed subsurface/intrusive locations.

4.5.5 Confirm all circuits were on during subsurface checks if the checks were for identifying energized lines (e.g. circuits on timers or light sensing switches).

4.5.6 Areas that have a high density of sub-surface facilities may require a secondary locate by another independent locator to verify locations identified by the first locator.

4.6 Private Utility Locating

4.6.1 One Call services may not be available in various non-urban locations. Private utility locating companies shall be utilized to identify and located any underground utilities or subsurface installations.

4.6.2 Be aware urban areas (e.g. city or town) may have subsurface installations (e.g. underground garages) and utilities (e.g. public water, sewer, and gas pipelines) that are not covered by one-call systems.

- These subsurface installations and utilities require additional investigation and diligence beyond the one-call system.
- Additional investigation and diligence beyond the one-call system is also recommended for non-urban areas.

4.6.3 In urban areas, private utility locating companies shall be called to identify and locate, through geophysical surveys and other means, the presence of private utilities installed by the property owner (e.g. irrigation systems) and to verify the presence of public utilities on the properties.

- Hand clearing is required in urban areas.

4.6.4 Hand clearing is also recommended for non-urban areas and may be required by the given jurisdiction.

4.6.5 Warning tape, pea gravel, sand, non-indigenous material, bentonite, red concrete (indicative of electrical duct banks) and any departure from native soil or backfill may be evidence of the presence of subsurface installations and utilities.

4.7 Surface Markings

4.7.1 Once the underground installation has been identified, proper surface markings shall be made in accordance with the guidelines from the One-Call System (refer to S3AM-331-ATT1), guidance contained in this procedure or as contract-specified.

4.7.2 Color-coded surface marks (paints or similar coatings) shall be used to indicate the type, location, and route of buried installations. Additionally, to increase visibility, color-coded vertical markers (temporary stakes or flags) shall supplement surface marks.

4.7.3 All marks and markers shall indicate the name, initials, or logo of the company that owns or operates the installation and the width of the installation if it is greater than 2 inches.

4.7.4 If the surface over the buried installation is to be removed, supplemental offset marking shall be used. Offset markings shall be on a uniform alignment and shall clearly indicate that the actual installation is a specific distance away.

4.7.5 Locate marks shall be re-verified as per jurisdictional requirements or no later than 14 days after the previous locate was completed, whichever interval is shorter. These locate time intervals shall be maintained for the duration of the ground disturbance.

- If the work is interrupted during the determined lifespan or work does not commence during the applicable lifespan, a new locate shall be performed.
- Jurisdictional provisions may allow for an extension to the lifespan of the locate marks, however certain conditions may need to be met. (e.g. activities uninterrupted)
- If locate marks are moved or destroyed the location of the buried facilities shall be re-established.

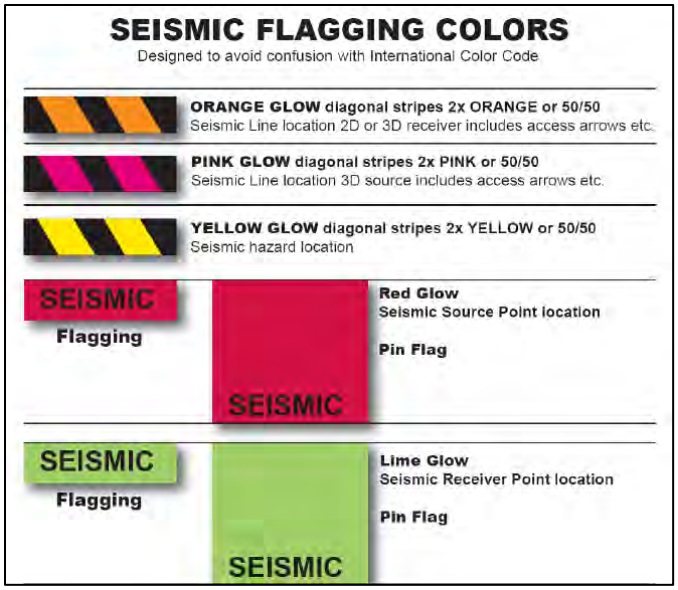
4.8 Uniform Color Coding

4.8.1 The colors and corresponding installation type are as follows unless otherwise contract-specified:

AMERICAN PUBLIC WORKS ASSOCIATION – APWA
Color Coding for Marking of Buried Facilities

White	Proposed Ground Disturbance Area
Pink	Temporary Survey Markings
Red	Electric Power Lines, Cables, Conduit and Lighting Cables
Yellow	Gas, Oil, Steam, Petroleum Lines or Gaseous Materials
Orange	Conduit, Cable, Communication, Alarm or Signal Lines
Blue	Potable Water
Green	Sewer, Storm Sewer and Drain Lines
Purple	Reclaimed Water, Irrigation and Slurry Lines (non-potable)

Canadian Association of Geophysical Contractors



4.9 Identification and Mapping of Utility and Subsurface Structures

4.9.1 The locations of subsurface utilities and subsurface installations shall be investigated, documented, and shown on a site plan (a scaled site plan shall be used when feasible). Refer to *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist.*

4.9.2 Documentation of utility and subsurface installation identification (calling one call, responses from utilities) along with the scaled site plan shall be available on the worksite at all times of intrusive activities.

4.10 Site Walk

4.10.1 A site walk shall be conducted by the AECOM Manager and any other appropriate personnel with the objectives of reviewing all planned intrusive activity locations, the locations of subsurface and overhead utilities, overhead obstructions, and the potential for subsurface installations, to determine the appropriate utility clearance activities, and to observe other physical hazards.

- Walk the area at least 50 feet (15.2 meters) from perimeter of the site to observe physical hazards.
- Walk the area of at least 50 feet (15.2 meters) radius from each proposed subsurface intrusion location.
- If possible, particularly at urban and industrial sites, the client/property owner or an individual knowledgeable about the site and site utilities will attend the site walk.
- Add discovered items/issues to map for use in location confirmation.

4.10.2 The Site Walk further supplements the Identification and Mapping of Utility and Subsurface Structures procedure. Site Walks should be repeated as necessary following the Identification and Mapping of Utility and Subsurface Structures as visual verification of the hazards. Examples include:

- Proposed location(s) does not lie on a line connecting two similar manhole covers (e.g. sanitary sewer or storm drain).
- Proposed subsurface location(s) has not subsided, been excavated and patched, nor gives the appearance it may be covering a former trench (e.g. linear cracks, sagging curbs, linear re-pavements, etc.).
- Proposed subsurface location(s) does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.

4.11 Proposed Subsurface Investigation Locations

4.11.1 All proposed subsurface locations will be reviewed in comparison to subsurface and overhead utilities and subsurface installations and adjustments made as necessary.

4.11.2 Minimum set back distances from subsurface and overhead utilities and subsurface installations will be established including 5 feet (1.5 meters) from any subsurface utility, 7 feet (2.1 meters) from the pad surrounding any underground storage tanks, and 10 feet (3 meters) from any overhead energized electrical line (or further depending on line voltage). These set back distances are a minimum; government regulations and utility requirements may dictate a greater set back distance.

4.12 Utility Clearance Investigation Location Confirmation

4.12.1 As applicable, all client on-site safety procedures shall be understood and adhered to.

4.12.2 Hand exposure or non-destructive ground disturbance techniques to expose an underground utility or subsurface installation are necessary to accurately determine size, location and alignment prior to mechanical excavation or intrusive subsurface work in the vicinity of that utility or installation.

4.12.3 Non-destructive ground disturbance techniques shall be acceptable to the owner of the buried utility (i.e. hydro-vacuum temperature or pressure).

4.12.4 Hydro-vacuum or air-knife require proper grounding equipment at sites where the subsurface may contain flammable gases, liquids, or vapors

4.12.5 Jurisdictional, land owner, client and utility owner requirements shall be consulted to determine the distance of the hand exposure zone, and what requirements, when met, may allow mechanical excavation within these zones.

4.12.6 At a minimum, all underground utilities and subsurface installations within a 5 feet (1.5 meter) radius of the work site shall be identified and physically located (seen) before use of mechanical excavation equipment is permitted. Jurisdictional, client, land owner and utility owner requirements shall be consulted as the required hand exposure radius may be larger.

4.12.7 In urban areas, proposed subsurface locations will be hand cleared to 5 feet (1.5 meters) (soil borings and wells) or 12 inches (30 centimeters) (soil gas sampling probes) using non-mechanical methods.

- In non-urban areas, hand clearing should be conducted if possible and shall be conducted as required by the given jurisdiction.
- Hand clearance should be extended if locations of deep utilities and structures are not known.
- Hand exposure or non-destructive ground disturbance techniques should extend a minimum of 24 inches (60 centimeters) below the intended ground disturbance depth to minimize the hazard of mechanical equipment contact with any utility or installation.

4.12.8 Mechanical equipment and attachment dimensions shall be considered when establishing the zone in which all underground utilities and subsurface installations are physically located (seen) prior to the use of that equipment. The radius may require expanding to maintain safe distances when using large equipment.

4.13 Utility Strikes

4.13.1 Utility strikes shall be reported in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.

4.13.2 All damaged utilities shall be repaired by a qualified and/or licensed professional.

5.0 Records

5.1 Retain completed *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist* and documents related the clearance process (e.g. Utility Owner communication, etc.) in the site or project files.

5.2 Documentation of employee training completed shall be retained in accordance with *S3AM-003-PR1 SH&E Training*.

6.0 Attachments

6.1 S3AM-331-ATT1 One-Call System

6.2 S3AM-331-ATT2 Underground Utilities & Subsurface Installation Flow Chart

6.3 S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist

Americas

Personal Protective Equipment

S3AM-208-PR1

1.0 Purpose and Scope

1.1 Provide an effective Personal Protective Equipment (PPE) Program to protect AECOM employees from potential workplace safety and health hazards.

1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

1.3 The proper use of appropriate PPE, in combination with effective engineering and administrative controls, can provide AECOM employees with protection against potential workplace hazards and can reduce the potential for workplace injury and illness.

2.0 Terms and Definitions

2.1 **ANSI** – American National Standards Institute

2.2 **CSA** – Canadian Standards Association

2.3 **PPE** – Personal Protective Equipment

2.4 **SDS** – Safety Data Sheets

2.5 **THA –** Task Hazard Assessment

3.0 References

3.1 S3AM-123-PR1 Respiratory Protection

3.2 S3AM-209-PR1 Risk Assessment & Management

3.3 S3AM-301-PR1 Confined Spaces

3.4 S3AM-304-PR1 Fall Protection

3.5 S3AM-315-PR1 Working On & Near Water

3.6 S3AM-317-PR1 Hand Safety

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Managers** or **Supervisors**

- Confirm the location specific SH&E Plan documents required hazard controls.
- Confirm Task Hazard Assessments (THAs) are conducted and hazards identified are eliminated through substitution, engineering, or administrative controls first before assigning PPE for hazard mitigation.
- Confirm appropriate subject matter experts, manufacturer's specifications, and regulatory requirements are consulted as necessary to assist with proper PPE selection.
- Match the appropriate PPE to those hazards that cannot be eliminated; support employees in exercising Stop Work Authority if the task is too hazardous to be mitigated
- Provide and document employee training on use and care of PPE.
- Determine which staff requires employee-issued PPE.

- Determine PPE requirements for visitors.
- If applicable, manage medical monitoring of employees using PPE (e.g. respirators, hearing protection, radiation, etc.).
- Approve the purchase of company-issued PPE.
- Confirm that appropriate PPE is utilized by employees when required or necessary. This may periodically be documented using *S3AM-208-FM2 Personal Protective Equipment Inspection*.
- Exercise Stop Work Authority if PPE is inadequate to address hazards.

4.1.2 **SH&E Managers**

- Provide guidance to Managers, Supervisors, and staff on the assessment of hazards and the selection of PPE.
- Provide training materials to Managers and Supervisors for employee training

4.1.3 **Employee**

- Review all relevant SH&E Plans, THAs and applicable SDS prior to commencing work.
- Exercise Stop Work Authority if the task is too hazardous.
- In accordance with training and instructions, utilize appropriate PPE that has been issued when required or necessary.
- Inspect PPE prior to and after use to confirm that it is functional, and maintain PPE in a clean and functional condition.
- Follow instructions and manufacturers' guidance on the care, use, and storage of PPE.
- Replace PPE when worn out, expired or damaged.
- Refrain from wearing PPE outside of the work area for which it is required if doing so would constitute a hazard.

4.2 Hazard Assessment

4.2.1 The location specific SH&E plan and THA shall assess the hazards and identify the necessary control measures. Refer to *S3AM-209-PR1Risk Assessment & Management.*

4.2.2 These control measures shall include direction and guidance concerning the appropriate PPE required as the last line of defense to the anticipated hazards of the specific operations and tasks. A PPE specific assessment may assist in identifying PPE requirements. *S3AM-208-FM1 Personal Protective Equipment Assessment* may be completed and included in the SH&E Plan.

4.2.3 Various tasks and operations, including but not limited to, demolition, remediation, spill response, asbestos abatement, and lead removal, may require additional direction concerning selection, use, care, and disposal of PPE from a subject matter expert (e.g. protector manufacturer, industrial hygienist, asbestos professional, etc.).

- Obtained direction shall be included in the SH&E Plan.
- Consultation with subject matters may be limited to the planning phase or they may be retained to provide technical assistance for a portion of or duration of the project.

4.3 Training

4.3.1 All employees shall be informed of their right to Stop Work if the task is too hazardous to mitigate through use of elimination, substitution, engineering controls, administrative controls, and PPE.

4.3.2 Staff will receive adequate instruction on the correct use, limitations, and assigned maintenance duties for the equipment to be used. The following information, at a minimum, will be covered during PPE training:

- What PPE is required.
- When it is required.
- Why it is required.
- How to properly don, doff, adjust, and wear the PPE described.
- The limitations of the PPE, including its expected useful life.
- How to properly care for, maintain, and dispose of the PPE.

4.3.3 Retraining may be required as applicable (e.g., observed non-compliance, changes in procedure, etc.).

4.3.4 Staff are responsible for confirming that they have reviewed the operation manual/instructions for the PPE before work commences.

4.3.5 All staff will receive a location specific orientation to the hazards on the job site as well as appropriate PPE requirements.

4.4 Determining the Need for PPE

4.4.1 Prior to beginning work, the SH&E plan shall be consulted and THAs developed to identify the PPE requirements.

4.4.2 After the hazard assessments have been completed, the manager and/or employee shall select the appropriate PPE for each job category or task, as necessary. PPE will be provided to each employee appropriate for the hazards present.

- All PPE selected, purchased and used by AECOM will meet or exceed the appropriate ANSI/CSA standards or other standards as determined by federal, provincial, territorial, or state legislation.

4.4.3 If the hazard can be mitigated through using appropriate PPE shall:

- Properly fit the employee's body. Reasonable attempts shall be made to procure gender-specific gear / sizing.
- Be selected and used in accordance with recognized standards and provide effective protection.
- Not in itself create a hazard to the wearer (e.g., scratched safety glasses which could cause impaired vision should be replaced with clear safety glasses).
- Be compatible so that one item of PPE does not interfere with other PPE.
- Be maintained in good working order and in a sanitary condition.
- Not be altered in any way.

4.4.4 Prior to entering any controlled or restricted work area, employees shall review the SH&E plan and corresponding THA(s) to confirm that they are equipped with the applicable ANSI/CSA-approved PPE, appropriate to the specific work area's hazards.

4.5 Eye and Face Protection

4.5.1 AECOM employees shall use appropriate eye and face protection when eye or face hazards are present or potential from flying particles, molten metal, liquid chemicals, acid and caustic liquids, chemical gases or vapors, or injurious light radiation.

4.5.2 Safety glasses with side protection is the minimum eye protection requirement. Additional eye protection shall be suitable to the anticipated hazards (e.g. goggles, safety glasses with a face-shield, welder's helmet, etc.). Refer to *S3AM-208-ATT1 Eye & Face Protection*.

4.6 Head Protection

4.6.1 Appropriate protective hardhats are required when employees are working in areas where there is any potential for injury to the head.

4.6.2 Head protection shall be suitable to the anticipated hazards (e.g. working near exposed electrical conductors requires hardhats designed to reduce electrical shock). Refer to *S3AM-208-ATT2 Head Protection.*

4.7 Foot Protection

4.7.1 AECOM employees shall use appropriate foot protection when hazards to feet are present or potential; including impact, puncture, cut, electrical, thermal or chemical hazards.

4.7.2 Refer to *S3AM-208-ATT3 Foot Protection.*

4.8 Hand Protection

4.8.1 Appropriate hand protection is required when employee's hands are exposed to hazards such as those from skin absorption of harmful substances, cuts and lacerations, abrasions, punctures, chemical burns, thermal burns, electricity, or harmful temperature extremes.

4.8.2 Refer to *S3AM-208-ATT4 Hand Protection* and *S3AM-317-PR1 Hand Safety*.

4.9 Chemically Resistant Clothing

4.9.1 Chemically resistant clothing is required when there is significant potential for the employee to come in direct contact with the chemicals being handled. Tasks that involve chemical handling will be evaluated for potential splashing or spilling. Refer to *S3AM-208-ATT5 Limb & Body Protection*.

4.9.2 The process for selecting chemical resistant clothing will be similar for the selection of chemical resistant gloves (refer to *S3AM-208-ATT4-Hand Protection* and *S3AM-317-PR1 Hand Safety*).

4.10 High-Visibility Apparel

4.10.1 “High visibility safety apparel” means personal protective safety clothing that is intended to provide conspicuity during both daytime and nighttime usage and that meets the Performance Class II or III requirements of ANSI/CSA standards. Refer to *S3AM-208-ATT6 High Visibility Safety Apparel.*

4.10.2 Color of apparel (orange or lime) may be client/project-specific. If there is a specific need to be visible to the passing public, to machine operators, or to other crew members, high visibility vests shall be worn (and retro-reflective striping on arms and legs at night).

4.10.3 Work conducted at night may require that the minimum level of apparel worn be, at minimum, ANSI/CSA Class III, and in accordance with the governing legislation.

4.11 Personal Clothing

4.11.1 Employees on a project site shall wear full length trousers and shirts that cover shoulders.

4.11.2 For personal safety on the job site, do not wear

- Loose or unsecured clothing or loose fitting cuffs;
- Greasy or oily clothing, gloves, or boots; or
- Torn or ragged clothing.
- Jewelry (e.g. rings, bracelets, neck chains) when working with moving parts or there is a risk or entanglement.

4.11.3 Long hair shall be tied back or otherwise confined when working with moving parts or there is a risk of entanglement.

4.11.4 Clothing made of synthetic fibers can be readily ignited and melted by electric flash or extreme heat sources. Cotton or wool fabrics are recommended for general use.

4.11.5 Footwear shall be suitable for the site conditions and task requirements. No athletic shoes, sandals, flip flops, permitted on active job sites.

4.11.6 It is recommended to use clothing with sun protection properties when working in high sun UV exposure

4.12 Specialized PPE

4.12.1 In addition to basic PPE, additional specialized PPE may be required to provide appropriate protection to the employee. Refer to applicable legislation and related SH&E procedures for additional information on PPE requirements.

- Fall Protection – Only full-body harnesses with shock-absorbing lanyards will be used for personal fall arrest. Refer to *S3AM-304-PR1 Fall Protection*.
- Respiratory Protection – Respiratory protection shall be selected based on the contaminant and concentration to which the employee will be exposed. Refer to *S3AM-123-PR1 Respiratory Protection*, the task- or project-specific hazard assessments and the applicable SDSs for specific requirements.
- Fire Resistant Clothing (FRC) – Approved fire-resistant outer clothing may be required at work locations with flammable or explosive materials or environments. Refer to *S3AM-208-ATT5 Limb & Body Protection.*
- Other Head Protection – Operators and passengers (if trained and permitted) of all-terrain vehicles and snowmobiles will wear approved helmets. Refer to *S3AM-208-ATT2 Head Protection.*
- Protection from Drowning – Appropriate personal floatation devices shall be worn when work working over and near water. Refer to *S3AM-315 Working On & Near Water*.
- Temperature Extremes – Work in cold environments may require additional layers and insulated clothing, gloves, boots and accessories such as balaclavas, hardhat liners. Confirm these items are approved and do not introduce additional unacceptable hazards (e.g. insufficient visibility, conductivity, etc.).
- Hearing Protection – Noise levels in the work environment that cannot be eliminated or reduced to acceptable levels requires worker be protected from exposure. Refer to *S3AM-118-PR1 Hearing Conservation.*
- Traction Devices – Traction devices applied to the base of work boots may be necessary if the employee may be walking on icy surfaces. Refer to *S3AM-208-ATT3 Foot Protection*.
- Rescue – Confined spaces hazards may necessitate the use of specific harnesses attached to retrieval lines to facilitate rescue. Refer to *S3AM-301-PR1 Confined Spaces*.

4.13 Maintaining PPE Supplies

4.13.1 Employees shall inspect their required PPE prior to use. Defective equipment shall be removed from service and replaced.

4.13.2 Each AECOM location will maintain a supply of safety equipment of appropriate types and sizes, including hard hats, high visibility vests, safety glasses, gloves, hearing protection and chemically resistant clothing based on the nature of their field activities. The Manager or designee will be responsible for maintaining this inventory.

4.13.3 Use of PPE by employees and adequacy of protection should be evaluated on a routine basis. This may periodically be documented using *S3AM-208-FM2 Personal Protective Equipment Inspection.*

4.13.4 At a minimum, locations will review their PPE program annually.

4.14 Obtaining Personalized Safety Gear

4.14.1 Employees are not expected to provide their own general PPE. Most basic PPE will be provided to the employee at no charge (e.g. safety glasses, hard hat, gloves, hearing protection, etc.) with the

exception of the below personalized safety equipment (prescription safety glasses, safety-toed boots, any washable coveralls).

4.14.2 Certain personalized safety gear such as prescription safety glasses, safety-toed (capped) boots, and any washable coveralls will be ordered and sized specifically by the user. A partial cost reimbursement to the employee may be made if their location provides a specialized PPE purchase program.

4.14.3 All specialized PPE (e.g. fall protection equipment, respirators, helmets, etc.) will be provided by AECOM for employee use at no charge to the employee, with the exception of the above personalized safety equipment (prescription safety glasses, safety-toed boots, any washable coveralls).

5.0 Records

5.1 Completed SH&E plans, THAs documenting PPE requirements, and as applicable, PPE assessments and PPE inspections, will be maintained in the location's safety files.

6.0 Attachments

6.1 S3AM-208-ATT1 Eye & Face Protection

6.2 S3AM-208-ATT2 Head Protection

6.3 S3AM-208-ATT3 Foot Protection

6.4 S3AM-208-ATT4 Hand Protection

6.5 S3AM-208-ATT5 Limb & Body Protection

6.6 S3AM-208-ATT6 High Visibility Safety Apparel

6.7 S3AM-208-FM1 Personal Protective Equipment Assessment

6.8 S3AM-208-FM2 Personal Protective Equipment Inspection

Attachment 2

AECOM Field Memorandum 1/08/2020

AECOM
100 Red Schoolhouse Road, Suite B-1
Chestnut Ridge, NY 10977

845.425.4980 tel

Field Memorandum

Today's Date: January 8, 2020

Job #: 60587637

Task #: Parcel 57 F

To: Christine De Ambrosio, AECOM

From: Al LoPilato, AECOM

Subject: FTMM Parcel 57 Additional Remedial Excavation and Post-Excavation Soil Sampling (including SPLP) Samples and Analysis

Summary

This memo has been prepared to outline field activities to be conducted for excavation of additional soil at four previously excavated "Hot Spot" locations located at Fort Monmouth Parcel 57.

The overall objective is to remove Polycyclic Aromatic Hydrocarbon (PAH) contamination detected above NJDEP RDCSRS and/or DIGWSSL as indicated in **Table 1** below:

Table 1
Previous Post-Ex Soil Sample Exceedance Locations
and Re-Excavation Sampling Plan

Location	Previous Sample Depth	Additional Excavation Proposed	Additional Post Excavation Sampling
SS12-E	1.0-1.5	• Excavate laterally 2.0 feet out from each previous sidewall listed; • Excavate vertically 1.0 feet below deepest previous sample depth along face of each sidewall listed.	1 soil sample from the bottom of each sidewall (4 samples total) for Benzo(a)pyrene analysis
SS12-N	1.0-1.5		
SS12-S	1.0-1.5		
SS-12-W	0.0-0.5 1.0-1.5		
SS13-E	0.0-0.5	• Excavate laterally 2.0 feet out from each previous sidewall listed; • Excavate vertically 1.0 feet below deepest previous sample depth along face of each sidewall listed.	1 soil sample from the bottom of each sidewall (2 samples total) for Benzo(a)pyrene analysis
SS13-S	0.0-0.5		
SS14-B	1.0-1.5	• Excavate laterally 2.0 feet out from each previous sidewall listed; • Excavate vertically 1.0 feet below BOTTOM depth of previous excavation; • Sample the bottom of each sidewall and the excavation bottom.	**PRIOR TO EXCAVATION** – collect 1 SPLP sample SS14-S sidewall with analysis for Organic Carbon (Lloyd Kahn), Total SVOC, SPLP w/ pH and soil moisture; **POST-EXCAVATION** - collect 1 sample from the bottom of each sidewall and 1 excavation bottom sample (5 samples total) for Benzo(a)pyrene, Benzo(a) anthracene, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene analysis;
SS14-E	0.0-0.5		
SS14-N	0.0-0.5		
SS14-S	0.0-0.5 1.0-1.5		
SS14-W	0.0-0.5 1.0-1.5		

SS18-E	0.0-0.5	• Excavate laterally 2.0 feet out from each previous sidewall listed; • Excavate vertically 1.0 feet below deepest previous sample depth along face of each sidewall listed.	**PRIOR TO EXCAVATION** – collect 1 SPLP sample each from SS18-N sidewall and SS18-S sidewall (2 samples total) with analysis for Organic Carbon (Lloyd Kahn), Total SVOC, SPLP w/ pH and soil moisture; **POST-EXCAVATION** - collect 1 sample from the bottom of each sidewall (4 samples total) for Benzo(a)pyrene, Benzo(a) anthracene, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene analysis;
SS18-N	0.0-0.5		
SS18-S	0.0-0.5		
SS18-W	0.0-0.5		

Excavation Procedures

In summary, as depicted on **Figure 1,** a total of four previously remediated locations (SS12, SS13, SS14 and SS18) will be expanded. Additional asphalt will be removed as needed, and the areas will be over-excavated laterally and vertically as indicated in **Table 1**. Previously placed clean backfill (DGA) will be removed from each excavation and stockpiled on plastic for re-use. Any DGA removed that exhibits visual evidence of significant soil impact will be segregated, stockpiled and disposed off-site with the newly excavated soil material. Excavated soil and asphalt will be direct loaded into vehicles for transport to the disposal facility (Bayshore Recycling, Keasby, NJ). Based on the proposed excavation areas a volume of approximately 15-20 Cubic Yards is anticipated to be generated.

Sidewalls at deeper excavations should be extended outward and sloped as needed based on soil type and overall depth of the excavation, as per the AECOM's Excavation SOP (S3AM-303-PR1) included in the APP and attached herein, and at the direction of the on-site OSHA Excavation/Trenching Competent Person.

Sheeting and/or trench boxes are not planned for use during excavation activities. Personnel shall not enter deeper excavations, and a minimum working distance (at least equal to the depth of excavation) shall be maintained around the excavation perimeter. **Please complete the attached *Trenching & Excavation Permit* and *Daily Excavation Checklist* for retention in project folder.**

Waste Manifests/Bills of Lading

EISCO will have pre-prepared waste disposal paperwork for signature by the generator (US Army).

Post-Excavation/SPLP Soil Sample Collection and Analysis

Once the previously placed DGA backfill has been removed, AECOM will collect pre-excavation Synthetic Precipitation Leaching Procedure (SPLP) samples as locations SS14 and SS18 as indicated in **Table 1**, in order to establish Site Specific Impact to Groundwater Soil Remediation Standards (IGWSRS) for the target contaminants.

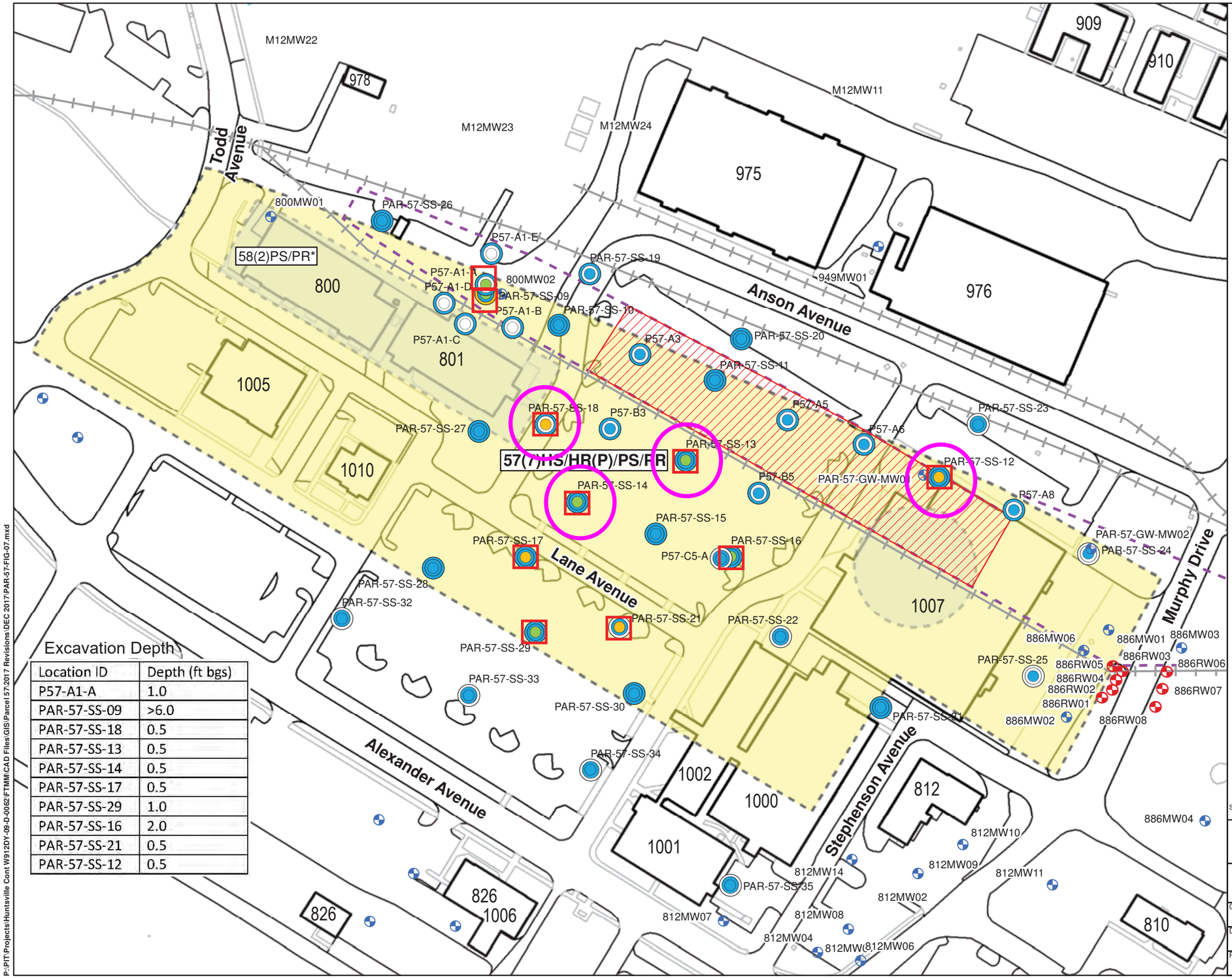
Post excavation soil samples will then be collected at all locations as indicated in **Table 1.** A summary table of previous analytical results is attached herein for reference purposes.

Backfill Material

Dense Grade Aggregate (DGA) for a NJ Licensed Quarry/Mine has been proposed for use as excavation backfill material. EISCO will provide the Certification from the Quarry that the material meets New Jersey's requirements for clean fill material as per the NJDEP's *Fill Material Guidance for SRP Sites (April 2015).*

H&S/Air Monitoring

Daily Safety Meetings etc. as per APP should be conducted. Please monitor dust downwind of the work areas using a MiniRam. Action level for respirable particulates is 5 mg/m3 (sustained) 10 mg/m3 total dust, at which point dust suppression measures (wetting) should be implemented or work stopped. VOC monitoring is not necessary unless evidence of VOC impacts is observed during excavation activity. PID will be on-site as a contingency.



LEGEND:

- Shallow Monitoring Well
- Recovery Well
- Parcel 57 Boundary
- Approximate Location of Former Railroad Track (based on 1962 FTMM plan figure)
- Approximate Extent of Former Coal Storage
- Former Concrete Coal Storage Pad
- Not analyzed for PAHs
- PAHs not detected or detected below RDCSRS
- PAHs exceeded RDCSRS
- PAHs exceeded both RDCSRS and NRDCSRS
- Water Table (approx. 5-7.5 ft. bgs)
  Intermediate (approx. 2-3.5 ft. bgs)
  Shallow (approx. 0-1 ft. bgs)
- PAH Hotspot Excavation Location
- Re-Excavation Locations

NOTES:

1. RDCSRS = Residential Direct Contact Soil Remediation Standard
2. NRDCSRS = Non-Residential Direct Contact Soil Remediation Standard
3. 2007 Sample Results are not shown if a 2010, 2015, or 2016 sample was collected in the same location.

Excavation Depth

Location ID	Depth (ft bgs)
P57-A1-A	1.0
PAR-57-SS-09	>6.0
PAR-57-SS-18	0.5
PAR-57-SS-13	0.5
PAR-57-SS-14	0.5
PAR-57-SS-17	0.5
PAR-57-SS-29	1.0
PAR-57-SS-16	2.0
PAR-57-SS-21	0.5
PAR-57-SS-12	0.5

BRAC Parcel Label Definitions

8(2)PS
- Contaminant Description: HS – Hazardous Substance Storage; HR – Hazardous Substance Release; PS – Petroleum Storage; PR – Petroleum Release; (P) – Possible Release or Disposal
- Category Number
- Parcel Number

N

1 inch = 120 feet

0 60 120 240 Feet

Source: FTMM Supplied CAD, 2013; U.S. Army BRAC, 2008.

PARSONS
401 Diamond Drive NW,
Huntsville AL

Fort Monmouth
New Jersey

COMPARISON OF SOIL RESULTS FOR PAHS TO NJDEP DIRECT CONTACT STANDARDS

CREATED BY:	REVIEWED BY:
RR	JB
DATE:	FIGURE NUMBER:
MAR. 2018	FIGURE 2
PROJECT NUMBER:	FILE:
748810-02110	PAR-57-FIG-07.mxd

P:\PIT Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 57\2017 Revisions\DEC 2017\PAR-57-FIG-07.mxd

SGS

Job Numbers:	**JC95903, JC95957, and JC96270**
Account:	**AECOM, INC.**
Project:	**Fort Monmouth, NJ**
Project Number:	

Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

Client Sample ID:			NJ Non-Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Default Impact to Groundwater Soils Screening (NJAC 7:26D 11/13)	P57-A1-AB (1.5-2.0)	P57-A1-AE (0.0-0.5)	P57-A1-AE (1.5-2.0)	P57-A1-AN (0.0-0.5)	P57-A1-AN (1.5-2.0)	P57-A1-AS (0.0-0.5)	P57-A1-AS (1.5-2.0)	P57-A1-AW (0.0-0.5)	P57-A1-AW (1.5-2.0)	P57-SS09B (6.5-7.0)	P57-SS09E (1.5-2.0)	P57-SS09E (6.5-7.0)	P57-SS09N (1.5-2.0)
Lab Sample ID:						JC95903-18	JC95903-14	JC95903-15	JC95903-10	JC95903-11	JC95903-12	JC95903-13	JC95903-16	JC95903-17	JC95903-7	JC95903-3	JC95903-5	JC95903-1
Date Sampled:						9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019
Matrix:						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte	**CAS#**	**Unit**																
MS Semi-volatiles (SW846 8270D)																		
Acenaphthene	83-32-9	mg/kg	37000	3400	110	ND (0.014)	ND (0.013)	ND (0.013)	ND (0.012)	ND (0.014)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.014)	ND (0.015)	ND (0.013)	ND (0.015)	ND (0.012)
Acenaphthylene	208-96-8	mg/kg	300000	NA	NA	ND (0.021)	ND (0.019)	ND (0.019)	ND (0.018)	ND (0.021)	ND (0.019)	ND (0.020)	ND (0.019)	ND (0.020)	ND (0.022)	ND (0.019)	ND (0.022)	ND (0.018)
Anthracene	120-12-7	mg/kg	30000	17000	2400	ND (0.025)	ND (0.023)	ND (0.023)	ND (0.022)	ND (0.025)	ND (0.022)	ND (0.024)	ND (0.023)	ND (0.025)	ND (0.027)	ND (0.023)	ND (0.027)	ND (0.022)
Benzo(a)anthracene	56-55-3	mg/kg	17	5	.8	ND (0.012)	ND (0.010)	ND (0.011)	ND (0.010)	ND (0.012)	0.0100 J	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.012)	ND (0.010)	ND (0.012)	ND (0.010)
Benzo(a)pyrene	50-32-8	mg/kg	2	.5	.2	ND (0.018)	ND (0.017)	ND (0.017)	ND (0.016)	ND (0.019)	ND (0.017)	ND (0.018)	ND (0.017)	ND (0.018)	ND (0.020)	ND (0.017)	ND (0.020)	ND (0.016)
Benzo(b)fluoranthene	205-99-2	mg/kg	17	5	2	ND (0.018)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.018)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.018)	ND (0.019)	ND (0.016)	ND (0.019)	ND (0.016)
Benzo(g,h,i)perylene	191-24-2	mg/kg	30000	380000	NA	ND (0.020)	ND (0.018)	ND (0.019)	ND (0.018)	ND (0.020)	ND (0.018)	ND (0.019)	ND (0.019)	ND (0.020)	ND (0.022)	ND (0.019)	ND (0.022)	ND (0.018)
Benzo(k)fluoranthene	207-08-9	mg/kg	170	45	25	ND (0.019)	ND (0.017)	ND (0.018)	ND (0.017)	ND (0.019)	ND (0.017)	ND (0.018)	ND (0.017)	ND (0.019)	ND (0.020)	ND (0.017)	ND (0.020)	ND (0.017)
Chrysene	218-01-9	mg/kg	1700	450	80	ND (0.013)	ND (0.012)	ND (0.012)	ND (0.011)	ND (0.013)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.013)	ND (0.014)	ND (0.012)	ND (0.014)	ND (0.011)
Dibenzo(a,h)anthracene	53-70-3	mg/kg	2	.5	.8	ND (0.018)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.018)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.018)	ND (0.019)	ND (0.016)	ND (0.019)	ND (0.016)
Fluoranthene	206-44-0	mg/kg	24000	2300	1300	ND (0.018)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.018)	ND (0.016)	ND (0.017)	ND (0.017)	ND (0.018)	ND (0.020)	ND (0.017)	ND (0.019)	ND (0.016)
Fluorene	86-73-7	mg/kg	24000	2300	170	ND (0.019)	ND (0.017)	ND (0.017)	ND (0.017)	ND (0.019)	ND (0.017)	ND (0.018)	ND (0.017)	ND (0.018)	ND (0.020)	ND (0.017)	ND (0.020)	ND (0.017)
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	17	5	7	ND (0.019)	ND (0.017)	ND (0.018)	ND (0.017)	ND (0.019)	ND (0.017)	ND (0.018)	ND (0.017)	ND (0.019)	ND (0.021)	ND (0.017)	ND (0.020)	ND (0.017)
Naphthalene	91-20-3	mg/kg	17	6	25	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.012)	ND (0.010)	ND (0.012)	ND (0.010)
Phenanthrene	85-01-8	mg/kg	300000	NA	NA	ND (0.014)	ND (0.012)	ND (0.013)	ND (0.012)	ND (0.014)	ND (0.012)	ND (0.013)	ND (0.012)	ND (0.014)	ND (0.015)	ND (0.012)	ND (0.015)	ND (0.012)
Pyrene	129-00-0	mg/kg	18000	1700	840	ND (0.013)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.013)	0.0153 J	ND (0.012)	ND (0.012)	ND (0.013)	ND (0.014)	ND (0.012)	ND (0.014)	ND (0.012)
General Chemistry																		
Solids, Percent		%	-	-	-	78.6	89.5	86.6	91.2	81.4	90.4	84.4	89.7	81.9	75	89	75.5	92.1

Footnotes:

[a] Associated CCV outside of control limits high.

[b] Associated CCV outside of control limits high, sample was ND.

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31 results exceeded regulatory criteria.

SGS

Job Numbers:	**JC95903, JC95957, and JC96270**
Account:	**AECOM, INC.**
Project:	**Fort Monmouth, NJ**
Project Number:	

Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

Client Sample ID:			NJ Non-Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Default Impact to Groundwater Soils Screening (NJAC 7:26D 11/13)	P57-SS09N (6.5-7.0)	P57-SS09S (1.5-2.0)	P57-SS09S (6.5-7.0)	P57-SS09W (1.5-2.0)	P57-SS09W (6.5-7.0)	P57-SS12-B (1.0-1.5)	P57-SS12-BD (1.0-1.5)	P57-SS12-E (0.0-0.5)	P57-SS12-E (1.0-1.5)	P57-SS12-N (0.0-0.5)	P57-SS12-N (1.0-1.5)	P57-SS12-S (0.0-0.5)	P57-SS12-S (1.0-1.5)
Lab Sample ID:						JC95903-6	JC95903-2	JC95903-9	JC95903-4	JC95903-8	JC96270-19	JC96270-20	JC96270-15	JC96270-16	JC96270-11	JC96270-12	JC96270-13	JC96270-14
Date Sampled:						9/30/2019	9/30/2019	9/30/2019	9/30/2019	9/30/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019
Matrix:						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte	**CAS#**	**Unit**																
MS Semi-volatiles (SW846 8270D)																		
Acenaphthene	83-32-9	mg/kg	37000	3400	110	ND (0.015)	ND (0.012)	ND (0.015)	ND (0.012)	ND (0.015)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	0.0256 J	ND (0.012)	0.0148 J
Acenaphthylene	208-96-8	mg/kg	300000	NA	NA	ND (0.022)	ND (0.018)	ND (0.023)	ND (0.018)	ND (0.022)	0.153	0.0734	0.0309 J	0.0693	0.0267 J	0.422	0.0302 J	0.612
Anthracene	120-12-7	mg/kg	30000	17000	2400	ND (0.027)	ND (0.022)	ND (0.027)	ND (0.022)	ND (0.027)	0.113	0.0456	0.0308 J	0.0785	0.0350	0.304	0.0286 J	0.428
Benzo(a)anthracene	56-55-3	mg/kg	17	5	.8	ND (0.012)	ND (0.010)	ND (0.013)	0.0274 J	ND (0.012)	0.185	0.0963	0.124	0.209	0.145	0.378	0.111	0.528
Benzo(a)pyrene	50-32-8	mg/kg	2	.5	.2	ND (0.020)	ND (0.016)	ND (0.020)	0.0324 J	ND (0.020)	0.195	0.103	0.146	**0.214**	0.160	**0.589**	0.146	**0.790**
Benzo(b)fluoranthene	205-99-2	mg/kg	17	5	2	ND (0.019)	ND (0.016)	ND (0.020)	0.0315 J	ND (0.019)	0.205	0.116	0.169	0.246	0.189	0.510	0.171	0.676
Benzo(g,h,i)perylene	191-24-2	mg/kg	30000	380000	NA	ND (0.022)	ND (0.018)	ND (0.022)	0.0270 J	ND (0.022)	0.192	0.102	0.150	0.149	0.126	0.472	0.127	0.627
Benzo(k)fluoranthene	207-08-9	mg/kg	170	45	25	ND (0.020)	ND (0.016)	ND (0.021)	ND (0.017)	ND (0.021)	0.0692	0.0343 J	0.0572	0.0761	0.0635	0.132	0.0499	0.176
Chrysene	218-01-9	mg/kg	1700	450	80	ND (0.014)	ND (0.011)	ND (0.014)	0.0293 J	ND (0.014)	0.265	0.137	0.147	0.227	0.150	0.450	0.121	0.667
Dibenzo(a,h)anthracene	53-70-3	mg/kg	2	.5	.8	ND (0.019)	ND (0.016)	ND (0.020)	ND (0.016)	ND (0.019)	0.0515	0.0241 J	0.0257 J	0.0390	0.0267 J	0.118	0.0262 J	0.155
Fluoranthene	206-44-0	mg/kg	24000	2300	1300	ND (0.019)	ND (0.016)	ND (0.020)	0.0202 J	ND (0.020)	0.172	0.0885	0.171	0.334	0.257	0.264	0.166	0.266
Fluorene	86-73-7	mg/kg	24000	2300	170	ND (0.020)	ND (0.016)	ND (0.020)	ND (0.016)	ND (0.020)	0.0331 J	0.0170 J	ND (0.016)	0.0186 J	ND (0.016)	0.0741	ND (0.016)	0.0912
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	17	5	7	ND (0.020)	ND (0.017)	ND (0.021)	0.0371	ND (0.021)	0.175	0.112	0.156	0.161	0.133	0.406	0.133	0.527
Naphthalene	91-20-3	mg/kg	17	6	25	ND (0.012)	ND (0.0099)	ND (0.013)	ND (0.010)	0.0251 J	0.0453	0.0397	0.0476	0.0136 J	0.0246 J	0.0375	0.0555	0.0409
Phenanthrene	85-01-8	mg/kg	300000	NA	NA	ND (0.015)	ND (0.012)	ND (0.015)	ND (0.012)	ND (0.015)	0.122	0.0610	0.0956	0.164	0.0963	0.133	0.0615	0.0791
Pyrene	129-00-0	mg/kg	18000	1700	840	ND (0.014)	ND (0.011)	ND (0.014)	0.0453	ND (0.014)	0.368	0.177	0.231	0.329	0.237	0.538	0.171	0.713
General Chemistry																		
Solids, Percent		%	-	-	-	76.7	92.7	74.8	92.9	75.8	94.2	93.1	94.3	95.4	93.8	92.2	95.8	95.1

Footnotes:

[a] Associated CCV outside of control limits high.

[b] Associated CCV outside of control limits high, sample was ND.

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31 results exceeded regulatory criteria.

SGS

Job Numbers:	**JC95903, JC95957, and JC96270**
Account:	**AECOM, INC.**
Project:	**Fort Monmouth, NJ**
Project Number:	

Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

Client Sample ID:			NJ Non-Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Default Impact to Groundwater Soils Screening (NJAC 7:26D 11/13)	P57-SS12-W (0.0-0.5)	P57-SS12-W (1.0-1.5)	P57-SS13-B (1.0-1.5)	P57-SS13-BD (1.0-1.5)	P57-SS13-E (0.0-0.5)	P57-SS13-E (1.0-1.5)	P57-SS13-N (0.0-0.5)	P57-SS13-N (1.0-1.5)	P57-SS13-S (0.0-0.5)	P57-SS13-S (1.0-1.5)	P57-SS13-W (0.0-0.5)	P57-SS13-W (1.0-1.5)	P57-SS14-B (1.0-1.5)
Lab Sample ID:						JC96270-17	JC96270-18	JC96270-9	JC96270-10	JC96270-5	JC96270-6	JC96270-1	JC96270-2	JC96270-3	JC96270-4	JC96270-7	JC96270-8	JC95957-28
Date Sampled:						10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/4/2019	10/1/2019
Matrix:						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte	**CAS#**	**Unit**																
MS Semi-volatiles (SW846 8270D)																		
Acenaphthene	83-32-9	mg/kg	37000	3400	110	ND (0.012)	0.0125 J	0.0163 J	ND (0.014)	ND (0.015)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.013)	0.277
Acenaphthylene	208-96-8	mg/kg	300000	NA	NA	0.0212 J	0.496	ND (0.020)	ND (0.020)	0.0591	ND (0.020)	ND (0.019)	ND (0.019)	0.0432	ND (0.019)	ND (0.019)	ND (0.020)	0.137
Anthracene	120-12-7	mg/kg	30000	17000	2400	0.0425	0.326	ND (0.024)	ND (0.024)	0.0853	ND (0.024)	0.0427	ND (0.023)	0.0860	ND (0.024)	ND (0.023)	ND (0.024)	0.647
Benzo(a)anthracene	56-55-3	mg/kg	17	5	.8	0.199	0.425	ND (0.011)	ND (0.011)	0.252	ND (0.011)	0.216	0.0273 J	0.299	ND (0.011)	ND (0.011)	ND (0.011)	**1.21**
Benzo(a)pyrene	50-32-8	mg/kg	2	.5	.2	**0.211**	**0.592**	ND (0.018)	ND (0.018)	**0.255**	ND (0.017)	0.200	ND (0.017)	**0.301**	ND (0.017)	ND (0.017)	ND (0.017)	**1.09**
Benzo(b)fluoranthene	205-99-2	mg/kg	17	5	2	0.241	0.506	ND (0.017)	ND (0.017)	0.288	ND (0.017)	0.242	0.0175 J	0.354	ND (0.017)	ND (0.016)	ND (0.017)	1.29
Benzo(g,h,i)perylene	191-24-2	mg/kg	30000	380000	NA	0.182	0.589	ND (0.020)	ND (0.020)	0.202	ND (0.019)	0.152	ND (0.019)	0.248	ND (0.019)	ND (0.019)	ND (0.019)	0.661
Benzo(k)fluoranthene	207-08-9	mg/kg	170	45	25	0.0914	0.141	ND (0.018)	ND (0.018)	0.109	ND (0.018)	0.0956	ND (0.018)	0.146	ND (0.018)	ND (0.017)	ND (0.018)	0.451
Chrysene	218-01-9	mg/kg	1700	450	80	0.231	0.562	ND (0.012)	ND (0.012)	0.301	ND (0.012)	0.238	0.0258 J	0.353	ND (0.012)	ND (0.012)	ND (0.012)	1.16
Dibenzo(a,h)anthracene	53-70-3	mg/kg	2	.5	.8	0.0399	0.152	ND (0.017)	ND (0.017)	0.0475	ND (0.017)	0.0343 J	ND (0.017)	0.0571	ND (0.017)	ND (0.016)	ND (0.017)	0.164 [a]
Fluoranthene	206-44-0	mg/kg	24000	2300	1300	0.314	0.204	ND (0.018)	ND (0.018)	0.293	ND (0.017)	0.323	0.0580	0.440	ND (0.017)	ND (0.017)	ND (0.017)	2.42
Fluorene	86-73-7	mg/kg	24000	2300	170	ND (0.016)	ND (0.016)	ND (0.018)	ND (0.018)	0.0228 J	ND (0.018)	ND (0.017)	0.0222 J	ND (0.017)	ND (0.018)	ND (0.017)	ND (0.018)	0.313
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	17	5	7	0.188	0.425	ND (0.018)	ND (0.018)	0.203	ND (0.018)	0.174	0.0468	0.243	ND (0.018)	ND (0.017)	ND (0.018)	0.783 [a]
Naphthalene	91-20-3	mg/kg	17	6	25	0.0110 J	0.0473	0.0810	0.0725	0.225	0.0199 J	0.0414	0.0292 J	0.122	0.0423	ND (0.011)	ND (0.011)	0.0739
Phenanthrene	85-01-8	mg/kg	300000	NA	NA	0.156	0.0754	0.0312 J	ND (0.013)	0.269	ND (0.013)	0.126	0.0982	0.181	ND (0.013)	ND (0.013)	ND (0.013)	2.42
Pyrene	129-00-0	mg/kg	18000	1700	840	0.378	0.713	0.0131 J	ND (0.013)	0.432	ND (0.012)	0.382	0.0571	0.539	ND (0.012)	ND (0.012)	ND (0.012)	2.33
General Chemistry																		
Solids, Percent		%	-	-	-	96.2	93.9	82.7	83.7	76.6	84.7	88	86.9	88.3	85.7	87.3	85.3	85.5

Footnotes:

[a] Associated CCV outside of control limits high.

[b] Associated CCV outside of control limits high, sample was ND.

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31 results exceeded regulatory criteria.

SGS

Job Numbers:	**JC95903, JC95957, and JC96270**
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Project Number:	

Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

Client Sample ID:			NJ Non-Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Default Impact to Groundwater Soils Screening (NJAC 7:26D 11/13)	P57-SS14-E (0.0-0.5)	P57-SS14-E (1.0-1.5)	P57-SS14-N (0.0-0.5)	P57-SS14-N (1.0-1.5)	P57-SS14-S (0.0-0.5)	P57-SS14-S (1.0-1.5)	P57-SS14-W (0.0-0.5)	P57-SS14-W (1.0-1.5)	P57-SS16-B (2.5-3.0)	P57-SS16-E (0.0-0.5)	P57-SS16-E (2.5-3.0)	P57-SS16-ED (2.5-3.0)	P57-SS16-N (0.0-0.5)
Lab Sample ID:						JC95957-24	JC95957-25	JC95957-20	JC95957-21	JC95957-22	JC95957-23	JC95957-26	JC95957-27	JC95957-19	JC95957-14	JC95957-15	JC95957-16	JC95957-10
Date Sampled:						10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019
Matrix:						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte	**CAS#**	**Unit**																
MS Semi-volatiles (SW846 8270D)																		
Acenaphthene	83-32-9	mg/kg	37000	3400	110	0.138	0.0315 J	0.0184 J	ND (0.013)	0.524	ND (0.013)	0.0144 J	0.410	ND (0.013)	ND (0.012)	ND (0.013)	ND (0.013)	ND (0.013)
Acenaphthylene	208-96-8	mg/kg	300000	NA	NA	0.189	ND (0.019)	0.0499	ND (0.018)	0.0868	ND (0.019)	0.0486	0.136	ND (0.019)	ND (0.018)	ND (0.019)	ND (0.019)	ND (0.019)
Anthracene	120-12-7	mg/kg	30000	17000	2400	0.659	0.101	0.0816	ND (0.022)	1.50	0.0411	0.0533	0.853	ND (0.023)	ND (0.022)	ND (0.022)	ND (0.023)	ND (0.023)
Benzo(a)anthracene	56-55-3	mg/kg	17	5	.8	**1.27**	0.157	0.544	0.0634	**4.60**	0.239	0.403	**1.65**	ND (0.011)	0.0216 J	0.0154 J	ND (0.011)	0.107
Benzo(a)pyrene	50-32-8	mg/kg	2	.5	.2	**1.06**	0.143	**0.604**	0.0676	**4.05**	**0.242**	**0.391**	**1.47**	ND (0.017)	0.0214 J	ND (0.017)	ND (0.017)	0.114
Benzo(b)fluoranthene	205-99-2	mg/kg	17	5	2	1.26	0.166	0.732	0.0830	**5.04**	0.285	0.497	1.77	ND (0.017)	0.0283 J	ND (0.016)	ND (0.017)	0.131
Benzo(g,h,i)perylene	191-24-2	mg/kg	30000	380000	NA	0.583	0.0928	0.448	0.0499	2.61	0.148	0.250	0.913	ND (0.019)	ND (0.018)	ND (0.018)	ND (0.019)	0.0705
Benzo(k)fluoranthene	207-08-9	mg/kg	170	45	25	0.484	0.0643	0.271	0.0306 J	1.79	0.111	0.180	0.607	ND (0.018)	ND (0.017)	ND (0.017)	ND (0.017)	0.0472
Chrysene	218-01-9	mg/kg	1700	450	80	1.12	0.184	0.548	0.0692	4.09	0.230	0.421	1.57	ND (0.012)	0.0216 J	0.0163 J	ND (0.012)	0.104
Dibenzo(a,h)anthracene	53-70-3	mg/kg	2	.5	.8	0.155 [a]	0.0254 J [a]	0.107 [a]	ND (0.016) [b]	**0.709** [a]	0.0326 J [a]	0.0628 [a]	0.231 [a]	ND (0.017) [b]	ND (0.016) [b]	ND (0.016) [b]	ND (0.017) [b]	0.0187 J
Fluoranthene	206-44-0	mg/kg	24000	2300	1300	2.49	0.427	0.736	0.107	8.23	0.345	0.572	3.16	ND (0.017)	0.0323 J	0.0215 J	ND (0.017)	0.196
Fluorene	86-73-7	mg/kg	24000	2300	170	0.285	0.0391	ND (0.018)	ND (0.017)	0.559	ND (0.017)	ND (0.016)	0.374	ND (0.017)	ND (0.016)	ND (0.017)	ND (0.017)	ND (0.017)
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	17	5	7	0.712 [a]	0.103 [a]	0.493 [a]	0.0525 [a]	3.08 [a]	0.171 [a]	0.293 [a]	1.06 [a]	ND (0.018) [b]	ND (0.017) [b]	ND (0.017) [b]	ND (0.018) [b]	0.0758
Naphthalene	91-20-3	mg/kg	17	6	25	0.0336 J	ND (0.010)	ND (0.011)	ND (0.010)	0.0348 J	ND (0.010)	ND (0.010)	0.118	ND (0.011)	ND (0.010)	ND (0.010)	ND (0.011)	ND (0.010)
Phenanthrene	85-01-8	mg/kg	300000	NA	NA	2.15	0.394	0.215	0.0555	4.90	0.138	0.119	3.01	ND (0.013)	0.0137 J	0.0197 J	ND (0.013)	0.0415
Pyrene	129-00-0	mg/kg	18000	1700	840	2.39	0.369	0.920	0.102	8.87	0.352	0.703	3.05	ND (0.012)	0.0292 J	0.0241 J	ND (0.012)	0.193
General Chemistry																		
Solids, Percent		%	-	-	-	89.7	90.5	87.4	90.9	85	89.9	90.1	88.7	86.9	90.2	89.8	88.1	89.5

Footnotes:

[a] Associated CCV outside of control limits high.

[b] Associated CCV outside of control limits high, sample was ND.

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31 results exceeded regulatory criteria.

SGS

Job Numbers:	JC95903, JC95957, and JC96270
Account:	AECOM, INC.
Project:	Fort Monmouth, NJ
Project Number:	

Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

Client Sample ID:			NJ Non-Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Default Impact to Groundwater Soils Screening (NJAC 7:26D 11/13)	P57-SS16-N (2.5-3.0)	P57-SS16-S (0.0-0.5)	P57-SS16-S (2.5-3.0)	P57-SS16-W (0.0-0.5)	P57-SS16-W (2.5-3.0)	P57-SS17-B (1.0-1.5)	P57-SS17-BD (1.0-1.5)	P57-SS17-E (0.0-0.5)	P57-SS17-E (1.0-1.5)	P57-SS17-N (0.0-0.5)	P57-SS17-N (1.0-1.5)	P57-SS17-S (0.0-0.5)	P57-SS17-S (1.0-1.5)
Lab Sample ID:						JC95957-11	JC95957-12	JC95957-13	JC95957-17	JC95957-18	JC95957-47	JC95957-48	JC95957-43	JC95957-44	JC95957-39	JC95957-40	JC95957-41	JC95957-42
Date Sampled:						10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019
Matrix:						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte	**CAS#**	**Unit**																
MS Semi-volatiles (SW846 8270D)																		
Acenaphthene	83-32-9	mg/kg	37000	3400	110	ND (0.012)	ND (0.013)	ND (0.013)	0.0235 J	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.013)
Acenaphthylene	208-96-8	mg/kg	300000	NA	NA	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.019)	ND (0.018)	0.0920	0.0324 J	ND (0.017)	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.019)
Anthracene	120-12-7	mg/kg	30000	17000	2400	ND (0.022)	ND (0.022)	ND (0.022)	0.0382	ND (0.022)	0.0600	ND (0.022)	ND (0.020)	ND (0.021)	ND (0.022)	ND (0.022)	ND (0.021)	ND (0.023)
Benzo(a)anthracene	56-55-3	mg/kg	17	5	.8	0.0139 J	ND (0.010)	ND (0.010)	0.172	0.0346 J	0.119	0.0302 J	ND (0.0095)	ND (0.0098)	ND (0.010)	ND (0.0099)	ND (0.0099)	ND (0.010)
Benzo(a)pyrene	50-32-8	mg/kg	2	.5	.2	ND (0.016)	ND (0.017)	ND (0.017)	0.184	0.0299 J	0.180	0.0472	ND (0.015)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.017)
Benzo(b)fluoranthene	205-99-2	mg/kg	17	5	2	ND (0.016)	ND (0.016)	ND (0.016)	0.237	0.0352 J	0.186 [a]	0.0454 [a]	ND (0.015) [b]	ND (0.015) [b]	ND (0.016) [b]	ND (0.016) [b]	ND (0.015) [b]	ND (0.016) [b]
Benzo(g,h,i)perylene	191-24-2	mg/kg	30000	380000	NA	ND (0.018)	ND (0.018)	ND (0.018)	0.126	0.0193 J	0.139	0.0392	ND (0.017)	ND (0.017)	ND (0.018)	ND (0.018)	ND (0.017)	ND (0.019)
Benzo(k)fluoranthene	207-08-9	mg/kg	170	45	25	ND (0.017)	ND (0.017)	ND (0.017)	0.0836	ND (0.017)	0.0576	0.0165 J	ND (0.016)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.016)	ND (0.017)
Chrysene	218-01-9	mg/kg	1700	450	80	0.0141 J	ND (0.011)	ND (0.011)	0.193	0.0338 J	0.141	0.0352	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.012)
Dibenzo(a,h)anthracene	53-70-3	mg/kg	2	.5	.8	ND (0.016)	ND (0.016) [b]	ND (0.016) [b]	0.0307 J [a]	ND (0.016) [b]	0.0324 J	ND (0.016)	ND (0.015)	ND (0.015)	ND (0.016)	ND (0.016)	ND (0.015)	ND (0.016)
Fluoranthene	206-44-0	mg/kg	24000	2300	1300	0.0216 J	ND (0.016)	ND (0.016)	0.345	0.0712	0.148	0.0171 J	ND (0.015)	ND (0.015)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.017)
Fluorene	86-73-7	mg/kg	24000	2300	170	ND (0.017)	ND (0.017)	ND (0.017)	ND (0.017)	ND (0.016)	0.0288 J	ND (0.016)	ND (0.015)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.016)	ND (0.017)
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	17	5	7	ND (0.017)	ND (0.017) [b]	ND (0.017) [b]	0.144 [a]	0.0219 J [a]	0.142	0.0496	0.0265 J	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.016)	ND (0.017)
Naphthalene	91-20-3	mg/kg	17	6	25	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.0099)	ND (0.0094)	ND (0.0098)	ND (0.010)	ND (0.0099)	ND (0.0098)	ND (0.010)
Phenanthrene	85-01-8	mg/kg	300000	NA	NA	ND (0.012)	ND (0.012)	ND (0.012)	0.121	0.0613	0.118	0.0170 J	ND (0.011)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)
Pyrene	129-00-0	mg/kg	18000	1700	840	0.0240 J	0.0125 J	ND (0.012)	0.331	0.0528	0.216	0.0404	ND (0.011)	ND (0.011)	ND (0.012)	ND (0.011)	ND (0.011)	ND (0.012)
General Chemistry																		
Solids, Percent		%	-	-	-	88.7	90.2	89.7	90.3	90.7	88.5	89.3	97.5	92.1	90.7	89.8	94.8	89

Footnotes:

[a] Associated CCV outside of control limits high.

[b] Associated CCV outside of control limits high, sample was ND.

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31 results exceeded regulatory criteria.

SGS

Job Numbers:	**JC95903, JC95957, and JC96270**
Account:	**AECOM, INC.**
Project:	**Fort Monmouth, NJ**
Project Number:	

Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

Client Sample ID:			NJ Non-Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Default Impact to Groundwater Soils Screening (NJAC 7:26D 11/13)	P57-SS17-W (0.0-0.5)	P57-SS17-W (1.0-1.5)	P57-SS18-B (1.0-1.5)	P57-SS18-E (0.0-0.5)	P57-SS18-E (1.1-1.5)	P57-SS18-N (0.0-0.5)	P57-SS18-N (1.1-1.5)	P57-SS18-S (0.0-0.5)	P57-SS18-S (1.1-1.5)	P57-SS18-W (0.0-0.5)	P57-SS18-W (1.0-1.5)	P57-SS21-B (1.0-1.5)	P57-SS21-BD (1.0-1.5)
Lab Sample ID:						JC95957-45	JC95957-46	JC95957-9	JC95957-5	JC95957-6	JC95957-1	JC95957-2	JC95957-3	JC95957-4	JC95957-7	JC95957-8	JC95957-37	JC95957-38
Date Sampled:						10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019
Matrix:						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte	**CAS#**	**Unit**																
MS Semi-volatiles (SW846 8270D)																		
Acenaphthene	83-32-9	mg/kg	37000	3400	110	ND (0.012)	ND (0.012)	ND (0.013)	0.0347 J	ND (0.012)	0.489	ND (0.012)	0.238	ND (0.013)	0.275	ND (0.012)	ND (0.012)	ND (0.012)
Acenaphthylene	208-96-8	mg/kg	300000	NA	NA	ND (0.017)	ND (0.018)	0.0736	0.0247 J	ND (0.018)	0.0971	0.0318 J	0.0699	ND (0.019)	0.0354 J	ND (0.018)	ND (0.018)	ND (0.018)
Anthracene	120-12-7	mg/kg	30000	17000	2400	ND (0.021)	ND (0.022)	0.0416	0.133	ND (0.022)	1.28	0.0288 J	0.976	ND (0.023)	0.855	ND (0.022)	ND (0.022)	ND (0.022)
Benzo(a)anthracene	56-55-3	mg/kg	17	5	.8	0.0186 J	ND (0.010)	0.0739	0.432	0.0245 J	**3.68**	0.0797	**4.65**	0.0262 J	**2.53**	0.0234 J	0.0106 J	ND (0.0099)
Benzo(a)pyrene	50-32-8	mg/kg	2	.5	.2	ND (0.016)	ND (0.016)	0.118	**0.391**	0.0202 J	**3.16**	0.0958	**4.26**	0.0235 J	**2.40**	0.0190 J	ND (0.016)	ND (0.016)
Benzo(b)fluoranthene	205-99-2	mg/kg	17	5	2	ND (0.015) [b]	ND (0.016) [b]	0.110	0.468	0.0257 J	**3.68**	0.106	**4.85**	0.0289 J	**2.61**	0.0238 J	ND (0.016) [b]	ND (0.016) [b]
Benzo(g,h,i)perylene	191-24-2	mg/kg	30000	380000	NA	ND (0.017)	ND (0.018)	0.105	0.234	0.0182 J	1.69	0.0750	2.67	ND (0.019)	1.39	ND (0.018)	ND (0.018)	ND (0.018)
Benzo(k)fluoranthene	207-08-9	mg/kg	170	45	25	ND (0.016)	ND (0.017)	0.0400	0.151	ND (0.017)	1.29	0.0348 J	1.75	ND (0.018)	0.944	ND (0.017)	ND (0.017)	ND (0.016)
Chrysene	218-01-9	mg/kg	1700	450	80	0.0171 J	ND (0.011)	0.0943	0.381	0.0227 J	3.14	0.0830	4.04	0.0236 J	2.16	0.0180 J	ND (0.011)	ND (0.011)
Dibenzo(a,h)anthracene	53-70-3	mg/kg	2	.5	.8	ND (0.015)	ND (0.016)	0.0292 J	0.0646	ND (0.016)	0.433	0.0185 J	**0.653**	ND (0.017)	0.331	ND (0.016)	ND (0.016)	ND (0.016)
Fluoranthene	206-44-0	mg/kg	24000	2300	1300	0.0184 J	ND (0.016)	0.0667	0.882	0.0694	7.71	0.124	8.84	0.0437	5.24	0.0446	0.0195 J	ND (0.016)
Fluorene	86-73-7	mg/kg	24000	2300	170	ND (0.016)	ND (0.017)	ND (0.017)	0.0331 J	ND (0.017)	0.402	ND (0.016)	0.172	ND (0.017)	0.290	ND (0.016)	ND (0.016)	ND (0.016)
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	17	5	7	0.0207 J	ND (0.017)	0.0920	0.255	0.0181 J	1.91	0.0640	2.94	ND (0.018)	1.48	ND (0.017)	ND (0.017)	ND (0.016)
Naphthalene	91-20-3	mg/kg	17	6	25	ND (0.0097)	ND (0.010)	ND (0.010)	ND (0.011)	ND (0.010)	0.0761	ND (0.010)	0.0171 J	ND (0.011)	0.0198 J	ND (0.010)	ND (0.010)	ND (0.0099)
Phenanthrene	85-01-8	mg/kg	300000	NA	NA	0.0406	0.0140 J	0.0279 J	0.368	0.0297 J	3.95	0.0510	2.67	0.0154 J	2.66	0.0389	0.0321 J	ND (0.012)
Pyrene	129-00-0	mg/kg	18000	1700	840	0.0345	ND (0.012)	0.121	0.878	0.0669	7.68	0.146	8.62	0.0422	4.63	0.0396	0.0179 J	ND (0.011)
General Chemistry																		
Solids, Percent		%	-	-	-	96	90.6	90.3	86.5	92.6	86.3	91.3	86.4	88.2	86.3	89.3	92.9	93.9

Footnotes:

[a] Associated CCV outside of control limits high.

[b] Associated CCV outside of control limits high, sample was ND.

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31 results exceeded regulatory criteria.

SGS

Job Numbers:	JC95903, JC95957, and JC96270
Account:	AECOM, INC.
Project:	Fort Monmouth, NJ
Project Number:	

Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

Client Sample ID:			NJ Non-Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Default Impact to Groundwater Soils Screening (NJAC 7:26D 11/13)	P57-SS21-E (0.0-0.5)	P57-SS21-E (1.0-1.5)	P57-SS21-N (0.0-0.5)	P57-SS21-N (1.0-1.5)	P57-SS21-S (0.0-0.5)	P57-SS21-S (1.0-1.5)	P57-SS21-W (0.0-0.5)	P57-SS21-W (1.0-1.5)	P57-SS29-B (1.0-1.5)	P57-SS29-E (0.0-0.5)	P57-SS29-E (1.0-1.5)	P57-SS29-N (0.0-0.5)	P57-SS29-N (1.0-1.5)
Lab Sample ID:						JC95957-33	JC95957-34	JC95957-29	JC95957-30	JC95957-31	JC95957-32	JC95957-35	JC95957-36	JC95957-57	JC95957-53	JC95957-54	JC95957-49	JC95957-50
Date Sampled:						10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019	10/1/2019
Matrix:						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte	**CAS#**	**Unit**																
MS Semi-volatiles (SW846 8270D)																		
Acenaphthene	83-32-9	mg/kg	37000	3400	110	ND (0.012)	ND (0.013)	ND (0.012)	ND (0.013)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.013)	ND (0.011)	ND (0.012)
Acenaphthylene	208-96-8	mg/kg	300000	NA	NA	ND (0.018)	ND (0.019)	ND (0.018)	ND (0.019)	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.018)	0.0883	ND (0.019)	ND (0.017)	ND (0.018)
Anthracene	120-12-7	mg/kg	30000	17000	2400	ND (0.022)	ND (0.023)	0.0240 J	ND (0.022)	ND (0.021)	ND (0.022)	ND (0.022)	ND (0.022)	ND (0.021)	0.0421	ND (0.022)	ND (0.020)	ND (0.022)
Benzo(a)anthracene	56-55-3	mg/kg	17	5	.8	ND (0.010)	ND (0.011)	0.0542	0.0122 J	ND (0.0099)	ND (0.010)	ND (0.010)	ND (0.010)	0.0163 J	0.106	0.0320 J	ND (0.0093)	0.0240 J
Benzo(a)pyrene	50-32-8	mg/kg	2	.5	.2	ND (0.016)	ND (0.017)	0.0574	ND (0.017)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.016)	0.142	0.0217 J	ND (0.015)	0.0234 J
Benzo(b)fluoranthene	205-99-2	mg/kg	17	5	2	ND (0.016) [b]	ND (0.017) [b]	0.0614	ND (0.016)	ND (0.015)	ND (0.016) [b]	ND (0.016) [b]	ND (0.016) [b]	ND (0.015)	0.151	0.0197 J	ND (0.015) [b]	0.0236 J [a]
Benzo(g,h,i)perylene	191-24-2	mg/kg	30000	380000	NA	ND (0.018)	ND (0.019)	0.0411	ND (0.018)	ND (0.017)	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.017)	0.122	ND (0.018)	ND (0.016)	ND (0.018)
Benzo(k)fluoranthene	207-08-9	mg/kg	170	45	25	ND (0.017)	ND (0.018)	0.0257 J	ND (0.017)	ND (0.016)	ND (0.017)	ND (0.017)	ND (0.017)	ND (0.016)	0.0500	ND (0.017)	ND (0.015)	ND (0.017)
Chrysene	218-01-9	mg/kg	1700	450	80	ND (0.011)	ND (0.012)	0.0575	ND (0.012)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	0.0169 J	0.137	0.0335 J	ND (0.010)	0.0269 J
Dibenzo(a,h)anthracene	53-70-3	mg/kg	2	.5	.8	ND (0.016)	ND (0.017)	ND (0.015) [b]	ND (0.016) [b]	ND (0.015) [b]	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.015)	0.0336 J	ND (0.016)	ND (0.015)	ND (0.016)
Fluoranthene	206-44-0	mg/kg	24000	2300	1300	ND (0.016)	ND (0.017)	0.125	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.016)	0.0536	0.0373	ND (0.015)	0.0198 J
Fluorene	86-73-7	mg/kg	24000	2300	170	ND (0.017)	ND (0.017)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.017)	ND (0.016)	0.0195 J	0.0175 J	ND (0.015)	ND (0.016)
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	17	5	7	ND (0.017)	ND (0.018)	0.0419 [a]	ND (0.017) [b]	ND (0.016) [b]	ND (0.017)	ND (0.017)	ND (0.017)	0.0242 J	0.128	0.0284 J	ND (0.015)	0.0312 J
Naphthalene	91-20-3	mg/kg	17	6	25	ND (0.010)	ND (0.011)	ND (0.0098)	ND (0.010)	ND (0.0098)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.0099)	ND (0.0096)	ND (0.010)	ND (0.0093)	ND (0.010)
Phenanthrene	85-01-8	mg/kg	300000	NA	NA	ND (0.012)	ND (0.013)	0.107	0.0223 J	ND (0.012)	0.0127 J	ND (0.012)	ND (0.012)	0.0140 J	0.0485	0.0841	ND (0.011)	0.0269 J
Pyrene	129-00-0	mg/kg	18000	1700	840	ND (0.012)	ND (0.012)	0.105	0.0138 J	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.012)	0.0251 J	0.110	0.0671	ND (0.011)	0.0384
General Chemistry																		
Solids, Percent		%	-	-	-	91.5	87.1	93.2	88.3	94.6	90.2	92.8	92.4	94.7	96.6	91	95.7	88.1

Footnotes:

[a] Associated CCV outside of control limits high.

[b] Associated CCV outside of control limits high, sample was ND.

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31 results exceeded regulatory criteria.

SGS

Job Numbers:	**JC95903, JC95957, and JC96270**
Account:	**AECOM, INC.**
Project:	**Fort Monmouth, NJ**
Project Number:	

Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

Client Sample ID:			NJ Non-Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Residential Direct Contact Soil (NJAC 7:26D 9/18/17)	NJ Default Impact to Groundwater Soils Screening (NJAC 7:26D 11/13)	P57-SS29-S (0.0-0.5)	P57-SS29-S (1.0-1.5)	P57-SS29-W (0.0-0.5)	P57-SS29-W (1.0-1.5)
Lab Sample ID:						**JC95957-51**	**JC95957-52**	**JC95957-55**	**JC95957-56**
Date Sampled:						**10/1/2019**	**10/1/2019**	**10/1/2019**	**10/1/2019**
Matrix:						**Soil**	**Soil**	**Soil**	**Soil**
Analyte	**CAS#**	**Unit**							
MS Semi-volatiles (SW846 8270D)									
Acenaphthene	83-32-9	mg/kg	37000	3400	110	ND (0.011)	ND (0.012)	ND (0.012)	ND (0.013)
Acenaphthylene	208-96-8	mg/kg	300000	NA	NA	ND (0.017)	0.0300 J	ND (0.018)	ND (0.019)
Anthracene	120-12-7	mg/kg	30000	17000	2400	ND (0.020)	0.0252 J	ND (0.021)	ND (0.023)
Benzo(a)anthracene	56-55-3	mg/kg	17	5	.8	0.0265 J	0.0681	0.0164 J	0.0195 J
Benzo(a)pyrene	50-32-8	mg/kg	2	.5	.2	0.0195 J	0.0532	ND (0.016)	ND (0.017)
Benzo(b)fluoranthene	205-99-2	mg/kg	17	5	2	0.0215 J [a]	0.0572	ND (0.015)	ND (0.016)
Benzo(g,h,i)perylene	191-24-2	mg/kg	30000	380000	NA	ND (0.017)	0.0318 J	ND (0.017)	ND (0.018)
Benzo(k)fluoranthene	207-08-9	mg/kg	170	45	25	ND (0.015)	0.0193 J	ND (0.016)	ND (0.017)
Chrysene	218-01-9	mg/kg	1700	450	80	0.0274 J	0.0746	0.0173 J	0.0133 J
Dibenzo(a,h)anthracene	53-70-3	mg/kg	2	.5	.8	ND (0.015)	ND (0.016)	ND (0.015)	ND (0.016)
Fluoranthene	206-44-0	mg/kg	24000	2300	1300	0.0279 J	0.0739	ND (0.015)	0.0310 J
Fluorene	86-73-7	mg/kg	24000	2300	170	ND (0.015)	0.0176 J	ND (0.016)	ND (0.017)
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	17	5	7	0.0274 J	0.0478	0.0242 J	0.0238 J
Naphthalene	91-20-3	mg/kg	17	6	25	ND (0.0093)	ND (0.010)	ND (0.0098)	0.0144 J
Phenanthrene	85-01-8	mg/kg	300000	NA	NA	0.0211 J	0.110	0.0138 J	0.0290 J
Pyrene	129-00-0	mg/kg	18000	1700	840	0.0469	0.146	0.0235 J	0.0262 J
General Chemistry									
Solids, Percent		%	-	-	-	95.9	90.6	94.7	88.5

Footnotes:

[a] Associated CCV outside of control limits high.

[b] Associated CCV outside of control limits high, sample was ND.

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31 results exceeded regulatory criteria.

Americas

Excavation

S3AM-303-PR1

1.0 Purpose and Scope

1.1 To evaluate all excavation operations to provide proper protective systems for employee protection from associated hazards.

1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

2.1 **Benching (Benching system)** – One or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels to protect employee from cave-ins.

2.2 **Cave-in (collapse)** – The separation of a mass of soil or rock material from the side of an excavation or the loss of soil from under a trench shield or support system and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

2.3 **Competent person** – Person, who, by way of training, knowledge, and/or experience, is capable of classifying soils and is also capable of identifying existing and predictable hazards in excavation/trenching work area and who has the authority to take prompt corrective measures to eliminate them. The person shall also be familiar with the requirements in the regulation.

2.4 **Excavation** – A manmade cut, cavity, trench, or depression in an earth surface formed by earth removal. Examples include trenches, tunnels, shafts, caissons and open cut holes.

2.5 **Faces (or sides) –** The vertical or inclined earth surfaces formed as a result of excavation work.

2.6 **Failure** – A structural member's integrity and supportive capabilities is compromised, causing a breakage, displacement, or permanent deformation.

2.7 **Hazardous Atmosphere** – An atmosphere that by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen-deficient, toxic, or otherwise harmful may cause death, illness, or injury.

2.8 **Protective Systems** – Devices or methods in protecting employees in an excavation from cave-ins, a collapse or falling material. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

2.9 **Ramp** – An inclined walking or working surface that is used to gain access to one point from another and is constructed from earth or from structural materials such as steel or wood.

2.10 **Professional Engineer** – A registered engineer who can authorize any state of work by his professional designation. A **Professional Engineer** registered in the State, Province, or territory is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

2.11 **Shield (Shield system)** – A structure that is able to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built. Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

2.12 **Shoring (Shoring system) –** A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and that is designed to prevent cave-ins.

2.13 **Sloping (Sloping system)** – An alternative to shoring is trench sloping. This means that the trench walls are cut back to decrease the possibility of cave-ins. The angle of incline required to prevent a cave-in varies with such factors as soil type, environmental conditions of exposure, and application of surcharge loads.

2.14 **Stable rock** – A natural solid mineral material that can be excavated with vertical side wall; unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against cave-in or movement by rock bolts or by another protective system that has been designed by a **Professional Engineer**.

2.15 **Support system** – A structure such as underpinning, bracing, or shoring that provides support to an adjacent structure, underground installation, or the sides of an excavation.

2.16 **Trench** – An open narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width (measured at the bottom) is often not greater than 15 feet (4.57 meters). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.57 meters) or less (measured at the bottom of the excavation), the excavation is also considered a trench.

2.17 **Trench Box –** A trench box is a unit of shoring that is an engineered shoring system capable of protecting workers in case of cave-in of trench walls. The space between the trench wall and the trench box shall be backfilled.

3.0 References

3.1 S3AM-003-PR1 Safety, Health and Environment (SH&E Training)

3.2 S3AM-202-PR1 Competent Person Designation S3AM-218-PR1 Permit to Work

3.3 S3AM-322-PR1 Overhead Lines

3.4 S3AM-331-PR1 Underground Utilities

3.5

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Managers**

- Shall confirm that all projects under their direct control or authority and which involve excavations or trenching are conducted in a safe and efficient manner and in accordance with the requirements of this procedure and local legislation.
- Shall confirm that all projects under their direct control or authority have a written Safe Work Plan (SWP)/Health and Safety Plan (HASP) prepared for the activity.
- Confirm the applicable *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* or equivalent has been completed and is reviewed prior to commencing any excavation activities.

4.1.2 **Professional Engineer**

- The professional status and the actual practice of professional engineering is legally defined and protected by law. In some jurisdictions, only licensed engineers (sometimes called registered engineers) are permitted to "practice engineering.
- For the purposes of this procedure, determination of soil condition and the safe management of the shoring, sloping or benching may require consultation, specifications and/or design by a Professional Engineer.

4.1.3 **Competent Person**

- Shall be present during all work that involves entry by AECOM personnel into trenches or excavations greater than 5 feet (1.52 meters) in depth (as above).
- Does not have to be an AECOM employee; however, an AECOM competent person shall be qualified per *S3AM-202-PR1 Competent Person Designation*.
- Shall identify prompt corrective measures to eliminate recognized present or anticipated hazards.
- The competent person shall be identified in the SH&E Plan for the location or project, and the Task Hazard Assessment for the particular task.
- The competent person:
  - Will determine the maximum allowable slope for the walls of the trench or excavation.
  - Will classify the soil in the trench or excavation in accordance with the requirements specified in the applicable legislation prior to determining that a maximum allowable slope, other than 34 degrees with the horizontal is selected.
  - Will inspect the excavation or trench on a daily basis when the potential for employee exposure to the hazards of the trench or excavation exists (*S3AM-303-FM1 Daily Excavation Checklist*).

4.1.4 **Employees**

- Maintain appropriate training for the excavation and the applicable tasks, and competency in the associated procedures (e.g. communication, rescue, etc.) and use of the necessary personal protective equipment (PPE). Refer to *S3AM-003-PR1 SH&E Training* and *S3AM-208-PR1 Personal Protective Equipment.*
- Know the location specific Emergency Response Plan and be able to recognize the potential for real hazards associated with the Excavation.
- Refrain from making any attempt to enter an excavation without approval and first meeting the requirements of this procedure and the applicable SH&E Plan (SWP)/Health and Task Hazard Assessment (THA).

4.2 Restrictions

4.2.1 Because of their inherent dangers, entry into trenches and excavations shall not be performed if there are means other than entry to perform the work. Where entry into trenches and excavations is necessary, strict adherence to the procedures specified below is extremely important. Whenever there are questions regarding the safety of trench or excavation entry, contact shall be made with the Competent Person or the SH&E Manager.

4.2.2 No one shall enter any trench or excavation until the walls have been adequately cut back or temporary protective structures have been installed unless the trench or excavation is shallower than stabilized.

4.2.3 Excavation work shall be completed and inspected in accordance with the written instructions of a qualified professional and in accordance with jurisdictional legislative regulations.

4.3 Excavation and Trenching Permit

4.3.1 If required by the applicable jurisdiction, confirm notification of the proposed excavation is provided within the required timeframe to the appropriate agencies or governing bodies prior to commencing excavation (e.g. California – CAL/ASHA Excavation Permit for the construction of trenches or excavations that are 5 feet (1.5 meters) or deeper that will be entered; Manitoba WHS Branch notification in order to obtain registration number, etc.).

4.3.2 An Excavation and Trenching Permit (*S3AM-303-FM2 Excavation & Trenching Permit* or equivalent) shall be completed prior to all excavation or trenching activities

4.3.3 The Excavation and Trenching Permit shall be completed and signed by all applicable parties as indicated on the permit. The Project Manager shall determine which signatures are required.

4.3.4 Excavation and Trenching Permits may be valid for up to one week; however the permit shall be reviewed at the beginning of each shift.

4.3.5 Refer also to *S3AM-218-PR1 Permit to Work* for additional guidance related to Safe Work Permits.

4.4 Planning and Preparation

4.4.1 Prior to beginning any excavation work at a site, the location of all underground and overhead utilities shall be identified and work locations will be carefully planned to avoid any potential for inadvertent contact with them.

4.4.2 Clearance, including hand exposure, of underground utilities shall be completed in accordance with *S3AM-331-PR1 Underground Utilities*. The associated *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* or equivalent shall be available and reviewed with all employees expected to be involved in the excavation prior to commencing any excavation activities.

4.4.3 Identify any overhead power lines and de-energize or protect by other appropriate means. Refer to *S3AM-322-PR1 Overhead Lines*.

4.5 Excavation Requirements

4.5.1 A Professional Engineer shall be engaged if specified by the applicable jurisdiction and as appropriate to the soil conditions and proposed excavation considerations (e.g. wall slope, shoring requirements, load calculations, etc.).

4.5.2 All personnel involved in the excavation activities shall be appropriately trained to their respective activities and associated hazards. Refer to *S3AM-003-PR1 SH&E Training*.

4.5.3 All personnel involved in the excavation activities shall wear the required PPE, including reflective clothing if mobile equipment or vehicular traffic. Refer to *S3AM-208-PR1 Personal Protective Equipment.*

4.5.4 The Task Hazard Assessment (THA) or Safe Work Plan (SWP) identifying applicable hazards and appropriate control measures shall be completed and clearly communicated to all involved personnel as well as to any concurrent operations potentially affected. The work environment shall be monitored for changing conditions and the THA / SWP updated accordingly.

4.5.5 Excavation shall be conducted in a manner that minimizes environmental impact.

4.5.6 Excavated (spoil) material shall be kept at least 3.2 feet (1 meter) from the edge of the excavation, or further if local regulations are more stringent.

- Excavated (spoil) material shall be piled in a manner to prevent sloughing of loose material. Various jurisdictions provide specific spoil pile sloping requirements.

4.5.7 If the walls of an excavation or trench are not sloped or cutback, barriers shall be placed around the perimeter. The barrier shall be at least 3.6 feet (1.10 meters) in height.

4.5.8 If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored regularly to confirm proper operation.

4.5.9 If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require regular inspections.

4.5.10 All excavations shall be appropriately secured at the end of the day to prevent unauthorized entry or inadvertent entry into the excavation. This may require a protective covering, barriers, fencing, signage or other measures appropriate to the excavation and associated conditions.

4.5.11 Backfill trenches as soon as reasonably possible after work is complete.

4.6 Soils Classifications

4.6.1 Soil classification shall be conducted to confirm appropriate measures are taken to protect workers and to secure excavation walls. Measures may include, but are not limited to:

- Sloping, shoring or shielding.
- Relocation of equipment or materials.
- Scheduling to minimize concurrent operations.

4.6.2 Soil characteristics evaluated when classifying include, but are not limited to:

- Cohesiveness / compaction / compressive strengths (e.g. fissured, hardpan, fractured rock, etc.).
- Composition (sand, clay, gravel, layered, etc.).
- Moisture content / submersion.
- Compaction.
- Exposure to vibration (e.g. traffic, pile driving, etc.).
- Previous disturbances.

4.6.3 Consult the applicable jurisdictional requirements as classification methods, definitions and terms can vary. In general classifications or types include:

- Stable soil that is dense and heavy and consists primarily of clay.
- Soil with a medium level of stability and generally includes soils such as silt, sandy loam, and medium clay.
- Unstable soil which generally includes gravel, loamy sand, and soft clay.

4.7 Protective System Requirements

4.7.1 Protective systems shall be used to protect workers entering an excavation when there is a potential for cave in, and is required when:

- An excavation is greater than 4 feet (1.22 meters) in depth and is not entirely in stable rock.
- A worker is required to be closer to a trench wall than the height of the trench wall.
- A worker will approach closer to the side or edge of the excavation that the distance equal to the depth of the excavation.

4.7.2 The protective system may include sloping the excavation walls, shoring the excavation walls, and/or installing a shielding system. The protective system(s) chosen shall have the capacity to resist, without failure, all loads to be applied to the system.

4.7.3 Slope angle, or type of shoring or shielding shall be determined by:

- Soil classification – including structure, strength, moisture content.
- Depth of the excavation
- Weather and environmental conditions.
- Anticipated duration of excavation activities.
- Loading of soil and soil stress (e.g. proximity of structures, location of equipment, stored material, anticipated vibration, etc.)

Factor	Description / Examples
Soil Structure and Strength	Proper classification of soil is necessary in order to select appropriate protection methods. Trench walls, at first glance, may appear to have strength, particularly if rock is encountered. Fractures in the rock can develop because of construction and soil strength may fail when subjected to undercutting or high-energy impacts. Irregular slopes on stratified soils that appear stable can fail if lower materials do not have adequate strength.
Excavation Depth	Jurisdictional requirements may specify the type of protective methods that are required at given depths. Additionally, consultation of a professional engineer may be necessary.
Soil Moisture Content	Soil may be moist even though the weather has been dry. Care shall be taken and appropriate protection methods employed if the soil appears to be moist.
Weather and Humidity	These can have a significant impact on excavation wall stability and effectiveness of protection methods. Frozen stable soil may collapse if warm mild weather persists. Percolation of water into the soil can increase the load on shoring due to the increased weight and mobility of saturated soils. Frozen ground does not preclude the need to appropriately slope, shore or shield unless the freezing process is designed and approved by a Professional Engineer.
Loading and Soil Stress	Stress can originate from many sources. Heavy machinery passing close to the excavation creates vibrations that decrease the soil strength and can result in wall collapse or shoring failure if it is inadequate to these conditions. Stationary equipment at the edges of the excavation can transmit loads and additional stresses to the excavation wall and method of protection.
Trench Depth and Width	These directly influence the choice of materials and the spacing of support bracing. The shoring requirements of a wide and deep trench differ substantially from those of a narrower trench.
Erosion Time	If excavations are to be left for extended periods, different methods of protection may be required and shoring materials may have to be increased.

4.7.4 If an excavation may affect the stability of an adjacent building or structure, precautions shall be taken to prevent damage to the structure. The precautions shall be specified in writing by a Professional Engineer.

4.7.5 All sloping, shielding, or shoring shall be conducted in accordance with applicable Federal, State, Provincial, Territorial or Legislative regulations.

4.7.6 Exceptions. Each individual in an excavation shall be protected from cave-ins and trench collapse by an adequate protective system except when:

- Excavations are made entirely in stable rock.
- Excavations are less than 4 feet (1.22 meters) in depth and an examination of the excavation by a Competent Person reveals no indication of a potential cave-in.

4.7.7 The depth of the excavation or trench is to be measured at its greatest vertical dimension. Be aware that crouching or kneeling in a trench that is less than 3 feet (0.91 meter) in depth may still pose significant hazard for the employee involved.

4.7.8 Consult the applicable jurisdiction's requirements concerning the standards that protective systems shall meet; this may include design and certification by a Professional Engineer.

4.7.9 A Professional Engineer can properly assess the need for and the type of shoring required for specific applications. Shoring may not be needed in all cases, but failure to recognize the need for shoring can be catastrophic.

4.8 Use of Sloping as a Means of Protection

4.8.1 Sloping the walls of the trench or excavation is the preferred, and typically simplest, means of protecting employees who shall enter trenches or excavations which are greater than 4 feet (1.22 meters) in depth or where there is danger of collapse.

4.8.2 If sloping is used as the means of protection, the trench or excavation walls shall be sloped back so that the ratio of the horizontal distance to the vertical rise (H:V ratio) of the sloped wall or degree from horizontal is appropriate to the soil type and in compliance with jurisdictional requirements.

4.8.3 In many cases, determining the maximum allowable slope may allow the use of a steeper slope, which will result in a narrower excavation. However, determination of soil classification is complicated and requires that the Competent Person be familiar with the manual and visual tests. Since incorrect soil classification may result in the use of a steeper, and potentially unsafe, slope, it

is recommended that an angle of 34 degrees (or less given specific jurisdictional requirements and unstable soil types) with the horizontal typically be selected.

4.9 Use of Shoring or Shielding as a Means of Protection

4.9.1 Where sloping the walls of the trench or excavation is unfeasible (e.g., when there are dimensional constraints or adjacent structures), the use of shoring or shield systems (e.g., trench boxes) may be necessary.

4.9.2 Soil classification is required. The excavation shall comply with one of the four options below:

- The soil shall be classified and the timber shoring be constructed in accordance with applicable legislative regulations.
- Other protective systems meeting applicable legislative regulations shall be utilized (e.g., shield systems, trench jacks, aluminum hydraulic shoring, etc.) and the manufacturer's data shall be explicitly followed.
- A protective system meeting applicable legislative regulations shall be utilized based on tabulated data which has been approved by a Professional Engineer.
- A protective system meeting applicable jurisdictional requirements and designed by a Professional Engineer shall be utilized and installed in accordance with the engineer’s written plans.

4.9.3 In all cases listed above, the SH&E Manager shall be contacted before proceeding.

4.9.4 Workers shall be protected whenever shoring is being installed or removed.

4.9.5 Shoring, stringers or bracing shall be installed from the top of the trench or excavation down. Removal shall be completed from the bottom up unless conditions exist that would make doing so unsafe. A removal method shall be developed that does not require worker entry.

4.9.6 Check hydraulic shoring once per shift at a minimum (leaking hoses and/or cylinders, broken connections, cracked nipples, bent bases, other damaged or defective parts) and more frequently as required.

4.9.7 Hydraulic or pneumatic trench jacks shall have a means of ensuring that they will not collapse in the event of loss of internal pressure.

4.9.8 Shielding and Trench Boxes differ from shoring in that their design is intended primarily to protect workers from cave-ins and similar incidents. They may be used in combination with sloping and benching.

- The excavated area between the outside of the trench box and the face of the trench should be as small as possible and may be backfilled to prevent lateral movement of the shield.
- The box shall extend at least 18 inches (0.45m) above the surrounding area, or as specified by the applicable jurisdiction, if there is sloping toward excavation. This can be accomplished by providing a benched area adjacent to the box.
- Earth excavation below the shield is permitted only if:
  - The excavation does not exceed a depth of 2ft (0.61m) below the shield,
  - The shield is capable of withstanding the forces calculated for the full depth of the trench, and
  - There are no indications while the trench is open of possible loss of soil from behind or below the bottom of the support system.
- A shield shall not be subjected to loads exceeding those for which it was designed to withstand.

4.9.9 Bell-bottom pier holes that are to be entered by workers shall be designed and supported according to written instructions of a registered professional engineer.

- Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, should wear a harness with a retrieval line securely attached to it.
    - Retrieval lines shall not be used to handle materials.
    - Rescue equipment shall be individually attended at all times while the employee wearing the retrieval line is in the excavation.

4.10 Work Around the Trench/Excavation

4.10.1 Structural ramps used for excavation access or egress of equipment shall be constructed in accordance with jurisdictional requirements and the instructions or designs of an individual competent and qualified in structural design.

4.10.2 If the ramp has an open side, it shall have a curb or a restraining device.

4.10.3 Confirm equipment placement does not compromise the integrity of the excavation wall and optimizes visibility of work zone and any contact hazards (spoil placement should also take these into consideration). Use wheel chocking or barricades as necessary to prevent encroachment of edge.

4.10.4 If the appropriate setback of equipment is not possible confirm appropriate blocking or matting is used to disperse weight. These requirements may need to be determined by a professional engineer.

4.10.5 While workers are in a trench, an aboveground observer or spotter shall be present to warn of earth movements and to advise equipment operators of the presence and location of those in the trench so as to avoid vibrating equipment near trenches or excavations.

4.10.6 If there is a danger of a worker or equipment falling into an excavation, or whenever the edge is not clearly visible, identify the trench or excavation perimeter with visual markers (e.g., barricade tape, wooden railings, stop logs, etc). If the trench or excavation is 4 feet (1.22 meters) or greater in depth, the visual barrier shall be a minimum of 6 feet (1.83 meters) from the edge.

4.10.7 Personnel shall notify workers of the excavation through flagging, marking, safeguards, or other appropriate and effective means.

4.10.8 If walkways are permitted over excavations or trenches (e.g. trench over 6 feet [1.8 meters] in depth and wider than 30 inches [76 centimeters]), the installation shall be in such a manner as to not compromise the stability of the excavation.

4.10.9 Walkways shall be equipped with guardrails and constructed in accordance with jurisdictional requirements.

4.10.10 If vehicle crossings over excavations are required, they shall be designed by and installed under the direction of a Professional Engineer.

4.10.11 Precautions shall be taken to isolate or remove loose rocks, trees, or other materials that may slide, roll, or fall into the trench and onto workers prior to entry by workers into an excavation.

4.10.12 While operating heavy equipment in the work area, the equipment operator shall maintain communication with a designated signal person through either direct voice contact or approved standard hand signals.

4.10.13 When mobile equipment is operated adjacent to an excavation or when such equipment is required to approach the edge of an excavation and the operator does not have a clear and direct view of the edge of the excavation, a warning system such as barricades, hand or mechanical signals, or stop logs shall be used. If possible, the grade should be away from the excavation.

4.10.14 All site personnel should maintain a safe distance and remain clear of the swing of operating excavation equipment.

4.10.15 Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles

being loaded or unloaded when the vehicles are equipped to provide adequate protection for the operator during loading and unloading operations.

4.10.16 All materials such as pipe, rebar, etc., shall be kept out of traffic lanes and access ways. Materials and equipment shall be stored in a designated area so as not to endanger personnel at any time.

4.10.17 A flagman with roadwork, signs, cones, and high-level warning signs shall be provided when it is necessary to control normal vehicular traffic due to vehicles, such as end-dumps, entering, or leaving the site.

4.11 Work Within the Trench/Excavation

4.11.1 Personnel shall not be permitted on the faces of sloped or benched excavations at levels above other workers unless those workers at lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

4.11.2 Employees shall not work in excavations in which there is accumulated water or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and retrieval line.

4.11.3 A stairway, ladder, ramp, or other safe means of egress shall be located in excavations or trenches that are 4 feet (1.22 meters) or more in depth so as to minimize lateral travel for employees. Jurisdictional maximum lateral travel distances vary between 25 feet (7.6 meters) and 49 feet (15 meters). In the absence of jurisdictional specification, travel distance shall not exceed 25 feet (7.6 meters). Ladders should extend at least 3 feet (0.91 meters) above the trench top.

4.11.4 Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design and shall be constructed in accordance with the design.

4.11.5 Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement. Structural members used for ramps and runways shall be of uniform thickness. Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping. Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

4.12 Confined Spaces and Hazardous Atmospheres

4.12.1 An excavation may contain hazardous gases, vapors, dusts, fumes or an oxygen deficient or enriched atmosphere.

- To prevent exposure to harmful levels of atmospheric contaminants, the hazard assessment shall evaluate atmospheric hazards when workers are required to enter trenches and excavations:
  - Greater than 4 feet (1.22 meters) in depth in which a hazardous atmosphere exists, or could reasonably be expected to exist, such as in excavations in landfill areas, where equipment is exhausting nearby, or where hazardous substances are stored nearby.
  - Less than 4 feet (1.22 meters) in depth if workers could be exposed to a hazardous atmosphere (e.g. crouching).
- Appropriate atmospheric testing is necessary to accurately identify these hazards. Ongoing atmospheric monitoring, use of attendants and rescue equipment may be necessary to address the identified hazards.

4.12.2 Confined spaces may exist in excavations where there is limited access or egress and in which a hazardous gas, vapor, dust, or fume or an oxygen-deficient atmosphere may occur. Confined

space entry shall be performed in accordance with the requirements specified in *S3AM-301-PR1 Confined Spaces*. Consult the applicable jurisdictional requirements as the excavation may or may not be subject to confined space requirements.

4.12.3 Adequate precautions, such as mechanical ventilation or appropriate respiratory protection, shall be taken prior to entry into trenches and excavations in which hazardous atmospheres exist or could reasonably be expected to exist.

4.12.4 When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to confirm that the atmosphere remains safe. Atmospheric testing will be conducted in the anticipated breathing zone of the work area to determine oxygen content, combustible gas, and toxic gases and vapors, if applicable.

4.12.5 Appropriate respiratory protection shall be donned prior to entry into any trench or excavation in which airborne levels of toxic substances are present at concentrations in excess of their Threshold Limit Value/Occupational Exposure Limit or Permissible Exposure Limit.

4.12.6 Confirm appropriate emergency response measures are in place as necessary, including but not limited to:

- Location Specific Emergency Response Plan shall include procedures applicable to the potential emergencies the excavation work may present.
- Communication methods shall be established.
- Equipment such as spill kits, breathing apparatus, and retrieval equipment, shall be readily available.
- Where hazardous atmospheres are present rescue equipment shall be attended when workers have entered the excavation.

4.13 Stability of Adjacent Structures

4.13.1 Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to confirm the stability of such structures for the protection of employees.

4.13.2 Excavation below the level of the base or footing of any foundation or retaining wall that could reasonably be expected to pose a hazard to employees shall not be permitted except when:

- A support system, such as underpinning, is provided to confirm the safety of employees and the stability of the structure; or
- The excavation is in stable rock; or
- A Professional Engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or
- A Professional Engineer has approved the determination that such excavation work will not pose a hazard to employees.

4.13.3 In addition, sidewalks, pavements, and secondary structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

4.14 Inspections

4.14.1 Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a Competent Person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. Refer to *S3AM-303-FM1 Daily Excavation Checklist.*

4.14.2 An inspection shall be conducted by the Competent Person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard-

increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

4.14.3 Where the Competent Person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to confirm their safety and the permit reissued or revised.

4.15 Backfilling

4.15.1 Perform any required notifications within the necessary timeframes prior to backfilling.

4.15.2 Confirm accurate classification of soil types of backfill material and absence of signs of contamination, discoloration and smell.

4.15.3 Confirm the re-establishment of the original soil integrity using the original material (if suitable) or designated fill material(s). A small cap of material on top of the ditch/hole should be left to allow for sloughing and settling of material.

4.15.4 Backfilling shall be done with care to prevent damage to any exposed utilities or facilities.

4.15.5 A spotter may be necessary to avoid encroachment (e.g. working around other equipment, traveling under overhead lines, working in close conjunction to underground facilities and other workers, compromised line of vision) and to watch for any rocks falling into the excavation, which may damage exposed facilities. If fill contains rocks or hard material, a shield or alternate fill material may be used to protect the facilities

4.15.6 Confirm piping or facilities are properly supported prior to backfilling.

4.15.7 If shoring was used, remove from the bottom up.

4.15.8 If a trench box has been used it should be placed no more than 24” above the base of the excavation or a sub-trench bed containing the pipe.

4.15.9 Appropriate measures shall be taken to confirm proper backfilling and compaction of the soil below the trench box. Removing and reinserting the trench box multiple times may be necessary to accomplish this.

4.15.10 Dragging of a trench box shall only be permitted if it will not damage facility or disturb the backfill, otherwise it shall be lifted vertically. No worker shall occupy a trench box while it is being moved.

4.15.11 If compaction is required confirm the appropriate method is employed and compaction testing is conducted in a manner that does not damage any facilities or pipelines in the excavation.

4.15.12 Final grading and cover of the ground disturbance should confirm corrosion control. Original state of the area and access shall be considered in completion of backfilling.

4.15.13 Any excess excavation material shall be properly disposed of.

5.0 Records

5.1 Completed Daily Excavation Checklist, Permits and applicable notifications shall be retained in the project files for +1 year.

6.0 Attachments

6.1 S3AM-303-FM1 Daily Excavation Checklist

6.2 S3AM-303-FM2 Excavation & Trenching Permit

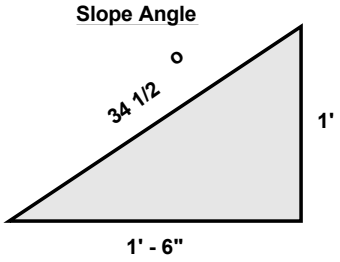
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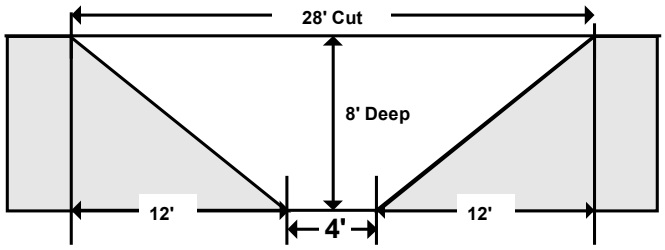
Daily Excavation Checklist

S3AM-303-FM1

Daily Excavation Checklist			
Competent Person Name:	Date:		
Competent Person Signature:			
Site Location:	Project Number:		
Soil Type: Excavation Depth:	Excavation Width:		
Type of Protective System Used:			
Indicate for each item: Yes – No – or N/A for not applicable:			
1. General Information:	**Yes**	**No**	**N/A**
a. Is there a potential for a cave-in? ***IF YES, excavation must be sloped, shored, or shielded.**			
b. Is excavation deeper than (enter jurisdictional requirement)? *** IF YES, excavation must be sloped, shored, or shielded.**			
c. Is sloping used as your protective system?			

Slope information to keep in mind:





Example of a Simple 34-degree Slope commonly used around the site for cave-in protection.

d. Was a manual method utilized to determine Soil Classification? Type			
e. Was a visual method utilized to determine Soil Classification?			
Soil classification comments:			

2. Training:	Yes	No	N/A
a. Have all individuals had Excavation Safety Awareness Training?			
b. Have all individuals reviewed the site specific Emergency Response Plan?			
3. Inspection of Job Site	**Yes**	**No**	**N/A**
a. Are excavations, adjacent areas, and protective systems inspected by a competent person daily before the start of work?			
b. Does the competent person has the authority to remove all individuals from the excavation immediately?			
c. Are surface encumbrances removed or supported?			
d. Are all individuals protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation?			
e. Are hard hats, safety-toed boots, and safety glasses worn by all individuals?			
f. Is spoil pile set back at least 3.2 feet (1.0 m) from the edge of the excavation and sloped to prevent sloughing and according to jurisdictional requirements?			
g. Are adequate barriers provided at all excavations, wells, pits, shafts, etc.?			
h. Are warning vests or other highly visible clothing provided and worn by all individuals?			
i. Are all individuals required to stand away from vehicles being loaded / unloaded?			
j. Are warning system established and utilized when mobile equipment is operating near the edge of the excavation (e.g., barricade tape, signalpersons, stop logs, etc)?			
k. Are all individuals prohibited from going under suspended loads?			
l. Are materials and equipment set back 3.2 feet (1.0 m) or greater from the edge of the excavation?			
4. Utilities	**Yes**	**No**	**N/A**
a. Are locations of utilities marked. *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* available and reviewed?			
b. Prior to the use of equipment, have underground utilities been located by hand exposure?			
c. Are underground utilities protected, supported, or removed when excavation is open?			
d. Are overhead lines are de-energizes or protected by other appropriate means?			
5. Means of Access and Egress:	**Yes**	**No**	**N/A**
a. Is travel distance to means of egress no greater than (enter jurisdictional requirement) in excavations 4 feet (1.2m) or more in depth?			
b. Do straight ladders used in excavations extend at least 3 feet (0.9m) above the edge of the trench?			
c. Have ramps being used for employee access been designed by the competent person?			
d. Are all individuals are protected from cave-ins when entering / exiting the excavation?			
Protection description:			

6. Wet Conditions:	Yes	No	N/A
a. Have precautions been taken to protect workers from the accumulation of water?			
b. Is water removal equipment monitored by a competent person?			
c. Is surface water or runoff diverted or controlled to prevent accumulation in the excavation?			
d. Have inspections have been conducted after every rainstorm or other hazard-increasing occurrence (freeze/thaw, local demolition, rerouting of traffic, etc)?			
7. Hazardous Atmosphere: The atmosphere within the excavation must be tested where there is a reasonable possibility of an oxygen deficiency or a combustible or other harmful contaminant exposing any individual to a hazard.	**Yes**	**No**	**N/A**
a. Are there exposed sewer or natural gas lines in excavation?			
b. Is equipment operating nearby that may produce introduce exhaust into the excavation?			
c. Is the excavation near a landfill area, or are hazardous substances being stored close to the excavation?			
If you answered YES to A,B, or C then treat the excavation as a confined space. **See *S3AM-301-PR1 Confined Spaces***			
d. Has an emergency rescue plan been developed and are rescue services in place?			
8. Support Systems:	**Yes**	**No**	**N/A**
a. Are materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads?			
b. Have materials and equipment used for protective systems been inspected and are they in good condition?			
c. Have materials and equipment in unsatisfactory condition have been removed from service?			
d. Are protective systems installed without exposing all individuals to the hazards of cave-ins, collapses, or the threat of being struck by materials or equipment?			
e. Are members of support system securely fastened to prevent failure?			
f. Are support systems provided to ensure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.?			
g. Have excavations below the level of the base of a footing been approved by a registered Professional Engineer?			
h. Does removal of support systems progress from the bottom, and are members released slowly to allow for detection of any indications of possible failure?			
i. Does backfilling progress with the removal of the support system?			
j. Is material excavated to a level no greater than 2 feet (0.6m) below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth?			
k. Has a shield system been placed to prevent lateral movement?			
l. Are all individuals prohibited from remaining in the shield system during movement?			

Americas

Excavation & Trenching Permit

S3AM-303-FM2

Authorization No.: _____ Date & Time Permit Valid: _____

Competent Person: _____ Date & Time Permit Expires: _____

Project Name: _____ Excavation/Trench Location: _____

Description or Job Special Procedures:

_____

_____

_____

ESTIMATED DIMENSIONS:	**DEPTH =**	_____	
	TOP =	W _____	L _____
	BOTTOM =	W _____	L _____

SOIL ANALYSIS METHOD(S) USED:

☐ Visual ☐ Manual ☐ Tabulated Data

SOIL TYPE:

☐ Stable Rock ☐ Type A
☐ Type B ☐ Type C
☐ Avg. Compression Strength _____ tsf
☐ Compressed Strength Data _____

SOIL CHARACTERISTICS:

☐ Cemented ☐ Cohesive ☐ Layered
☐ Fissured ☐ Granular ☐ Plastic
☐ Dry ☐ Moist ☐ Saturated ☐ Submerged

MANUAL TEST USED:

☐ Plasticity ☐ Dry Strength ☐ Ribbon
☐ Thumb Penetration ☐ Pocket Penetrometer
☐ Dry Testing ☐ Other

PROTECTIVE SYSTEMS:

☐ Prof. Engineered Protective System Required

SLOPING/BENCHING:

☐ **Vertical (90°)** ☐ **3/4 :1 (53°)** ☐ **1:1 (45°)**
☐ **1 ½:1 (34°)** ☐ **2:1 (26°)** ☐ **Other**

SHORING:

☐ Timber ☐ Trench Shield/Trench Box
☐ Aluminum Hydraulic

OTHER:

☐ Means of Egress Required
☐ Confined Space Permit Required
☐ Mechanical Ventilation Required
☐ Owner / Designate Required to be Present
☐ Surveys, drawings, Plot Plans, etc. Attached
☐ Landowner Consent Obtained
☐ Other

UTILITIES (underground/overhead):

☐ One Call Service Notified
☐ Search Zone Established
☐ Utilities Marked by Public Utilities Locator
☐ Property Owner Contacted
☐ Utility Drawings Reviewed
☐ Utilities Marked by Private Locator

LIST OF KNOWN OBSTRUCTIONS:

☐ Electrical ☐ Telephone ☐ Water
☐ Sewer ☐ Steam ☐ Natural Gas
☐ Drain ☐ Process ☐ Alarm
☐ Concrete Encasement ☐ Pilings
☐ Footings ☐ Other

UTILITIES (hand exposure requirements):

☐ Radius Established –
☐ Exposure Interval Established –
☐ Other

SPECIAL INSTRUCTIONS and WORK INSTRUCTIONS

All unsafe conditions shall be corrected prior to excavation entry. If any hazardous conditions are observed, the excavation shall be evacuated immediately, and no one is permitted to re-enter until corrective action has been taken.

Signature and Dates
(Manager shall determine which signatures are required)

	Print Name	Signature	Date
Excavation Competent Person (Required)			
Supervisor			
SH&E Representative			
Registered Professional Engineer (if applicable)			
Other			

Americas

Underground Utilities

S3AM-331-PR1

1.0 Purpose and Scope

1.1 Provides procedures designed to help prevent injuries to personnel working on the location and pedestrians, property damage, and adverse environmental impact as a result of potential hazards associated with encountering underground utilities, subsurface installations, and potential overhead hazards.

1.2 Provides the minimum requirements to be followed for underground work (e.g., excavations, drilling, boring, and probing work) to ensure that underground installations, and subsurface structures, are identified properly before work commences.

1.3 This procedure applies to all Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

1.4 The Manager is responsible for meeting all the requirements in this procedure.

1.5 AECOM's clients may have specific procedures which shall be followed to identify and map utility and subsurface structures on their properties or facilities. Provided the client's procedures meet or exceed those of AECOM, approval shall be obtained from the Manager and the SH&E Manager to follow the client's procedures.

2.0 Terms and Definitions

2.1 **Underground Utilities –** All utility systems located beneath grade level, including, but not limited to, gas, electrical, water, compressed air, sewage, signaling and communications, etc.

2.2 **Clearance** – includes the following:

- The positive locating of underground utilities or subsurface installations in or near the work area.
- A signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.

2.3 **Ground Disturbance (GD) –** Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work that results in the penetration of the ground.

2.4 **Hand Clearance Zone –** The area on either side of the locate marks of a utility that shall be maintained in order to expose the utility through the use of non-destructive ground disturbance techniques acceptable to the owner of the buried utility. Visual exposure is required before mechanical excavation equipment may be used.

2.5 **Intrusive Activities –** Examples: Excavation of soil borings, installations of monitoring wells, installation of soil gas sampling probes, excavation of test pits/trenches or other man-made cuts, cavity, trench or depression in an earth surface formed by earth removal.

2.6 **Non-Destructive Ground Disturbance Technique –** A safe and acceptable excavation method that is used to visually expose an underground utility without causing damage. Non-destructive ground disturbance techniques may include, but are not limited to:

- Hand digging.
- Use of non-conductive tools.
- Hydro-vacuum.

2.7 **Subsurface Installation –** Examples: Subterranean tunnels, underground parking garages and other structures beneath the surface.

2.8 **Utility Strikes –** Unplanned contact with utilities resulting in damage to the utility or its protective coating.

3.0 References

3.1 S3AM-003-PR1 SH&E Training

3.2 S3AM-303-PR1 Excavation

3.3 S3AM-321-PR1 Drilling, Boring & Direct-Push Probing

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Manager**

- Administer this procedure and the development of the SH&E Plan.
- Confirm the appropriate equipment and materials are available to conduct the underground utility and/or subsurface installation clearance.
- Confirm all employees involved and affected by the task review the SH&E Plan and Task Hazard Assessment (THA) prior to work commencing
- Authorize work to proceed using the *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist*.
- Confirm that employees conducting underground utilities and subsurface clearance processes possess all required training, registrations or certifications.
- Provide authorization (with the concurrence of the Site Supervisor and SH&E Manager) for work to resume if interrupted due to unexpected conditions or events.

4.1.2 **Safety, Health & Environment (SH&E) Manager**

- Assist AECOM management as needed by providing guidance and clarification as to issues that may arise.
- Review the SH&E Plan to confirm compliance with jurisdictional regulations. Provide technical guidance as needed when a variance is pursued related to this procedure.

4.1.3 **Employees**

- Maintain training as appropriate to the work to be completed (e.g. ground disturbance, lockout tagout, equipment operation, etc.). Refer to *S3AM-003-PR1 SH&E Training*.
- Review the SH&E Plan and Task Hazard Assessment (THA) prior to work commencing.
- As appropriate to the anticipated or encountered hazards and as addressed in the applicable planning documentation, utilize appropriate personal protective equipment (PPE) and applicable training, practices and operating procedures.
- Immediately notify the Manager of any unanticipated conditions or events. If assigned equipment, perform appropriate inspections and confirmations of maintenance and/or repairs.

4.2 Training

4.2.1 All on-site employees involved with the underground utility and subsurface identification and associated clearance process shall be trained, at a minimum, in these procedures.

4.2.2 Employees shall complete all required training associated with their tasks in accordance with the SH&E Training Matrix and any training assessments developed at the business group.

- Refer to *S3AM-003-PR1 SH&E Training.*
- This training may include, but is not limited to, Excavation / Trenching (Ground Disturbance), HAZWOPER, Petroleum Safety Training (or Construction Safety Training), and H2S Alive as appropriate.

4.2.3 As applicable, employees shall receive client-required training.

4.3 Planning

4.3.1 Health and Safety Plan – At a minimum, a SH&E Plan and task hazard assessments (THAs) shall be prepared prior to any underground utilities and subsurface installations clearance activities.

- The SH&E Plan will address any required environmental monitoring including gas monitoring, dust, noise, metals, radiation or other monitoring as may be appropriate for site conditions.
- Employees shall comply with all SH&E Plan requirements.
- The location specific emergency response plan shall be in place, contain procedures applicable to the potential emergencies presented by the operations, and be reviewed with all personnel potentially affected.

4.3.2 *S3AM-331-ATT2 Underground Utilities & Subsurface Installation Clearance Flow Chart* provides a summary of the key requirements addressed in this procedure.

4.3.3 Underground utilities and subsurface installations shall be investigated as being present, including the following, but not limited to:

- Steam, gas and electric.
- Sewer and water.
- Subterranean tunnels.
- Fibre optics (note: routine geophysical surveys will not identify fibre optic cables).
- Traffic control cables.

4.3.4 Location of underground utilities and subsurface installations will be confirmed by cross-referencing available information:

- Maps, as-built drawings and issued for construction (IFC) drawings.
- Plot plans, permits, crossing/encroachment agreements.
- One-Call information, locator and provided surveys.
- Private utility information, locator and provided surveys (e.g. ground penetrating radar (GPR), electromagnetic, etc.).
- Owner supplied documentation.
- Site walks.

4.3.5 As applicable, emergency shut-off locations of utilities shall be verified before work activities commence.

4.3.6 Jurisdictional, land owner, client and utility owner requirements shall be consulted to determine the minimum search zone dimensions and appropriate clearance distances.

4.3.7 As necessary and if possible, adjust locations of excavations or intrusive subsurface work away from subsurface utilities and installations

4.3.8 Prior to any excavation or intrusive subsurface work, the *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist* shall be completed. The form shall be reviewed and signed by the Manager.

- If the answer to any question in Part 1 of the checklist is “No” or “N/A”, no ground disturbance may take place without review by the Manager, in consultation with SH&E Manager, of the circumstances related to the particular item. The Manager shall initial beside each “No” or “N/A” item to indicate review and authorization.

4.4 Permits, Notifications and Access Agreements

4.4.1 Any required notifications shall be provided within the appropriate timeframe to the applicable organization (e.g. owner, utility company, agency, governing body, etc.).

4.4.2 All applicable permits (e.g. client, government, working near rail road, etc.) will be identified, obtained, and adhered to.

4.4.3 All access agreements will be obtained and adhered to.

4.5 Locating Underground Utilities and Subsurface Installations

4.5.1 Utilize the appropriate call/click-before-you-dig provider. Refer to *S3AM-331-ATT1 One-Call System*.

4.5.2 Federal/State/Provincial/Territorial and other "One Call" providers shall be contacted at least two working days and no more than ten working days prior to commencing the ground disturbance. Jurisdictional requirements shall be consulted to verify the appropriate advance notice. (e.g. 24 hours, two full working days, three to ten business days, etc.).

4.5.3 If the location of proposed excavation or intrusive subsurface work cannot be clearly and adequately identified, the route and/or area of the proposed ground disturbance shall be identified using white flags, paint or stakes prior to the arrival of the locator. Consult jurisdictional requirements as white-lining may be a mandatory requirement on all ground disturbances.

4.5.4 One Call providers shall appropriately identify and mark the subsurface utilities or installations, or otherwise provide written notification they do not have any facilities near the proposed subsurface/intrusive locations.

4.5.5 Confirm all circuits were on during subsurface checks if the checks were for identifying energized lines (e.g. circuits on timers or light sensing switches).

4.5.6 Areas that have a high density of sub-surface facilities may require a secondary locate by another independent locator to verify locations identified by the first locator.

4.6 Private Utility Locating

4.6.1 One Call services may not be available in various non-urban locations. Private utility locating companies shall be utilized to identify and located any underground utilities or subsurface installations.

4.6.2 Be aware urban areas (e.g. city or town) may have subsurface installations (e.g. underground garages) and utilities (e.g. public water, sewer, and gas pipelines) that are not covered by one-call systems.

- These subsurface installations and utilities require additional investigation and diligence beyond the one-call system.
- Additional investigation and diligence beyond the one-call system is also recommended for non-urban areas.

4.6.3 In urban areas, private utility locating companies shall be called to identify and locate, through geophysical surveys and other means, the presence of private utilities installed by the property owner (e.g. irrigation systems) and to verify the presence of public utilities on the properties.

- Hand clearing is required in urban areas.

4.6.4 Hand clearing is also recommended for non-urban areas and may be required by the given jurisdiction.

4.6.5 Warning tape, pea gravel, sand, non-indigenous material, bentonite, red concrete (indicative of electrical duct banks) and any departure from native soil or backfill may be evidence of the presence of subsurface installations and utilities.

4.7 Surface Markings

4.7.1 Once the underground installation has been identified, proper surface markings shall be made in accordance with the guidelines from the One-Call System (refer to S3AM-331-ATT1), guidance contained in this procedure or as contract-specified.

4.7.2 Color-coded surface marks (paints or similar coatings) shall be used to indicate the type, location, and route of buried installations. Additionally, to increase visibility, color-coded vertical markers (temporary stakes or flags) shall supplement surface marks.

4.7.3 All marks and markers shall indicate the name, initials, or logo of the company that owns or operates the installation and the width of the installation if it is greater than 2 inches.

4.7.4 If the surface over the buried installation is to be removed, supplemental offset marking shall be used. Offset markings shall be on a uniform alignment and shall clearly indicate that the actual installation is a specific distance away.

4.7.5 Locate marks shall be re-verified as per jurisdictional requirements or no later than 14 days after the previous locate was completed, whichever interval is shorter. These locate time intervals shall be maintained for the duration of the ground disturbance.

- If the work is interrupted during the determined lifespan or work does not commence during the applicable lifespan, a new locate shall be performed.
- Jurisdictional provisions may allow for an extension to the lifespan of the locate marks, however certain conditions may need to be met. (e.g. activities uninterrupted)
- If locate marks are moved or destroyed the location of the buried facilities shall be re-established.

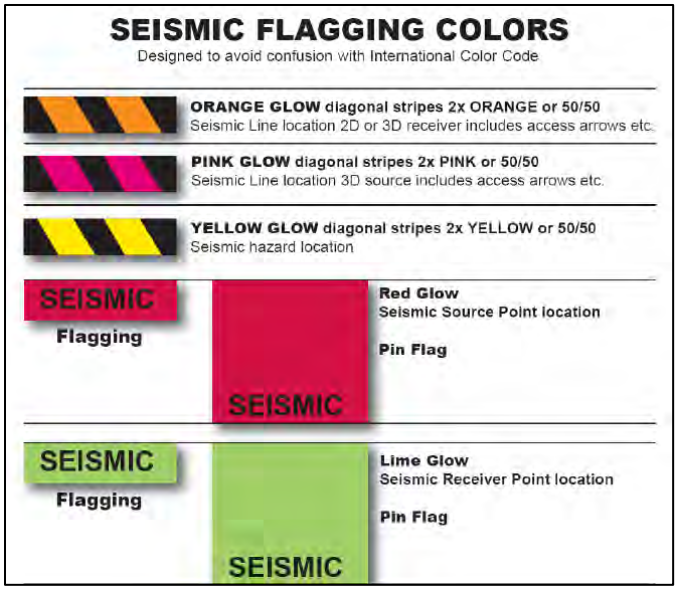
4.8 Uniform Color Coding

4.8.1 The colors and corresponding installation type are as follows unless otherwise contract-specified:

AMERICAN PUBLIC WORKS ASSOCIATION – APWA
Color Coding for Marking of Buried Facilities

White	Proposed Ground Disturbance Area
Pink	Temporary Survey Markings
Red	Electric Power Lines, Cables, Conduit and Lighting Cables
Yellow	Gas, Oil, Steam, Petroleum Lines or Gaseous Materials
Orange	Conduit, Cable, Communication, Alarm or Signal Lines
Blue	Potable Water
Green	Sewer, Storm Sewer and Drain Lines
Purple	Reclaimed Water, Irrigation and Slurry Lines (non-potable)

Canadian Association of Geophysical Contractors



4.9 Identification and Mapping of Utility and Subsurface Structures

4.9.1 The locations of subsurface utilities and subsurface installations shall be investigated, documented, and shown on a site plan (a scaled site plan shall be used when feasible). Refer to *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist.*

4.9.2 Documentation of utility and subsurface installation identification (calling one call, responses from utilities) along with the scaled site plan shall be available on the worksite at all times of intrusive activities.

4.10 Site Walk

4.10.1 A site walk shall be conducted by the AECOM Manager and any other appropriate personnel with the objectives of reviewing all planned intrusive activity locations, the locations of subsurface and overhead utilities, overhead obstructions, and the potential for subsurface installations, to determine the appropriate utility clearance activities, and to observe other physical hazards.

- Walk the area at least 50 feet (15.2 meters) from perimeter of the site to observe physical hazards.
- Walk the area of at least 50 feet (15.2 meters) radius from each proposed subsurface intrusion location.
- If possible, particularly at urban and industrial sites, the client/property owner or an individual knowledgeable about the site and site utilities will attend the site walk.
- Add discovered items/issues to map for use in location confirmation.

4.10.2 The Site Walk further supplements the Identification and Mapping of Utility and Subsurface Structures procedure. Site Walks should be repeated as necessary following the Identification and Mapping of Utility and Subsurface Structures as visual verification of the hazards. Examples include:

- Proposed location(s) does not lie on a line connecting two similar manhole covers (e.g. sanitary sewer or storm drain).
- Proposed subsurface location(s) has not subsided, been excavated and patched, nor gives the appearance it may be covering a former trench (e.g. linear cracks, sagging curbs, linear re-pavements, etc.).
- Proposed subsurface location(s) does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.

4.11 Proposed Subsurface Investigation Locations

4.11.1 All proposed subsurface locations will be reviewed in comparison to subsurface and overhead utilities and subsurface installations and adjustments made as necessary.

4.11.2 Minimum set back distances from subsurface and overhead utilities and subsurface installations will be established including 5 feet (1.5 meters) from any subsurface utility, 7 feet (2.1 meters) from the pad surrounding any underground storage tanks, and 10 feet (3 meters) from any overhead energized electrical line (or further depending on line voltage). These set back distances are a minimum; government regulations and utility requirements may dictate a greater set back distance.

4.12 Utility Clearance Investigation Location Confirmation

4.12.1 As applicable, all client on-site safety procedures shall be understood and adhered to.

4.12.2 Hand exposure or non-destructive ground disturbance techniques to expose an underground utility or subsurface installation are necessary to accurately determine size, location and alignment prior to mechanical excavation or intrusive subsurface work in the vicinity of that utility or installation.

4.12.3 Non-destructive ground disturbance techniques shall be acceptable to the owner of the buried utility (i.e. hydro-vacuum temperature or pressure).

4.12.4 Hydro-vacuum or air-knife require proper grounding equipment at sites where the subsurface may contain flammable gases, liquids, or vapors

4.12.5 Jurisdictional, land owner, client and utility owner requirements shall be consulted to determine the distance of the hand exposure zone, and what requirements, when met, may allow mechanical excavation within these zones.

4.12.6 At a minimum, all underground utilities and subsurface installations within a 5 feet (1.5 meter) radius of the work site shall be identified and physically located (seen) before use of mechanical excavation equipment is permitted. Jurisdictional, client, land owner and utility owner requirements shall be consulted as the required hand exposure radius may be larger.

4.12.7 In urban areas, proposed subsurface locations will be hand cleared to 5 feet (1.5 meters) (soil borings and wells) or 12 inches (30 centimeters) (soil gas sampling probes) using non-mechanical methods.

- In non-urban areas, hand clearing should be conducted if possible and shall be conducted as required by the given jurisdiction.
- Hand clearance should be extended if locations of deep utilities and structures are not known.
- Hand exposure or non-destructive ground disturbance techniques should extend a minimum of 24 inches (60 centimeters) below the intended ground disturbance depth to minimize the hazard of mechanical equipment contact with any utility or installation.

4.12.8 Mechanical equipment and attachment dimensions shall be considered when establishing the zone in which all underground utilities and subsurface installations are physically located (seen) prior to the use of that equipment. The radius may require expanding to maintain safe distances when using large equipment.

4.13 Utility Strikes

4.13.1 Utility strikes shall be reported in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.

4.13.2 All damaged utilities shall be repaired by a qualified and/or licensed professional.

5.0 Records

5.1 Retain completed *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist* and documents related the clearance process (e.g. Utility Owner communication, etc.) in the site or project files.

5.2 Documentation of employee training completed shall be retained in accordance with *S3AM-003-PR1 SH&E Training*.

6.0 Attachments

6.1 S3AM-331-ATT1 One-Call System

6.2 S3AM-331-ATT2 Underground Utilities & Subsurface Installation Flow Chart

6.3 S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist

Americas

Personal Protective Equipment

S3AM-208-PR1

1.0 Purpose and Scope

1.1 Provide an effective Personal Protective Equipment (PPE) Program to protect AECOM employees from potential workplace safety and health hazards.

1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

1.3 The proper use of appropriate PPE, in combination with effective engineering and administrative controls, can provide AECOM employees with protection against potential workplace hazards and can reduce the potential for workplace injury and illness.

2.0 Terms and Definitions

2.1 **ANSI** – American National Standards Institute

2.2 **CSA** – Canadian Standards Association

2.3 **PPE** – Personal Protective Equipment

2.4 **SDS** – Safety Data Sheets

2.5 **THA –** Task Hazard Assessment

3.0 References

3.1 S3AM-123-PR1 Respiratory Protection

3.2 S3AM-209-PR1 Risk Assessment & Management

3.3 S3AM-301-PR1 Confined Spaces

3.4 S3AM-304-PR1 Fall Protection

3.5 S3AM-315-PR1 Working On & Near Water

3.6 S3AM-317-PR1 Hand Safety

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Managers** or **Supervisors**

- Confirm the location specific SH&E Plan documents required hazard controls.
- Confirm Task Hazard Assessments (THAs) are conducted and hazards identified are eliminated through substitution, engineering, or administrative controls first before assigning PPE for hazard mitigation.
- Confirm appropriate subject matter experts, manufacturer's specifications, and regulatory requirements are consulted as necessary to assist with proper PPE selection.
- Match the appropriate PPE to those hazards that cannot be eliminated; support employees in exercising Stop Work Authority if the task is too hazardous to be mitigated
- Provide and document employee training on use and care of PPE.
- Determine which staff requires employee-issued PPE.

- Determine PPE requirements for visitors.
- If applicable, manage medical monitoring of employees using PPE (e.g. respirators, hearing protection, radiation, etc.).
- Approve the purchase of company-issued PPE.
- Confirm that appropriate PPE is utilized by employees when required or necessary. This may periodically be documented using *S3AM-208-FM2 Personal Protective Equipment Inspection*.
- Exercise Stop Work Authority if PPE is inadequate to address hazards.

4.1.2 **SH&E Managers**

- Provide guidance to Managers, Supervisors, and staff on the assessment of hazards and the selection of PPE.
- Provide training materials to Managers and Supervisors for employee training

4.1.3 **Employee**

- Review all relevant SH&E Plans, THAs and applicable SDS prior to commencing work.
- Exercise Stop Work Authority if the task is too hazardous.
- In accordance with training and instructions, utilize appropriate PPE that has been issued when required or necessary.
- Inspect PPE prior to and after use to confirm that it is functional, and maintain PPE in a clean and functional condition.
- Follow instructions and manufacturers' guidance on the care, use, and storage of PPE.
- Replace PPE when worn out, expired or damaged.
- Refrain from wearing PPE outside of the work area for which it is required if doing so would constitute a hazard.

4.2 Hazard Assessment

4.2.1 The location specific SH&E plan and THA shall assess the hazards and identify the necessary control measures. Refer to *S3AM-209-PR1Risk Assessment & Management.*

4.2.2 These control measures shall include direction and guidance concerning the appropriate PPE required as the last line of defense to the anticipated hazards of the specific operations and tasks. A PPE specific assessment may assist in identifying PPE requirements. *S3AM-208-FM1 Personal Protective Equipment Assessment* may be completed and included in the SH&E Plan.

4.2.3 Various tasks and operations, including but not limited to, demolition, remediation, spill response, asbestos abatement, and lead removal, may require additional direction concerning selection, use, care, and disposal of PPE from a subject matter expert (e.g. protector manufacturer, industrial hygienist, asbestos professional, etc.).

- Obtained direction shall be included in the SH&E Plan.
- Consultation with subject matters may be limited to the planning phase or they may be retained to provide technical assistance for a portion of or duration of the project.

4.3 Training

4.3.1 All employees shall be informed of their right to Stop Work if the task is too hazardous to mitigate through use of elimination, substitution, engineering controls, administrative controls, and PPE.

4.3.2 Staff will receive adequate instruction on the correct use, limitations, and assigned maintenance duties for the equipment to be used. The following information, at a minimum, will be covered during PPE training:

- What PPE is required.
- When it is required.
- Why it is required.
- How to properly don, doff, adjust, and wear the PPE described.
- The limitations of the PPE, including its expected useful life.
- How to properly care for, maintain, and dispose of the PPE.

4.3.3 Retraining may be required as applicable (e.g., observed non-compliance, changes in procedure, etc.).

4.3.4 Staff are responsible for confirming that they have reviewed the operation manual/instructions for the PPE before work commences.

4.3.5 All staff will receive a location specific orientation to the hazards on the job site as well as appropriate PPE requirements.

4.4 Determining the Need for PPE

4.4.1 Prior to beginning work, the SH&E plan shall be consulted and THAs developed to identify the PPE requirements.

4.4.2 After the hazard assessments have been completed, the manager and/or employee shall select the appropriate PPE for each job category or task, as necessary. PPE will be provided to each employee appropriate for the hazards present.

- All PPE selected, purchased and used by AECOM will meet or exceed the appropriate ANSI/CSA standards or other standards as determined by federal, provincial, territorial, or state legislation.

4.4.3 If the hazard can be mitigated through using appropriate PPE shall:

- Properly fit the employee's body. Reasonable attempts shall be made to procure gender-specific gear / sizing.
- Be selected and used in accordance with recognized standards and provide effective protection.
- Not in itself create a hazard to the wearer (e.g., scratched safety glasses which could cause impaired vision should be replaced with clear safety glasses).
- Be compatible so that one item of PPE does not interfere with other PPE.
- Be maintained in good working order and in a sanitary condition.
- Not be altered in any way.

4.4.4 Prior to entering any controlled or restricted work area, employees shall review the SH&E plan and corresponding THA(s) to confirm that they are equipped with the applicable ANSI/CSA-approved PPE, appropriate to the specific work area's hazards.

4.5 Eye and Face Protection

4.5.1 AECOM employees shall use appropriate eye and face protection when eye or face hazards are present or potential from flying particles, molten metal, liquid chemicals, acid and caustic liquids, chemical gases or vapors, or injurious light radiation.

4.5.2 Safety glasses with side protection is the minimum eye protection requirement. Additional eye protection shall be suitable to the anticipated hazards (e.g. goggles, safety glasses with a face-shield, welder's helmet, etc.). Refer to *S3AM-208-ATT1 Eye & Face Protection*.

4.6 Head Protection

4.6.1 Appropriate protective hardhats are required when employees are working in areas where there is any potential for injury to the head.

4.6.2 Head protection shall be suitable to the anticipated hazards (e.g. working near exposed electrical conductors requires hardhats designed to reduce electrical shock). Refer to *S3AM-208-ATT2 Head Protection.*

4.7 Foot Protection

4.7.1 AECOM employees shall use appropriate foot protection when hazards to feet are present or potential; including impact, puncture, cut, electrical, thermal or chemical hazards.

4.7.2 Refer to *S3AM-208-ATT3 Foot Protection.*

4.8 Hand Protection

4.8.1 Appropriate hand protection is required when employee's hands are exposed to hazards such as those from skin absorption of harmful substances, cuts and lacerations, abrasions, punctures, chemical burns, thermal burns, electricity, or harmful temperature extremes.

4.8.2 Refer to *S3AM-208-ATT4 Hand Protection* and *S3AM-317-PR1 Hand Safety*.

4.9 Chemically Resistant Clothing

4.9.1 Chemically resistant clothing is required when there is significant potential for the employee to come in direct contact with the chemicals being handled. Tasks that involve chemical handling will be evaluated for potential splashing or spilling. Refer to *S3AM-208-ATT5 Limb & Body Protection*.

4.9.2 The process for selecting chemical resistant clothing will be similar for the selection of chemical resistant gloves (refer to *S3AM-208-ATT4-Hand Protection* and *S3AM-317-PR1 Hand Safety*).

4.10 High-Visibility Apparel

4.10.1 “High visibility safety apparel” means personal protective safety clothing that is intended to provide conspicuity during both daytime and nighttime usage and that meets the Performance Class II or III requirements of ANSI/CSA standards. Refer to *S3AM-208-ATT6 High Visibility Safety Apparel.*

4.10.2 Color of apparel (orange or lime) may be client/project-specific. If there is a specific need to be visible to the passing public, to machine operators, or to other crew members, high visibility vests shall be worn (and retro-reflective striping on arms and legs at night).

4.10.3 Work conducted at night may require that the minimum level of apparel worn be, at minimum, ANSI/CSA Class III, and in accordance with the governing legislation.

4.11 Personal Clothing

4.11.1 Employees on a project site shall wear full length trousers and shirts that cover shoulders.

4.11.2 For personal safety on the job site, do not wear

- Loose or unsecured clothing or loose fitting cuffs;
- Greasy or oily clothing, gloves, or boots; or
- Torn or ragged clothing.
- Jewelry (e.g. rings, bracelets, neck chains) when working with moving parts or there is a risk or entanglement.

4.11.3 Long hair shall be tied back or otherwise confined when working with moving parts or there is a risk of entanglement.

4.11.4 Clothing made of synthetic fibers can be readily ignited and melted by electric flash or extreme heat sources. Cotton or wool fabrics are recommended for general use.

4.11.5 Footwear shall be suitable for the site conditions and task requirements. No athletic shoes, sandals, flip flops, permitted on active job sites.

4.11.6 It is recommended to use clothing with sun protection properties when working in high sun UV exposure

4.12 Specialized PPE

4.12.1 In addition to basic PPE, additional specialized PPE may be required to provide appropriate protection to the employee. Refer to applicable legislation and related SH&E procedures for additional information on PPE requirements.

- Fall Protection – Only full-body harnesses with shock-absorbing lanyards will be used for personal fall arrest. Refer to *S3AM-304-PR1 Fall Protection*.
- Respiratory Protection – Respiratory protection shall be selected based on the contaminant and concentration to which the employee will be exposed. Refer to *S3AM-123-PR1 Respiratory Protection*, the task- or project-specific hazard assessments and the applicable SDSs for specific requirements.
- Fire Resistant Clothing (FRC) – Approved fire-resistant outer clothing may be required at work locations with flammable or explosive materials or environments. Refer to *S3AM-208-ATT5 Limb & Body Protection.*
- Other Head Protection – Operators and passengers (if trained and permitted) of all-terrain vehicles and snowmobiles will wear approved helmets. Refer to *S3AM-208-ATT2 Head Protection.*
- Protection from Drowning – Appropriate personal floatation devices shall be worn when work working over and near water. Refer to *S3AM-315 Working On & Near Water*.
- Temperature Extremes – Work in cold environments may require additional layers and insulated clothing, gloves, boots and accessories such as balaclavas, hardhat liners. Confirm these items are approved and do not introduce additional unacceptable hazards (e.g. insufficient visibility, conductivity, etc.).
- Hearing Protection – Noise levels in the work environment that cannot be eliminated or reduced to acceptable levels requires worker be protected from exposure. Refer to *S3AM-118-PR1 Hearing Conservation.*
- Traction Devices – Traction devices applied to the base of work boots may be necessary if the employee may be walking on icy surfaces. Refer to *S3AM-208-ATT3 Foot Protection*.
- Rescue – Confined spaces hazards may necessitate the use of specific harnesses attached to retrieval lines to facilitate rescue. Refer to *S3AM-301-PR1 Confined Spaces*.

4.13 Maintaining PPE Supplies

4.13.1 Employees shall inspect their required PPE prior to use. Defective equipment shall be removed from service and replaced.

4.13.2 Each AECOM location will maintain a supply of safety equipment of appropriate types and sizes, including hard hats, high visibility vests, safety glasses, gloves, hearing protection and chemically resistant clothing based on the nature of their field activities. The Manager or designee will be responsible for maintaining this inventory.

4.13.3 Use of PPE by employees and adequacy of protection should be evaluated on a routine basis. This may periodically be documented using *S3AM-208-FM2 Personal Protective Equipment Inspection.*

4.13.4 At a minimum, locations will review their PPE program annually.

4.14 Obtaining Personalized Safety Gear

4.14.1 Employees are not expected to provide their own general PPE. Most basic PPE will be provided to the employee at no charge (e.g. safety glasses, hard hat, gloves, hearing protection, etc.) with the

exception of the below personalized safety equipment (prescription safety glasses, safety-toed boots, any washable coveralls).

4.14.2 Certain personalized safety gear such as prescription safety glasses, safety-toed (capped) boots, and any washable coveralls will be ordered and sized specifically by the user. A partial cost reimbursement to the employee may be made if their location provides a specialized PPE purchase program.

4.14.3 All specialized PPE (e.g. fall protection equipment, respirators, helmets, etc.) will be provided by AECOM for employee use at no charge to the employee, with the exception of the above personalized safety equipment (prescription safety glasses, safety-toed boots, any washable coveralls).

5.0 Records

5.1 Completed SH&E plans, THAs documenting PPE requirements, and as applicable, PPE assessments and PPE inspections, will be maintained in the location's safety files.

6.0 Attachments

6.1 S3AM-208-ATT1 Eye & Face Protection

6.2 S3AM-208-ATT2 Head Protection

6.3 S3AM-208-ATT3 Foot Protection

6.4 S3AM-208-ATT4 Hand Protection

6.5 S3AM-208-ATT5 Limb & Body Protection

6.6 S3AM-208-ATT6 High Visibility Safety Apparel

6.7 S3AM-208-FM1 Personal Protective Equipment Assessment

6.8 S3AM-208-FM2 Personal Protective Equipment Inspection

Attachment 3

Analytical Data Packages

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report



Technical Report for

AECOM, INC.

Fort Monmouth, NJ

60587637

SGS Job Number: JC95903

Sampling Date: 09/30/19

Report to:

AECOM, INC.

Alfred.LoPilato@aecom.com

ATTN: Alfred LoPilato

Total number of pages in report: 30

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Laura Degenhardt
General Manager

Client Service contact: Ayesha Kapadia 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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how we can serve you better at:
EHS.US.CustomerCare@sgs.com

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Sample Summary

AECOM, INC.

Job No: JC95903

Fort Monmouth, NJ
Project No: 60587637

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
This report contains results reported as ND = Not detected. The following applies:							
Organics ND	= Not detected above the MDL						
JC95903-1	09/30/19	09:30	CD	09/30/19	SO	Soil	P57-SS09N(1.5-2.0)
JC95903-2	09/30/19	09:35	CD	09/30/19	SO	Soil	P57-SS09S(1.5-2.0)
JC95903-3	09/30/19	09:45	CD	09/30/19	SO	Soil	P57-SS09E(1.5-2.0)
JC95903-4	09/30/19	09:50	CD	09/30/19	SO	Soil	P57-SS09W(1.5-2.0)
JC95903-5	09/30/19	10:15	CD	09/30/19	SO	Soil	P57-SS09E(6.5-7.0)
JC95903-6	09/30/19	10:20	CD	09/30/19	SO	Soil	P57-SS09N(6.5-7.0)
JC95903-7	09/30/19	10:25	CD	09/30/19	SO	Soil	P57-SS09B(6.5-7.0)
JC95903-8	09/30/19	10:30	CD	09/30/19	SO	Soil	P57-SS09W(6.5-7.0)
JC95903-9	09/30/19	10:35	CD	09/30/19	SO	Soil	P57-SS09S(6.5-7.0)
JC95903-10	09/30/19	13:15	CD	09/30/19	SO	Soil	P57-A1-AN(0.0-0.5)
JC95903-11	09/30/19	13:20	CD	09/30/19	SO	Soil	P57-A1-AN(1.5-2.0)
JC95903-12	09/30/19	13:25	CD	09/30/19	SO	Soil	P57-A1-AS(0.0-0.5)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Sample Summary
(continued)

AECOM, INC.

Job No: JC95903

Fort Monmouth, NJ
Project No: 60587637

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC95903-13	09/30/19	13:30	CD	09/30/19	SO	Soil	P57-A1-AS(1.5-2.0)
JC95903-14	09/30/19	13:35	CD	09/30/19	SO	Soil	P57-A1-AE(0.0-0.5)
JC95903-15	09/30/19	13:40	CD	09/30/19	SO	Soil	P57-A1-AE(1.5-2.0)
JC95903-16	09/30/19	13:45	CD	09/30/19	SO	Soil	P57-A1-AW(0.0-0.5)
JC95903-17	09/30/19	13:50	CD	09/30/19	SO	Soil	P57-A1-AW(1.5-2.0)
JC95903-18	09/30/19	13:55	CD	09/30/19	SO	Soil	P57-A1-AB(1.5-2.0)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

CASE NARRATIVE / CONFORMANCE SUMMARY

Client:	AECOM, INC.	**Job No**	JC95903
Site:	Fort Monmouth, NJ	**Report Date**	10/3/2019 12:17:39 P

On 09/30/2019, 18 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 1.1 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC95903 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

MS Semi-volatiles By Method SW846 8270D

Matrix: SO **Batch ID:** OP23068

- All samples were extracted within the recommended method holding time.
- Sample(s) JC95903-1MS, JC95903-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

General Chemistry By Method SM2540 G 18TH ED MOD

Matrix: SO **Batch ID:** GN642

- Sample(s) JC95803-9DUP were used as the QC samples for Solids, Percent.

Matrix: SO **Batch ID:** GN645

- Sample(s) JC95760-1DUP were used as the QC samples for Solids, Percent.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

Summary of Hits

Job Number: JC95903
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 09/30/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95903-1	**P57-SS09N(1.5-2.0)**					
No hits reported in this sample.						
JC95903-2	**P57-SS09S(1.5-2.0)**					
No hits reported in this sample.						
JC95903-3	**P57-SS09E(1.5-2.0)**					
No hits reported in this sample.						
JC95903-4	**P57-SS09W(1.5-2.0)**					
Benzo(a)anthracene		27.4 J	35	10	ug/kg	SW846 8270D
Benzo(a)pyrene		32.4 J	35	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		31.5 J	35	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		27.0 J	35	18	ug/kg	SW846 8270D
Chrysene		29.3 J	35	11	ug/kg	SW846 8270D
Fluoranthene		20.2 J	35	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		37.1	35	17	ug/kg	SW846 8270D
Pyrene		45.3	35	11	ug/kg	SW846 8270D
JC95903-5	**P57-SS09E(6.5-7.0)**					
No hits reported in this sample.						
JC95903-6	**P57-SS09N(6.5-7.0)**					
No hits reported in this sample.						
JC95903-7	**P57-SS09B(6.5-7.0)**					
No hits reported in this sample.						
JC95903-8	**P57-SS09W(6.5-7.0)**					
Naphthalene		25.1 J	44	12	ug/kg	SW846 8270D
JC95903-9	**P57-SS09S(6.5-7.0)**					
No hits reported in this sample.						

Summary of Hits

Job Number: JC95903
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 09/30/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95903-10	**P57-A1-AN(0.0-0.5)**					
No hits reported in this sample.						
JC95903-11	**P57-A1-AN(1.5-2.0)**					
No hits reported in this sample.						
JC95903-12	**P57-A1-AS(0.0-0.5)**					
Benzo(a)anthracene		10.0 J	37	10	ug/kg	SW846 8270D
Pyrene		15.3 J	37	12	ug/kg	SW846 8270D
JC95903-13	**P57-A1-AS(1.5-2.0)**					
No hits reported in this sample.						
JC95903-14	**P57-A1-AE(0.0-0.5)**					
No hits reported in this sample.						
JC95903-15	**P57-A1-AE(1.5-2.0)**					
No hits reported in this sample.						
JC95903-16	**P57-A1-AW(0.0-0.5)**					
No hits reported in this sample.						
JC95903-17	**P57-A1-AW(1.5-2.0)**					
No hits reported in this sample.						
JC95903-18	**P57-A1-AB(1.5-2.0)**					
No hits reported in this sample.						

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	P57-SS09N(1.5-2.0)		
Lab Sample ID:	JC95903-1	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	92.1
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187532.D	1	10/02/19 12:35	CS	10/01/19 14:50	OP23068	EF8079
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	ND	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	62%		26-134%
321-60-8	2-Fluorobiphenyl	58%		39-124%
1718-51-0	Terphenyl-d14	73%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS09S(1.5-2.0)
Lab Sample ID: JC95903-2
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 09/30/19
Date Received: 09/30/19
Percent Solids: 92.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90082.D	1	10/02/19 11:27	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	35	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	35	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	35	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	35	16	ug/kg	
218-01-9	Chrysene	ND	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	35	16	ug/kg	
206-44-0	Fluoranthene	ND	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	35	17	ug/kg	
91-20-3	Naphthalene	ND	35	9.9	ug/kg	
85-01-8	Phenanthrene	ND	35	12	ug/kg	
129-00-0	Pyrene	ND	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	67%		26-134%
321-60-8	2-Fluorobiphenyl	56%		39-124%
1718-51-0	Terphenyl-d14	76%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS09E(1.5-2.0)
Lab Sample ID: JC95903-3
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 09/30/19
Date Received: 09/30/19
Percent Solids: 89.0

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90066.D	1	10/02/19 04:42	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	37	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	ND	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
206-44-0	Fluoranthene	ND	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	ND	37	12	ug/kg	
129-00-0	Pyrene	ND	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	67%		26-134%
321-60-8	2-Fluorobiphenyl	54%		39-124%
1718-51-0	Terphenyl-d14	77%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS09W(1.5-2.0)
Lab Sample ID: JC95903-4
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 09/30/19
Date Received: 09/30/19
Percent Solids: 92.9

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90081.D	1	10/02/19 11:01	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	22	ug/kg	
56-55-3	Benzo(a)anthracene	27.4	35	10	ug/kg	J
50-32-8	Benzo(a)pyrene	32.4	35	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	31.5	35	16	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	27.0	35	18	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	35	17	ug/kg	
218-01-9	Chrysene	29.3	35	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	35	16	ug/kg	
206-44-0	Fluoranthene	20.2	35	16	ug/kg	J
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	37.1	35	17	ug/kg	
91-20-3	Naphthalene	ND	35	10	ug/kg	
85-01-8	Phenanthrene	ND	35	12	ug/kg	
129-00-0	Pyrene	45.3	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		26-134%
321-60-8	2-Fluorobiphenyl	53%		39-124%
1718-51-0	Terphenyl-d14	79%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS09E(6.5-7.0)		
Lab Sample ID:	JC95903-5	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	75.5
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90067.D	1	10/02/19 05:07	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	43	15	ug/kg	
208-96-8	Acenaphthylene	ND	43	22	ug/kg	
120-12-7	Anthracene	ND	43	27	ug/kg	
56-55-3	Benzo(a)anthracene	ND	43	12	ug/kg	
50-32-8	Benzo(a)pyrene	ND	43	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	43	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	43	22	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	43	20	ug/kg	
218-01-9	Chrysene	ND	43	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	43	19	ug/kg	
206-44-0	Fluoranthene	ND	43	19	ug/kg	
86-73-7	Fluorene	ND	43	20	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	43	20	ug/kg	
91-20-3	Naphthalene	ND	43	12	ug/kg	
85-01-8	Phenanthrene	ND	43	15	ug/kg	
129-00-0	Pyrene	ND	43	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	88%		26-134%
321-60-8	2-Fluorobiphenyl	72%		39-124%
1718-51-0	Terphenyl-d14	107%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS09N(6.5-7.0)		
Lab Sample ID:	JC95903-6	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	76.7
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90068.D	1	10/02/19 05:33	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	43	15	ug/kg	
208-96-8	Acenaphthylene	ND	43	22	ug/kg	
120-12-7	Anthracene	ND	43	27	ug/kg	
56-55-3	Benzo(a)anthracene	ND	43	12	ug/kg	
50-32-8	Benzo(a)pyrene	ND	43	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	43	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	43	22	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	43	20	ug/kg	
218-01-9	Chrysene	ND	43	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	43	19	ug/kg	
206-44-0	Fluoranthene	ND	43	19	ug/kg	
86-73-7	Fluorene	ND	43	20	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	43	20	ug/kg	
91-20-3	Naphthalene	ND	43	12	ug/kg	
85-01-8	Phenanthrene	ND	43	15	ug/kg	
129-00-0	Pyrene	ND	43	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	80%		26-134%
321-60-8	2-Fluorobiphenyl	67%		39-124%
1718-51-0	Terphenyl-d14	96%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS09B(6.5-7.0)
Lab Sample ID: JC95903-7
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 09/30/19
Date Received: 09/30/19
Percent Solids: 75.0

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90069.D	1	10/02/19 05:58	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	44	15	ug/kg	
208-96-8	Acenaphthylene	ND	44	22	ug/kg	
120-12-7	Anthracene	ND	44	27	ug/kg	
56-55-3	Benzo(a)anthracene	ND	44	12	ug/kg	
50-32-8	Benzo(a)pyrene	ND	44	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	44	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	44	22	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	44	20	ug/kg	
218-01-9	Chrysene	ND	44	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	44	19	ug/kg	
206-44-0	Fluoranthene	ND	44	20	ug/kg	
86-73-7	Fluorene	ND	44	20	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	44	21	ug/kg	
91-20-3	Naphthalene	ND	44	12	ug/kg	
85-01-8	Phenanthrene	ND	44	15	ug/kg	
129-00-0	Pyrene	ND	44	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	82%		26-134%
321-60-8	2-Fluorobiphenyl	68%		39-124%
1718-51-0	Terphenyl-d14	96%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS09W(6.5-7.0)		
Lab Sample ID:	JC95903-8	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	75.8
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90070.D	1	10/02/19 06:23	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	44	15	ug/kg	
208-96-8	Acenaphthylene	ND	44	22	ug/kg	
120-12-7	Anthracene	ND	44	27	ug/kg	
56-55-3	Benzo(a)anthracene	ND	44	12	ug/kg	
50-32-8	Benzo(a)pyrene	ND	44	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	44	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	44	22	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	44	21	ug/kg	
218-01-9	Chrysene	ND	44	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	44	19	ug/kg	
206-44-0	Fluoranthene	ND	44	20	ug/kg	
86-73-7	Fluorene	ND	44	20	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	44	21	ug/kg	
91-20-3	Naphthalene	25.1	44	12	ug/kg	J
85-01-8	Phenanthrene	ND	44	15	ug/kg	
129-00-0	Pyrene	ND	44	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	83%		26-134%
321-60-8	2-Fluorobiphenyl	68%		39-124%
1718-51-0	Terphenyl-d14	98%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS09S(6.5-7.0)		
Lab Sample ID:	JC95903-9	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	74.8
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90071.D	1	10/02/19 06:48	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	44	15	ug/kg	
208-96-8	Acenaphthylene	ND	44	23	ug/kg	
120-12-7	Anthracene	ND	44	27	ug/kg	
56-55-3	Benzo(a)anthracene	ND	44	13	ug/kg	
50-32-8	Benzo(a)pyrene	ND	44	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	44	20	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	44	22	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	44	21	ug/kg	
218-01-9	Chrysene	ND	44	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	44	20	ug/kg	
206-44-0	Fluoranthene	ND	44	20	ug/kg	
86-73-7	Fluorene	ND	44	20	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	44	21	ug/kg	
91-20-3	Naphthalene	ND	44	13	ug/kg	
85-01-8	Phenanthrene	ND	44	15	ug/kg	
129-00-0	Pyrene	ND	44	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	87%		26-134%
321-60-8	2-Fluorobiphenyl	71%		39-124%
1718-51-0	Terphenyl-d14	100%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AN(0.0-0.5)		
Lab Sample ID:	JC95903-10	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	91.2
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90072.D	1	10/02/19 07:13	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	ND	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	72%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	85%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AN(1.5-2.0)		
Lab Sample ID:	JC95903-11	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	81.4
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90073.D	1	10/02/19 07:38	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	41	14	ug/kg	
208-96-8	Acenaphthylene	ND	41	21	ug/kg	
120-12-7	Anthracene	ND	41	25	ug/kg	
56-55-3	Benzo(a)anthracene	ND	41	12	ug/kg	
50-32-8	Benzo(a)pyrene	ND	41	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	41	18	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	41	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	41	19	ug/kg	
218-01-9	Chrysene	ND	41	13	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	41	18	ug/kg	
206-44-0	Fluoranthene	ND	41	18	ug/kg	
86-73-7	Fluorene	ND	41	19	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	41	19	ug/kg	
91-20-3	Naphthalene	ND	41	11	ug/kg	
85-01-8	Phenanthrene	ND	41	14	ug/kg	
129-00-0	Pyrene	ND	41	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	79%		26-134%
321-60-8	2-Fluorobiphenyl	65%		39-124%
1718-51-0	Terphenyl-d14	94%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AS(0.0-0.5)		
Lab Sample ID:	JC95903-12	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.4
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90074.D	1	10/02/19 08:04	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	22	ug/kg	
56-55-3	Benzo(a)anthracene	10.0	37	10	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	ND	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
206-44-0	Fluoranthene	ND	37	16	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	ND	37	12	ug/kg	
129-00-0	Pyrene	15.3	37	12	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	58%		26-134%
321-60-8	2-Fluorobiphenyl	48%		39-124%
1718-51-0	Terphenyl-d14	68%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AS(1.5-2.0)		
Lab Sample ID:	JC95903-13	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	84.4
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90075.D	1	10/02/19 08:29	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	20	ug/kg	
120-12-7	Anthracene	ND	38	24	ug/kg	
56-55-3	Benzo(a)anthracene	ND	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	38	18	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	ND	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
206-44-0	Fluoranthene	ND	38	17	ug/kg	
86-73-7	Fluorene	ND	38	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	38	18	ug/kg	
91-20-3	Naphthalene	ND	38	11	ug/kg	
85-01-8	Phenanthrene	ND	38	13	ug/kg	
129-00-0	Pyrene	ND	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	81%		26-134%
321-60-8	2-Fluorobiphenyl	69%		39-124%
1718-51-0	Terphenyl-d14	97%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AE(0.0-0.5)		
Lab Sample ID:	JC95903-14	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.5
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90076.D	1	10/02/19 08:54	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	37	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	ND	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
206-44-0	Fluoranthene	ND	37	16	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	ND	37	12	ug/kg	
129-00-0	Pyrene	ND	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	70%		26-134%
321-60-8	2-Fluorobiphenyl	58%		39-124%
1718-51-0	Terphenyl-d14	81%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AE(1.5-2.0)		
Lab Sample ID:	JC95903-15	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	86.6
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90077.D	1	10/02/19 09:19	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	19	ug/kg	
120-12-7	Anthracene	ND	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	ND	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
206-44-0	Fluoranthene	ND	38	17	ug/kg	
86-73-7	Fluorene	ND	38	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	38	18	ug/kg	
91-20-3	Naphthalene	ND	38	11	ug/kg	
85-01-8	Phenanthrene	ND	38	13	ug/kg	
129-00-0	Pyrene	ND	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	73%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	84%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AW(0.0-0.5)		
Lab Sample ID:	JC95903-16	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.7
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90078.D	1	10/02/19 09:45	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	37	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	ND	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
206-44-0	Fluoranthene	ND	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	ND	37	12	ug/kg	
129-00-0	Pyrene	ND	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	70%		26-134%
321-60-8	2-Fluorobiphenyl	56%		39-124%
1718-51-0	Terphenyl-d14	79%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AW(1.5-2.0)		
Lab Sample ID:	JC95903-17	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	81.9
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90079.D	1	10/02/19 10:10	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	40	14	ug/kg	
208-96-8	Acenaphthylene	ND	40	20	ug/kg	
120-12-7	Anthracene	ND	40	25	ug/kg	
56-55-3	Benzo(a)anthracene	ND	40	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	40	18	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	40	18	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	40	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	40	19	ug/kg	
218-01-9	Chrysene	ND	40	13	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	40	18	ug/kg	
206-44-0	Fluoranthene	ND	40	18	ug/kg	
86-73-7	Fluorene	ND	40	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	40	19	ug/kg	
91-20-3	Naphthalene	ND	40	11	ug/kg	
85-01-8	Phenanthrene	ND	40	14	ug/kg	
129-00-0	Pyrene	ND	40	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	72%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	85%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-A1-AB(1.5-2.0)		
Lab Sample ID:	JC95903-18	**Date Sampled:**	09/30/19
Matrix:	SO - Soil	**Date Received:**	09/30/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	78.6
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90080.D	1	10/02/19 10:36	CS	10/01/19 14:50	OP23068	E2P3986
Run #2							

	Initial Weight	Final Volume
Run #1	31.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	41	14	ug/kg	
208-96-8	Acenaphthylene	ND	41	21	ug/kg	
120-12-7	Anthracene	ND	41	25	ug/kg	
56-55-3	Benzo(a)anthracene	ND	41	12	ug/kg	
50-32-8	Benzo(a)pyrene	ND	41	18	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	41	18	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	41	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	41	19	ug/kg	
218-01-9	Chrysene	ND	41	13	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	41	18	ug/kg	
206-44-0	Fluoranthene	ND	41	18	ug/kg	
86-73-7	Fluorene	ND	41	19	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	41	19	ug/kg	
91-20-3	Naphthalene	ND	41	11	ug/kg	
85-01-8	Phenanthrene	ND	41	14	ug/kg	
129-00-0	Pyrene	ND	41	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	66%		26-134%
321-60-8	2-Fluorobiphenyl	53%		39-124%
1718-51-0	Terphenyl-d14	78%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

SGS

SO

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Page 1 of __

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC95903

Client / Reporting Information	Project Information	Requested Analysis	Matrix Codes
Company Name: AECOM	Project Name: FTMM-Parcel 57		DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge SED-Sediment OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid WP - Wipe FB - Field Blank EB-Equipment Blank RB - Rinse Blank TB - Trip Blank
Street Address: 100 Red Schoolhouse Rd. Suite B-1	Street:	Billing Information (if different from Report to)	
City / State / Zip: Chestnut Ridge, NY 10977	City / State:	Company Name:	
Project Contact / E-mail: A. Lopilato	Project #: 60587637	Street Address:	
Phone #: 845-425-4994	Client Purchase Order #:	City / State / Zip:	
Sampler(s) Name(s) / Phone #: Christine DeAmbrogio	Project Manager: A. LoPilato	Attention:	

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	EnCore	PAH	LAB USE ONLY
1	P57-SS09N(1.5-2.0)		9/30/19	0930	CD	G	SO	1					1				X	
2	P57-SS09S(1.5-2.0)		9/30/19	0935	CD	G	SO	1					1				X	
3	P57-SS09E(1.5-2.0)		9/30/19	0945	CD	G	SO	1					1				X	
4	P57-SS09W(1.5-2.0)		9/30/19	0950	CD	G	SO	1					1				X	
5	P57-SS09E(6.5-7.0)		9/30/19	1015	CD	G	SO	1					1				X	
6	P57-SS09N(6.5-7.0)		9/30/19	1020	CD	G	SO	1					1				X	
7	P57-SS09B(6.5-7.0)		9/30/19	1025	CD	G	SO	1					1				X	
8	P57-SS09W(6.5-7.0)		9/30/19	1030	CD	G	SO	1					1				X	
9	P57-SS09S(6.5-7.0)		9/30/19	1035	CD	G	SO	1					1				X	
10	P57-A1-AN(0.0-0.5)		9/30/19	1315	CD	G	SO	1					1				X	
11	P57-A1-AN(1.5-2.0)		9/30/19	1320	CD	G	SO	1					1				X	
12	P57-A1-AS(0.0-0.5)		9/30/19	1325	CD	G	SO	1					1				X	

AECOM, INC
Fort Monmouth
AK-09619-47
Please place on the back of original (white copy of COC)
This will assist us in processing your samples
Thank You

D22

Turn Around Time (Business Days)

Approved By (SGS PM) / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [x] 3 Business Days
- [ ] 2 Business Days
- [ ] 1 Business Day
- [ ] Other

All data available via Lablink

Initial Assessment: AVC

Label Verification: _____

Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [x] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria_____
- [ ] CT RCP Criteria_____
- [ ] State Forms
- [ ] EDD Format _____
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:	Relinquished By:	Date / Time:	Received By:
1		9-30-19 1745		2	9-30-19 1800	2
3			3	4		4
5			5	Custody Seal #	Intact / Not Intact	Preserved where applicable: Absent / Therm. ID: / On Ice / Cooler Temp. °C: 0.3

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

CHAIN OF CUSTODY

Page 2 of 2

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC95903

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd Suite B1
City: Chestnut Ridge, State: NY, Zip: 10977
Project Contact: A. LoPilato, E-mail:
Phone #: 845-425-4994
Sampler(s) Name(s): Christine DeAmbrogio, Phone #:

Project Information

Project Name: FTMM-Parcel 57
Street:
City: State:
Project #: 60587637
Client Purchase Order #:
Project Manager: A. LoPilato

Billing Information (if different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL- Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB - Field Blank; EB-Equipment Blank; RS - Rinse Blank; TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	PAH	LAB USE ONLY
13	PS7-A1-AS(1.5-2.0)		9/30/19	1330	CD	G	SO	1						1			X	
14	PS7-A1-AE(0.0-0.5)		9/30/19	1335	CD	G	SO	1						1			X	
15	PS7-A1-AE(1.5-2.0)		9/30/19	1340	CD	G	SO	1						1			X	
16	PS7-A1-AW(0.0-0.5)		9/30/19	1345	CD	G	SO	1						1			X	
17	PS7-A1-AW(1.5-2.0)		9/30/19	1350	CD	G	SO	1						1			X	
18	PS7-A1-AB(1.5-2.0)		9/30/19	1355	CD	G	SO	1						1			X	

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [x] 3 Business Days
- [ ] 2 Business Days
- [ ] 1 Business Day
- [ ] Other

All data available via Lablink. Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [x] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria
- [ ] CT RCP Criteria
- [ ] State Forms
- [ ] EDD Format
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:
1	C DeA	9/30/19 1435	
2		9-30-19 1700	
3			
4			
5			

Custody Seal #: Intact / Not intact | Preserved where applicable: Absent | Therm. ID: | On Ice | Cooler Temp. °C: 0.5 5.0

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

SGS Sample Receipt Summary

Job Number: JC95903 **Client:** _____ **Project:** _____

Date / Time Received: 9/30/2019 5:00:00 PM **Delivery Method:** _____ **Airbill #'s:** _____

Cooler Temps (Raw Measured) °C: Cooler 1: (3.5);

Cooler Temps (Corrected) °C: Cooler 1: (1.1);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Cooler temp verification:	IR Gun		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Test Strip Lot #s: pH 1-12: 229517 pH 12+: 208717 Other: (Specify) _____ _____

Comments

SM089-03
Rev. Date 12/7/17

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report



Technical Report for

AECOM, INC.

Fort Monmouth, NJ

60587637

SGS Job Number: JC95957

Sampling Date: 10/01/19

Report to:

AECOM, INC.

Alfred.LoPilato@aecom.com

ATTN: Alfred LoPilato

Total number of pages in report: 92

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Laura Degenhardt
General Manager

Client Service contact: Ayesha Kapadia 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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Test results relate only to samples analyzed.

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EHS.US.CustomerCare@sgs.com

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Sample Summary

AECOM, INC.

Job No: JC95957

Fort Monmouth, NJ
Project No: 60587637

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
This report contains results reported as ND = Not detected. The following applies:							
Organics ND	= Not detected above the MDL						
JC95957-1	10/01/19	08:25	CD	10/01/19	SO	Soil	P57-SS18-N(0.0-0.5)
JC95957-2	10/01/19	08:30	CD	10/01/19	SO	Soil	P57-SS18-N(1.1-1.5)
JC95957-3	10/01/19	08:35	CD	10/01/19	SO	Soil	P57-SS18-S(0.0-0.5)
JC95957-4	10/01/19	08:40	CD	10/01/19	SO	Soil	P57-SS18-S(1.1-1.5)
JC95957-5	10/01/19	08:45	CD	10/01/19	SO	Soil	P57-SS18-E(0.0-0.5)
JC95957-6	10/01/19	08:50	CD	10/01/19	SO	Soil	P57-SS18-E(1.1-1.5)
JC95957-7	10/01/19	08:55	CD	10/01/19	SO	Soil	P57-SS18-W(0.0-0.5)
JC95957-8	10/01/19	09:00	CD	10/01/19	SO	Soil	P57-SS18-W(1.0-1.5)
JC95957-9	10/01/19	09:05	CD	10/01/19	SO	Soil	P57-SS18-B(1.0-1.5)
JC95957-10	10/01/19	09:50	CD	10/01/19	SO	Soil	P57-SS16-N(0.0-0.5)
JC95957-11	10/01/19	09:55	CD	10/01/19	SO	Soil	P57-SS16-N(2.5-3.0)
JC95957-12	10/01/19	10:00	CD	10/01/19	SO	Soil	P57-SS16-S(0.0-0.5)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Sample Summary
(continued)

AECOM, INC.

Job No: JC95957

Fort Monmouth, NJ
Project No: 60587637

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC95957-13	10/01/19	10:05	CD	10/01/19	SO	Soil	P57-SS16-S(2.5-3.0)
JC95957-14	10/01/19	10:10	CD	10/01/19	SO	Soil	P57-SS16-E(0.0-0.5)
JC95957-15	10/01/19	10:15	CD	10/01/19	SO	Soil	P57-SS16-E(2.5-3.0)
JC95957-16	10/01/19	10:20	CD	10/01/19	SO	Soil	P57-SS16-ED(2.5-3.0)
JC95957-17	10/01/19	11:25	CD	10/01/19	SO	Soil	P57-SS16-W(0.0-0.5)
JC95957-18	10/01/19	10:30	CD	10/01/19	SO	Soil	P57-SS16-W(2.5-3.0)
JC95957-19	10/01/19	10:35	CD	10/01/19	SO	Soil	P57-SS16-B(2.5-3.0)
JC95957-20	10/01/19	10:50	CD	10/01/19	SO	Soil	P57-SS14-N(0.0-0.5)
JC95957-21	10/01/19	10:55	CD	10/01/19	SO	Soil	P57-SS14-N(1.0-1.5)
JC95957-22	10/01/19	11:00	CD	10/01/19	SO	Soil	P57-SS14-S(0.0-0.5)
JC95957-23	10/01/19	11:05	CD	10/01/19	SO	Soil	P57-SS14-S(1.0-1.5)
JC95957-24	10/01/19	11:10	CD	10/01/19	SO	Soil	P57-SS14-E(0.0-0.5)
JC95957-25	10/01/19	11:15	CD	10/01/19	SO	Soil	P57-SS14-E(1.0-1.5)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Sample Summary
(continued)

AECOM, INC.

Job No: JC95957

Fort Monmouth, NJ
Project No: 60587637

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC95957-26	10/01/19	11:20	CD	10/01/19	SO	Soil	P57-SS14-W(0.0-0.5)
JC95957-27	10/01/19	11:25	CD	10/01/19	SO	Soil	P57-SS14-W(1.0-1.5)
JC95957-28	10/01/19	11:30	CD	10/01/19	SO	Soil	P57-SS14-B(1.0-1.5)
JC95957-29	10/01/19	13:05	CD	10/01/19	SO	Soil	P57-SS21-N(0.0-0.5)
JC95957-30	10/01/19	13:10	CD	10/01/19	SO	Soil	P57-SS21-N(1.0-1.5)
JC95957-31	10/01/19	13:15	CD	10/01/19	SO	Soil	P57-SS21-S(0.0-0.5)
JC95957-32	10/01/19	13:20	CD	10/01/19	SO	Soil	P57-SS21-S(1.0-1.5)
JC95957-33	10/01/19	13:25	CD	10/01/19	SO	Soil	P57-SS21-E(0.0-0.5)
JC95957-34	10/01/19	13:30	CD	10/01/19	SO	Soil	P57-SS21-E(1.0-1.5)
JC95957-35	10/01/19	13:35	CD	10/01/19	SO	Soil	P57-SS21-W(0.0-0.5)
JC95957-36	10/01/19	13:40	CD	10/01/19	SO	Soil	P57-SS21-W(1.0-1.5)
JC95957-37	10/01/19	13:45	CD	10/01/19	SO	Soil	P57-SS21-B(1.0-1.5)
JC95957-38	10/01/19	13:50	CD	10/01/19	SO	Soil	P57-SS21-BD(1.0-1.5)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Sample Summary
(continued)

AECOM, INC.

Job No: JC95957

Fort Monmouth, NJ
Project No: 60587637

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC95957-39	10/01/19	14:10	CD	10/01/19	SO	Soil	P57-SS17-N(0.0-0.5)
JC95957-40	10/01/19	14:15	CD	10/01/19	SO	Soil	P57-SS17-N(1.0-1.5)
JC95957-41	10/01/19	14:20	CD	10/01/19	SO	Soil	P57-SS17-S(0.0-0.5)
JC95957-42	10/01/19	14:25	CD	10/01/19	SO	Soil	P57-SS17-S(1.0-1.5)
JC95957-43	10/01/19	14:30	CD	10/01/19	SO	Soil	P57-SS17-E(0.0-0.5)
JC95957-44	10/01/19	14:35	CD	10/01/19	SO	Soil	P57-SS17-E(1.0-1.5)
JC95957-45	10/01/19	14:40	CD	10/01/19	SO	Soil	P57-SS17-W(0.0-0.5)
JC95957-46	10/01/19	14:45	CD	10/01/19	SO	Soil	P57-SS17-W(1.0-1.5)
JC95957-47	10/01/19	14:50	CD	10/01/19	SO	Soil	P57-SS17-B(1.0-1.5)
JC95957-48	10/01/19	14:55	CD	10/01/19	SO	Soil	P57-SS17-BD(1.0-1.5)
JC95957-49	10/01/19	15:05	CD	10/01/19	SO	Soil	P57-SS29-N(0.0-0.5)
JC95957-50	10/01/19	15:10	CD	10/01/19	SO	Soil	P57-SS29-N(1.0-1.5)
JC95957-51	10/01/19	15:15	CD	10/01/19	SO	Soil	P57-SS29-S(0.0-0.5)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Sample Summary
(continued)

AECOM, INC.

Job No: JC95957

Fort Monmouth, NJ
Project No: 60587637

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC95957-52	10/01/19	15:20	CD	10/01/19	SO	Soil	P57-SS29-S(1.0-1.5)
JC95957-53	10/01/19	15:25	CD	10/01/19	SO	Soil	P57-SS29-E(0.0-0.5)
JC95957-54	10/01/19	15:30	CD	10/01/19	SO	Soil	P57-SS29-E(1.0-1.5)
JC95957-55	10/01/19	15:35	CD	10/01/19	SO	Soil	P57-SS29-W(0.0-0.5)
JC95957-56	10/01/19	15:40	CD	10/01/19	SO	Soil	P57-SS29-W(1.0-1.5)
JC95957-57	10/01/19	15:45	CD	10/01/19	SO	Soil	P57-SS29-B(1.0-1.5)
JC95957-58	10/01/19	15:55	CD	10/01/19	AQ	Field Blank Soil	2019-10-01-P57-FB

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: AECOM, INC. **Job No** JC95957

Site: Fort Monmouth, NJ **Report Date** 10/10/2019 9:26:11 A

On 10/01/2019, 57 Sample(s), 0 Trip Blank(s) and 1 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 3.3 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC95957 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

MS Semi-volatiles By Method SW846 8270D

Matrix: AQ **Batch ID:** OP23096

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

Matrix: SO **Batch ID:** OP23086

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC95957-1MS, JC95957-1MSD were used as the QC samples indicated.
- Matrix Spike Recovery(s) for Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene are outside control limits.Outside control limits due to matrix interference.
- Matrix Spike Duplicate Recovery(s) for Benzo(b)fluoranthene, Chrysene are outside control limits.Outside control limits due to matrix interference.
- Matrix Spike/Matrix Spike Duplicate Recovery(s) for Benzo(a)anthracene, Fluoranthene, Pyrene, Phenanthrene, are outside control limits. Outside control limits due to high level in sample relative to spike amount.

Matrix: SO **Batch ID:** OP23087

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC95957-12MS, JC95957-12MSD were used as the QC samples indicated.
- JC95957-12 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high, sample was ND.
- JC95957-29 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-29 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-19 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high, sample was ND.
- JC95957-22 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-12 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-14 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-13 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-13 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high, sample was ND.
- JC95957-30 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-15 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high, sample was ND.
- JC95957-16 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-14 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high, sample was ND.
- JC95957-19 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-16 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high, sample was ND.

MS Semi-volatiles By Method SW846 8270D

Matrix: SO **Batch ID:** OP23087

- JC95957-18 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-15 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-26 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-24 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-22 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-20 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-20 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-28 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-28 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-27 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-27 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-17 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-31 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-30 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high, sample was ND.
- JC95957-31 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high, sample was ND.
- JC95957-26 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-25 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-25 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-23 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-23 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-21 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.
- JC95957-21 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-17 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high.
- JC95957-18 for Dibenzo(a,h)anthracene: Associated CCV outside of control limits high, sample was ND.
- JC95957-24 for Indeno(1,2,3-cd)pyrene: Associated CCV outside of control limits high.

Matrix: SO **Batch ID:** OP23088

- All samples were extracted within the recommended method holding time.
- Sample(s) JC95957-32MS, JC95957-32MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- JC95957-36 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-49 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-33 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-41 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-47 for Benzo(b)fluoranthene: Associated CCV outside of control limits high.
- JC95957-48 for Benzo(b)fluoranthene: Associated CCV outside of control limits high.
- JC95957-43 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-34 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-51 for Benzo(b)fluoranthene: Associated CCV outside of control limits high.
- JC95957-46 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-45 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-35 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.

MS Semi-volatiles By Method SW846 8270D

Matrix: SO **Batch ID:** OP23088

- JC95957-32 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-44 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-40 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-39 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-38 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-37 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-42 for Benzo(b)fluoranthene: Associated CCV outside of control limits high, sample was ND.
- JC95957-50 for Benzo(b)fluoranthene: Associated CCV outside of control limits high.

Matrix: SO **Batch ID:** OP23089

- All samples were extracted within the recommended method holding time.
- Sample(s) JC95812-10MS, JC95812-10MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- Matrix Spike Recovery(s) for Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Chrysene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene are outside control limits. Outside control limits due to high level in sample relative to spike amount.
- OP23089-MSD for Nitrobenzene-d5: Outside control limits due to matrix interference.
- Matrix Spike Duplicate Recovery(s) for Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Fluorene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene are outside control limits.Outside control limits due to high level in sample relative to spike amount.

General Chemistry By Method SM2540 G 18TH ED MOD

Matrix: SO **Batch ID:** GN746

- Sample(s) JC95957-1DUP were used as the QC samples for Solids, Percent.

Matrix: SO **Batch ID:** GN756

- Sample(s) JC95957-14DUP were used as the QC samples for Solids, Percent.

Matrix: SO **Batch ID:** GN758

- Sample(s) JC95957-34DUP were used as the QC samples for Solids, Percent.

Matrix: SO **Batch ID:** GN762

- Sample(s) JC95678-1DUP were used as the QC samples for Solids, Percent.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95957-1	**P57-SS18-N(0.0-0.5)**					
Acenaphthene		489	38	13	ug/kg	SW846 8270D
Acenaphthylene		97.1	38	19	ug/kg	SW846 8270D
Anthracene		1280	38	23	ug/kg	SW846 8270D
Benzo(a)anthracene		3680	190	53	ug/kg	SW846 8270D
Benzo(a)pyrene		3160	38	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		3680	38	17	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		1690	38	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		1290	38	18	ug/kg	SW846 8270D
Chrysene		3140	190	59	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		433	38	17	ug/kg	SW846 8270D
Fluoranthene		7710	190	84	ug/kg	SW846 8270D
Fluorene		402	38	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		1910	38	18	ug/kg	SW846 8270D
Naphthalene		76.1	38	11	ug/kg	SW846 8270D
Phenanthrene		3950	190	63	ug/kg	SW846 8270D
Pyrene		7680	190	60	ug/kg	SW846 8270D
JC95957-2	**P57-SS18-N(1.1-1.5)**					
Acenaphthylene		31.8 J	35	18	ug/kg	SW846 8270D
Anthracene		28.8 J	35	22	ug/kg	SW846 8270D
Benzo(a)anthracene		79.7	35	10	ug/kg	SW846 8270D
Benzo(a)pyrene		95.8	35	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		106	35	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		75.0	35	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		34.8 J	35	17	ug/kg	SW846 8270D
Chrysene		83.0	35	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		18.5 J	35	16	ug/kg	SW846 8270D
Fluoranthene		124	35	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		64.0	35	17	ug/kg	SW846 8270D
Phenanthrene		51.0	35	12	ug/kg	SW846 8270D
Pyrene		146	35	11	ug/kg	SW846 8270D
JC95957-3	**P57-SS18-S(0.0-0.5)**					
Acenaphthene		238	38	13	ug/kg	SW846 8270D
Acenaphthylene		69.9	38	19	ug/kg	SW846 8270D
Anthracene		976	38	23	ug/kg	SW846 8270D
Benzo(a)anthracene		4650	190	54	ug/kg	SW846 8270D
Benzo(a)pyrene		4260	190	86	ug/kg	SW846 8270D
Benzo(b)fluoranthene		4850	190	84	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		2670	38	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		1750	190	89	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Chrysene		4040	190	60	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		653	38	17	ug/kg	SW846 8270D
Fluoranthene		8840	190	85	ug/kg	SW846 8270D
Fluorene		172	38	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		2940	38	18	ug/kg	SW846 8270D
Naphthalene		17.1 J	38	11	ug/kg	SW846 8270D
Phenanthrene		2670	38	13	ug/kg	SW846 8270D
Pyrene		8620	190	61	ug/kg	SW846 8270D
JC95957-4	**P57-SS18-S(1.1-1.5)**					
Benzo(a)anthracene		26.2 J	38	11	ug/kg	SW846 8270D
Benzo(a)pyrene		23.5 J	38	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		28.9 J	38	17	ug/kg	SW846 8270D
Chrysene		23.6 J	38	12	ug/kg	SW846 8270D
Fluoranthene		43.7	38	17	ug/kg	SW846 8270D
Phenanthrene		15.4 J	38	13	ug/kg	SW846 8270D
Pyrene		42.2	38	12	ug/kg	SW846 8270D
JC95957-5	**P57-SS18-E(0.0-0.5)**					
Acenaphthene		34.7 J	38	13	ug/kg	SW846 8270D
Acenaphthylene		24.7 J	38	19	ug/kg	SW846 8270D
Anthracene		133	38	23	ug/kg	SW846 8270D
Benzo(a)anthracene		432	38	11	ug/kg	SW846 8270D
Benzo(a)pyrene		391	38	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		468	38	17	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		234	38	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		151	38	18	ug/kg	SW846 8270D
Chrysene		381	38	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		64.6	38	17	ug/kg	SW846 8270D
Fluoranthene		882	38	17	ug/kg	SW846 8270D
Fluorene		33.1 J	38	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		255	38	18	ug/kg	SW846 8270D
Phenanthrene		368	38	13	ug/kg	SW846 8270D
Pyrene		878	38	12	ug/kg	SW846 8270D
JC95957-6	**P57-SS18-E(1.1-1.5)**					
Benzo(a)anthracene		24.5 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		20.2 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		25.7 J	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		18.2 J	36	18	ug/kg	SW846 8270D
Chrysene		22.7 J	36	11	ug/kg	SW846 8270D
Fluoranthene		69.4	36	16	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Indeno(1,2,3-cd)pyrene		18.1 J	36	17	ug/kg	SW846 8270D
Phenanthrene		29.7 J	36	12	ug/kg	SW846 8270D
Pyrene		66.9	36	12	ug/kg	SW846 8270D
JC95957-7	**P57-SS18-W(0.0-0.5)**					
Acenaphthene		275	38	13	ug/kg	SW846 8270D
Acenaphthylene		35.4 J	38	19	ug/kg	SW846 8270D
Anthracene		855	38	23	ug/kg	SW846 8270D
Benzo(a)anthracene		2530	38	11	ug/kg	SW846 8270D
Benzo(a)pyrene		2400	38	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		2610	38	17	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		1390	38	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		944	38	18	ug/kg	SW846 8270D
Chrysene		2160	38	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		331	38	17	ug/kg	SW846 8270D
Fluoranthene		5240	190	85	ug/kg	SW846 8270D
Fluorene		290	38	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		1480	38	18	ug/kg	SW846 8270D
Naphthalene		19.8 J	38	11	ug/kg	SW846 8270D
Phenanthrene		2660	38	13	ug/kg	SW846 8270D
Pyrene		4630	190	61	ug/kg	SW846 8270D
JC95957-8	**P57-SS18-W(1.0-1.5)**					
Benzo(a)anthracene		23.4 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		19.0 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		23.8 J	36	16	ug/kg	SW846 8270D
Chrysene		18.0 J	36	11	ug/kg	SW846 8270D
Fluoranthene		44.6	36	16	ug/kg	SW846 8270D
Phenanthrene		38.9	36	12	ug/kg	SW846 8270D
Pyrene		39.6	36	11	ug/kg	SW846 8270D
JC95957-9	**P57-SS18-B(1.0-1.5)**					
Acenaphthylene		73.6	36	18	ug/kg	SW846 8270D
Anthracene		41.6	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		73.9	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		118	36	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		110	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		105	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		40.0	36	17	ug/kg	SW846 8270D
Chrysene		94.3	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		29.2 J	36	16	ug/kg	SW846 8270D
Fluoranthene		66.7	36	16	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Indeno(1,2,3-cd)pyrene		92.0	36	17	ug/kg	SW846 8270D
Phenanthrene		27.9 J	36	12	ug/kg	SW846 8270D
Pyrene		121	36	12	ug/kg	SW846 8270D
JC95957-10	**P57-SS16-N(0.0-0.5)**					
Benzo(a)anthracene		107	37	11	ug/kg	SW846 8270D
Benzo(a)pyrene		114	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		131	37	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		70.5	37	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		47.2	37	17	ug/kg	SW846 8270D
Chrysene		104	37	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		18.7 J	37	16	ug/kg	SW846 8270D
Fluoranthene		196	37	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		75.8	37	17	ug/kg	SW846 8270D
Phenanthrene		41.5	37	12	ug/kg	SW846 8270D
Pyrene		193	37	12	ug/kg	SW846 8270D
JC95957-11	**P57-SS16-N(2.5-3.0)**					
Benzo(a)anthracene		13.9 J	36	10	ug/kg	SW846 8270D
Chrysene		14.1 J	36	11	ug/kg	SW846 8270D
Fluoranthene		21.6 J	36	16	ug/kg	SW846 8270D
Pyrene		24.0 J	36	12	ug/kg	SW846 8270D
JC95957-12	**P57-SS16-S(0.0-0.5)**					
Pyrene		12.5 J	36	12	ug/kg	SW846 8270D
JC95957-13	**P57-SS16-S(2.5-3.0)**					
No hits reported in this sample.						
JC95957-14	**P57-SS16-E(0.0-0.5)**					
Benzo(a)anthracene		21.6 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		21.4 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		28.3 J	36	16	ug/kg	SW846 8270D
Chrysene		21.6 J	36	11	ug/kg	SW846 8270D
Fluoranthene		32.3 J	36	16	ug/kg	SW846 8270D
Phenanthrene		13.7 J	36	12	ug/kg	SW846 8270D
Pyrene		29.2 J	36	11	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95957-15	**P57-SS16-E(2.5-3.0)**					
Benzo(a)anthracene		15.4 J	37	10	ug/kg	SW846 8270D
Chrysene		16.3 J	37	12	ug/kg	SW846 8270D
Fluoranthene		21.5 J	37	16	ug/kg	SW846 8270D
Phenanthrene		19.7 J	37	12	ug/kg	SW846 8270D
Pyrene		24.1 J	37	12	ug/kg	SW846 8270D
JC95957-16	**P57-SS16-ED(2.5-3.0)**					
No hits reported in this sample.						
JC95957-17	**P57-SS16-W(0.0-0.5)**					
Acenaphthene		23.5 J	37	13	ug/kg	SW846 8270D
Anthracene		38.2	37	22	ug/kg	SW846 8270D
Benzo(a)anthracene		172	37	10	ug/kg	SW846 8270D
Benzo(a)pyrene		184	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		237	37	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		126	37	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		83.6	37	17	ug/kg	SW846 8270D
Chrysene		193	37	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		30.7 J	37	16	ug/kg	SW846 8270D
Fluoranthene		345	37	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		144	37	17	ug/kg	SW846 8270D
Phenanthrene		121	37	12	ug/kg	SW846 8270D
Pyrene		331	37	12	ug/kg	SW846 8270D
JC95957-18	**P57-SS16-W(2.5-3.0)**					
Benzo(a)anthracene		34.6 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		29.9 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		35.2 J	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		19.3 J	36	18	ug/kg	SW846 8270D
Chrysene		33.8 J	36	11	ug/kg	SW846 8270D
Fluoranthene		71.2	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		21.9 J	36	17	ug/kg	SW846 8270D
Phenanthrene		61.3	36	12	ug/kg	SW846 8270D
Pyrene		52.8	36	11	ug/kg	SW846 8270D
JC95957-19	**P57-SS16-B(2.5-3.0)**					
No hits reported in this sample.						

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95957-20	**P57-SS14-N(0.0-0.5)**					
Acenaphthene		18.4 J	38	13	ug/kg	SW846 8270D
Acenaphthylene		49.9	38	19	ug/kg	SW846 8270D
Anthracene		81.6	38	23	ug/kg	SW846 8270D
Benzo(a)anthracene		544	38	11	ug/kg	SW846 8270D
Benzo(a)pyrene		604	38	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		732	38	17	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		448	38	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		271	38	18	ug/kg	SW846 8270D
Chrysene		548	38	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		107	38	17	ug/kg	SW846 8270D
Fluoranthene		736	38	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		493	38	18	ug/kg	SW846 8270D
Phenanthrene		215	38	13	ug/kg	SW846 8270D
Pyrene		920	38	12	ug/kg	SW846 8270D
JC95957-21	**P57-SS14-N(1.0-1.5)**					
Benzo(a)anthracene		63.4	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		67.6	36	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		83.0	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		49.9	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		30.6 J	36	17	ug/kg	SW846 8270D
Chrysene		69.2	36	11	ug/kg	SW846 8270D
Fluoranthene		107	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		52.5	36	17	ug/kg	SW846 8270D
Phenanthrene		55.5	36	12	ug/kg	SW846 8270D
Pyrene		102	36	12	ug/kg	SW846 8270D
JC95957-22	**P57-SS14-S(0.0-0.5)**					
Acenaphthene		524	39	13	ug/kg	SW846 8270D
Acenaphthylene		86.8	39	20	ug/kg	SW846 8270D
Anthracene		1500	39	24	ug/kg	SW846 8270D
Benzo(a)anthracene		4600	190	55	ug/kg	SW846 8270D
Benzo(a)pyrene		4050	190	88	ug/kg	SW846 8270D
Benzo(b)fluoranthene		5040	190	85	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		2610	39	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		1790	190	90	ug/kg	SW846 8270D
Chrysene		4090	190	61	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		709	39	17	ug/kg	SW846 8270D
Fluoranthene		8230	190	86	ug/kg	SW846 8270D
Fluorene		559	39	18	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		3080	39	18	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
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Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Naphthalene		34.8 J	39	11	ug/kg	SW846 8270D
Phenanthrene		4900	190	65	ug/kg	SW846 8270D
Pyrene		8870	190	62	ug/kg	SW846 8270D
JC95957-23	**P57-SS14-S(1.0-1.5)**					
Anthracene		41.1	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		239	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		242	36	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		285	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		148	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		111	36	17	ug/kg	SW846 8270D
Chrysene		230	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		32.6 J	36	16	ug/kg	SW846 8270D
Fluoranthene		345	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		171	36	17	ug/kg	SW846 8270D
Phenanthrene		138	36	12	ug/kg	SW846 8270D
Pyrene		352	36	12	ug/kg	SW846 8270D
JC95957-24	**P57-SS14-E(0.0-0.5)**					
Acenaphthene		138	37	13	ug/kg	SW846 8270D
Acenaphthylene		189	37	19	ug/kg	SW846 8270D
Anthracene		659	37	23	ug/kg	SW846 8270D
Benzo(a)anthracene		1270	37	10	ug/kg	SW846 8270D
Benzo(a)pyrene		1060	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		1260	37	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		583	37	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		484	37	17	ug/kg	SW846 8270D
Chrysene		1120	37	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		155	37	16	ug/kg	SW846 8270D
Fluoranthene		2490	37	16	ug/kg	SW846 8270D
Fluorene		285	37	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		712	37	17	ug/kg	SW846 8270D
Naphthalene		33.6 J	37	10	ug/kg	SW846 8270D
Phenanthrene		2150	37	12	ug/kg	SW846 8270D
Pyrene		2390	37	12	ug/kg	SW846 8270D
JC95957-25	**P57-SS14-E(1.0-1.5)**					
Acenaphthene		31.5 J	36	13	ug/kg	SW846 8270D
Anthracene		101	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		157	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		143	36	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		166	36	16	ug/kg	SW846 8270D

Summary of Hits

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Account: AECOM, INC.
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Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Benzo(g,h,i)perylene		92.8	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		64.3	36	17	ug/kg	SW846 8270D
Chrysene		184	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		25.4 J	36	16	ug/kg	SW846 8270D
Fluoranthene		427	36	16	ug/kg	SW846 8270D
Fluorene		39.1	36	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		103	36	17	ug/kg	SW846 8270D
Phenanthrene		394	36	12	ug/kg	SW846 8270D
Pyrene		369	36	12	ug/kg	SW846 8270D
JC95957-26	**P57-SS14-W(0.0-0.5)**					
Acenaphthene		14.4 J	36	12	ug/kg	SW846 8270D
Acenaphthylene		48.6	36	18	ug/kg	SW846 8270D
Anthracene		53.3	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		403	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		391	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		497	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		250	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		180	36	17	ug/kg	SW846 8270D
Chrysene		421	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		62.8	36	16	ug/kg	SW846 8270D
Fluoranthene		572	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		293	36	17	ug/kg	SW846 8270D
Phenanthrene		119	36	12	ug/kg	SW846 8270D
Pyrene		703	36	11	ug/kg	SW846 8270D
JC95957-27	**P57-SS14-W(1.0-1.5)**					
Acenaphthene		410	35	12	ug/kg	SW846 8270D
Acenaphthylene		136	35	18	ug/kg	SW846 8270D
Anthracene		853	35	22	ug/kg	SW846 8270D
Benzo(a)anthracene		1650	35	10	ug/kg	SW846 8270D
Benzo(a)pyrene		1470	35	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		1770	35	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		913	35	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		607	35	17	ug/kg	SW846 8270D
Chrysene		1570	35	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		231	35	16	ug/kg	SW846 8270D
Fluoranthene		3160	35	16	ug/kg	SW846 8270D
Fluorene		374	35	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		1060	35	17	ug/kg	SW846 8270D
Naphthalene		118	35	10	ug/kg	SW846 8270D
Phenanthrene		3010	35	12	ug/kg	SW846 8270D
Pyrene		3050	35	11	ug/kg	SW846 8270D

Summary of Hits

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Account: AECOM, INC.
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Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95957-28	**P57-SS14-B(1.0-1.5)**					
Acenaphthene		277	39	13	ug/kg	SW846 8270D
Acenaphthylene		137	39	20	ug/kg	SW846 8270D
Anthracene		647	39	24	ug/kg	SW846 8270D
Benzo(a)anthracene		1210	39	11	ug/kg	SW846 8270D
Benzo(a)pyrene		1090	39	18	ug/kg	SW846 8270D
Benzo(b)fluoranthene		1290	39	17	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		661	39	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		451	39	18	ug/kg	SW846 8270D
Chrysene		1160	39	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene [a]		164	39	17	ug/kg	SW846 8270D
Fluoranthene		2420	39	17	ug/kg	SW846 8270D
Fluorene		313	39	18	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		783	39	18	ug/kg	SW846 8270D
Naphthalene		73.9	39	11	ug/kg	SW846 8270D
Phenanthrene		2420	39	13	ug/kg	SW846 8270D
Pyrene		2330	39	12	ug/kg	SW846 8270D
JC95957-29	**P57-SS21-N(0.0-0.5)**					
Anthracene		24.0 J	35	21	ug/kg	SW846 8270D
Benzo(a)anthracene		54.2	35	9.8	ug/kg	SW846 8270D
Benzo(a)pyrene		57.4	35	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		61.4	35	15	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		41.1	35	17	ug/kg	SW846 8270D
Benzo(k)fluoranthene		25.7 J	35	16	ug/kg	SW846 8270D
Chrysene		57.5	35	11	ug/kg	SW846 8270D
Fluoranthene		125	35	15	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene [a]		41.9	35	16	ug/kg	SW846 8270D
Phenanthrene		107	35	12	ug/kg	SW846 8270D
Pyrene		105	35	11	ug/kg	SW846 8270D
JC95957-30	**P57-SS21-N(1.0-1.5)**					
Benzo(a)anthracene		12.2 J	37	10	ug/kg	SW846 8270D
Phenanthrene		22.3 J	37	12	ug/kg	SW846 8270D
Pyrene		13.8 J	37	12	ug/kg	SW846 8270D
JC95957-31	**P57-SS21-S(0.0-0.5)**					

No hits reported in this sample.

Summary of Hits

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Account: AECOM, INC.
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Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95957-32	**P57-SS21-S(1.0-1.5)**					
Phenanthrene		12.7 J	36	12	ug/kg	SW846 8270D
JC95957-33	**P57-SS21-E(0.0-0.5)**					
No hits reported in this sample.						
JC95957-34	**P57-SS21-E(1.0-1.5)**					
No hits reported in this sample.						
JC95957-35	**P57-SS21-W(0.0-0.5)**					
No hits reported in this sample.						
JC95957-36	**P57-SS21-W(1.0-1.5)**					
No hits reported in this sample.						
JC95957-37	**P57-SS21-B(1.0-1.5)**					
Benzo(a)anthracene		10.6 J	36	10	ug/kg	SW846 8270D
Fluoranthene		19.5 J	36	16	ug/kg	SW846 8270D
Phenanthrene		32.1 J	36	12	ug/kg	SW846 8270D
Pyrene		17.9 J	36	11	ug/kg	SW846 8270D
JC95957-38	**P57-SS21-BD(1.0-1.5)**					
No hits reported in this sample.						
JC95957-39	**P57-SS17-N(0.0-0.5)**					
No hits reported in this sample.						
JC95957-40	**P57-SS17-N(1.0-1.5)**					
No hits reported in this sample.						
JC95957-41	**P57-SS17-S(0.0-0.5)**					
No hits reported in this sample.						

Summary of Hits

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Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95957-42	**P57-SS17-S(1.0-1.5)**					
No hits reported in this sample.						
JC95957-43	**P57-SS17-E(0.0-0.5)**					
Indeno(1,2,3-cd)pyrene		26.5 J	33	16	ug/kg	SW846 8270D
JC95957-44	**P57-SS17-E(1.0-1.5)**					
No hits reported in this sample.						
JC95957-45	**P57-SS17-W(0.0-0.5)**					
Benzo(a)anthracene		18.6 J	34	9.7	ug/kg	SW846 8270D
Chrysene		17.1 J	34	11	ug/kg	SW846 8270D
Fluoranthene		18.4 J	34	15	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		20.7 J	34	16	ug/kg	SW846 8270D
Phenanthrene		40.6	34	12	ug/kg	SW846 8270D
Pyrene		34.5	34	11	ug/kg	SW846 8270D
JC95957-46	**P57-SS17-W(1.0-1.5)**					
Phenanthrene		14.0 J	36	12	ug/kg	SW846 8270D
JC95957-47	**P57-SS17-B(1.0-1.5)**					
Acenaphthylene		92.0	36	18	ug/kg	SW846 8270D
Anthracene		60.0	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		119	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		180	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene [a]		186	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		139	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		57.6	36	17	ug/kg	SW846 8270D
Chrysene		141	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		32.4 J	36	16	ug/kg	SW846 8270D
Fluoranthene		148	36	16	ug/kg	SW846 8270D
Fluorene		28.8 J	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		142	36	17	ug/kg	SW846 8270D
Phenanthrene		118	36	12	ug/kg	SW846 8270D
Pyrene		216	36	11	ug/kg	SW846 8270D
JC95957-48	**P57-SS17-BD(1.0-1.5)**					
Acenaphthylene		32.4 J	35	18	ug/kg	SW846 8270D

Summary of Hits

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Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Benzo(a)anthracene		30.2 J	35	10	ug/kg	SW846 8270D
Benzo(a)pyrene		47.2	35	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene [a]		45.4	35	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		39.2	35	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		16.5 J	35	16	ug/kg	SW846 8270D
Chrysene		35.2	35	11	ug/kg	SW846 8270D
Fluoranthene		17.1 J	35	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		49.6	35	17	ug/kg	SW846 8270D
Phenanthrene		17.0 J	35	12	ug/kg	SW846 8270D
Pyrene		40.4	35	11	ug/kg	SW846 8270D
JC95957-49	**P57-SS29-N(0.0-0.5)**					
No hits reported in this sample.						
JC95957-50	**P57-SS29-N(1.0-1.5)**					
Benzo(a)anthracene		24.0 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		23.4 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene [a]		23.6 J	36	16	ug/kg	SW846 8270D
Chrysene		26.9 J	36	11	ug/kg	SW846 8270D
Fluoranthene		19.8 J	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		31.2 J	36	17	ug/kg	SW846 8270D
Phenanthrene		26.9 J	36	12	ug/kg	SW846 8270D
Pyrene		38.4	36	11	ug/kg	SW846 8270D
JC95957-51	**P57-SS29-S(0.0-0.5)**					
Benzo(a)anthracene		26.5 J	33	9.4	ug/kg	SW846 8270D
Benzo(a)pyrene		19.5 J	33	15	ug/kg	SW846 8270D
Benzo(b)fluoranthene [a]		21.5 J	33	15	ug/kg	SW846 8270D
Chrysene		27.4 J	33	10	ug/kg	SW846 8270D
Fluoranthene		27.9 J	33	15	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		27.4 J	33	16	ug/kg	SW846 8270D
Phenanthrene		21.1 J	33	11	ug/kg	SW846 8270D
Pyrene		46.9	33	11	ug/kg	SW846 8270D
JC95957-52	**P57-SS29-S(1.0-1.5)**					
Acenaphthylene		30.0 J	36	18	ug/kg	SW846 8270D
Anthracene		25.2 J	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		68.1	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		53.2	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		57.2	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		31.8 J	36	18	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Benzo(k)fluoranthene		19.3 J	36	17	ug/kg	SW846 8270D
Chrysene		74.6	36	11	ug/kg	SW846 8270D
Fluoranthene		73.9	36	16	ug/kg	SW846 8270D
Fluorene		17.6 J	36	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		47.8	36	17	ug/kg	SW846 8270D
Phenanthrene		110	36	12	ug/kg	SW846 8270D
Pyrene		146	36	12	ug/kg	SW846 8270D
JC95957-53	**P57-SS29-E(0.0-0.5)**					
Acenaphthylene		88.3	34	17	ug/kg	SW846 8270D
Anthracene		42.1	34	21	ug/kg	SW846 8270D
Benzo(a)anthracene		106	34	9.6	ug/kg	SW846 8270D
Benzo(a)pyrene		142	34	15	ug/kg	SW846 8270D
Benzo(b)fluoranthene		151	34	15	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		122	34	17	ug/kg	SW846 8270D
Benzo(k)fluoranthene		50.0	34	16	ug/kg	SW846 8270D
Chrysene		137	34	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		33.6 J	34	15	ug/kg	SW846 8270D
Fluoranthene		53.6	34	15	ug/kg	SW846 8270D
Fluorene		19.5 J	34	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		128	34	16	ug/kg	SW846 8270D
Phenanthrene		48.5	34	11	ug/kg	SW846 8270D
Pyrene		110	34	11	ug/kg	SW846 8270D
JC95957-54	**P57-SS29-E(1.0-1.5)**					
Benzo(a)anthracene		32.0 J	37	10	ug/kg	SW846 8270D
Benzo(a)pyrene		21.7 J	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		19.7 J	37	16	ug/kg	SW846 8270D
Chrysene		33.5 J	37	12	ug/kg	SW846 8270D
Fluoranthene		37.3	37	16	ug/kg	SW846 8270D
Fluorene		17.5 J	37	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		28.4 J	37	17	ug/kg	SW846 8270D
Phenanthrene		84.1	37	12	ug/kg	SW846 8270D
Pyrene		67.1	37	12	ug/kg	SW846 8270D
JC95957-55	**P57-SS29-W(0.0-0.5)**					
Benzo(a)anthracene		16.4 J	35	9.8	ug/kg	SW846 8270D
Chrysene		17.3 J	35	11	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		24.2 J	35	16	ug/kg	SW846 8270D
Phenanthrene		13.8 J	35	12	ug/kg	SW846 8270D
Pyrene		23.5 J	35	11	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC95957
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/01/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC95957-56	**P57-SS29-W(1.0-1.5)**					
Benzo(a)anthracene		19.5 J	37	10	ug/kg	SW846 8270D
Chrysene		13.3 J	37	12	ug/kg	SW846 8270D
Fluoranthene		31.0 J	37	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		23.8 J	37	17	ug/kg	SW846 8270D
Naphthalene		14.4 J	37	10	ug/kg	SW846 8270D
Phenanthrene		29.0 J	37	12	ug/kg	SW846 8270D
Pyrene		26.2 J	37	12	ug/kg	SW846 8270D
JC95957-57	**P57-SS29-B(1.0-1.5)**					
Benzo(a)anthracene		16.3 J	35	9.9	ug/kg	SW846 8270D
Chrysene		16.9 J	35	11	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		24.2 J	35	16	ug/kg	SW846 8270D
Phenanthrene		14.0 J	35	12	ug/kg	SW846 8270D
Pyrene		25.1 J	35	11	ug/kg	SW846 8270D
JC95957-58	**2019-10-01-P57-FB**					

No hits reported in this sample.

(a) Associated CCV outside of control limits high.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	P57-SS18-N(0.0-0.5)		
Lab Sample ID:	JC95957-1	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	86.3
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187599.D	1	10/04/19 01:01	AR	10/03/19 05:15	OP23086	EF8082
Run #2	F187613.D	5	10/04/19 10:30	CS	10/03/19 05:15	OP23086	EF8083

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2	30.9 g	1.0 ml

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	489	38	13	ug/kg	
208-96-8	Acenaphthylene	97.1	38	19	ug/kg	
120-12-7	Anthracene	1280	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	3680 [a]	190	53	ug/kg	
50-32-8	Benzo(a)pyrene	3160	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	3680	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	1690	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	1290	38	18	ug/kg	
218-01-9	Chrysene	3140 [a]	190	59	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	433	38	17	ug/kg	
206-44-0	Fluoranthene	7710 [a]	190	84	ug/kg	
86-73-7	Fluorene	402	38	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	1910	38	18	ug/kg	
91-20-3	Naphthalene	76.1	38	11	ug/kg	
85-01-8	Phenanthrene	3950 [a]	190	63	ug/kg	
129-00-0	Pyrene	7680 [a]	190	60	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	61%	59%	26-134%
321-60-8	2-Fluorobiphenyl	59%	56%	39-124%
1718-51-0	Terphenyl-d14	55%	57%	36-134%

(a) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-N(1.1-1.5)
Lab Sample ID: JC95957-2
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 91.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187607.D	1	10/04/19 06:02	CS	10/03/19 05:15	OP23086	EF8083
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	31.8	35	18	ug/kg	J
120-12-7	Anthracene	28.8	35	22	ug/kg	J
56-55-3	Benzo(a)anthracene	79.7	35	10	ug/kg	
50-32-8	Benzo(a)pyrene	95.8	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	106	35	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	75.0	35	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	34.8	35	17	ug/kg	J
218-01-9	Chrysene	83.0	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	18.5	35	16	ug/kg	J
206-44-0	Fluoranthene	124	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	64.0	35	17	ug/kg	
91-20-3	Naphthalene	ND	35	10	ug/kg	
85-01-8	Phenanthrene	51.0	35	12	ug/kg	
129-00-0	Pyrene	146	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	67%		26-134%
321-60-8	2-Fluorobiphenyl	65%		39-124%
1718-51-0	Terphenyl-d14	71%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-S(0.0-0.5)
Lab Sample ID: JC95957-3
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 86.4

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187612.D	1	10/04/19 10:01	CS	10/03/19 05:15	OP23086	EF8083
Run #2	F187615.D	5	10/04/19 11:28	CS	10/03/19 05:15	OP23086	EF8083

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2	30.5 g	1.0 ml

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	238	38	13	ug/kg	
208-96-8	Acenaphthylene	69.9	38	19	ug/kg	
120-12-7	Anthracene	976	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	4650 [a]	190	54	ug/kg	
50-32-8	Benzo(a)pyrene	4260 [a]	190	86	ug/kg	
205-99-2	Benzo(b)fluoranthene	4850 [a]	190	84	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2670	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	1750 [a]	190	89	ug/kg	
218-01-9	Chrysene	4040 [a]	190	60	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	653	38	17	ug/kg	
206-44-0	Fluoranthene	8840 [a]	190	85	ug/kg	
86-73-7	Fluorene	172	38	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2940	38	18	ug/kg	
91-20-3	Naphthalene	17.1	38	11	ug/kg	J
85-01-8	Phenanthrene	2670	38	13	ug/kg	
129-00-0	Pyrene	8620 [a]	190	61	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%	56%	26-134%
321-60-8	2-Fluorobiphenyl	63%	62%	39-124%
1718-51-0	Terphenyl-d14	64%	60%	36-134%

(a) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-S(1.1-1.5)
Lab Sample ID: JC95957-4
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 88.2

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187602.D	1	10/04/19 03:35	CS	10/03/19 05:15	OP23086	EF8083
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	19	ug/kg	
120-12-7	Anthracene	ND	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	26.2	38	11	ug/kg	J
50-32-8	Benzo(a)pyrene	23.5	38	17	ug/kg	J
205-99-2	Benzo(b)fluoranthene	28.9	38	17	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	23.6	38	12	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
206-44-0	Fluoranthene	43.7	38	17	ug/kg	
86-73-7	Fluorene	ND	38	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	38	18	ug/kg	
91-20-3	Naphthalene	ND	38	11	ug/kg	
85-01-8	Phenanthrene	15.4	38	13	ug/kg	J
129-00-0	Pyrene	42.2	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	62%		26-134%
321-60-8	2-Fluorobiphenyl	57%		39-124%
1718-51-0	Terphenyl-d14	63%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-E(0.0-0.5)
Lab Sample ID: JC95957-5
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 86.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187611.D	1	10/04/19 09:31	CS	10/03/19 05:15	OP23086	EF8083
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	34.7	38	13	ug/kg	J
208-96-8	Acenaphthylene	24.7	38	19	ug/kg	J
120-12-7	Anthracene	133	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	432	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	391	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	468	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	234	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	151	38	18	ug/kg	
218-01-9	Chrysene	381	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	64.6	38	17	ug/kg	
206-44-0	Fluoranthene	882	38	17	ug/kg	
86-73-7	Fluorene	33.1	38	17	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	255	38	18	ug/kg	
91-20-3	Naphthalene	ND	38	11	ug/kg	
85-01-8	Phenanthrene	368	38	13	ug/kg	
129-00-0	Pyrene	878	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	51%		26-134%
321-60-8	2-Fluorobiphenyl	51%		39-124%
1718-51-0	Terphenyl-d14	52%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-E(1.1-1.5)
Lab Sample ID: JC95957-6
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 92.6

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187605.D	1	10/04/19 05:03	CS	10/03/19 05:15	OP23086	EF8083
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	24.5	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	20.2	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	25.7	36	16	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	18.2	36	18	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	22.7	36	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	69.4	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	18.1	36	17	ug/kg	J
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	29.7	36	12	ug/kg	J
129-00-0	Pyrene	66.9	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	61%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	62%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS18-W(0.0-0.5)		
Lab Sample ID:	JC95957-7	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	86.3
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187610.D	1	10/04/19 09:02	CS	10/03/19 05:15	OP23086	EF8083
Run #2	F187614.D	5	10/04/19 10:59	CS	10/03/19 05:15	OP23086	EF8083

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2	30.4 g	1.0 ml

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	275	38	13	ug/kg	
208-96-8	Acenaphthylene	35.4	38	19	ug/kg	J
120-12-7	Anthracene	855	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	2530	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	2400	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	2610	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	1390	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	944	38	18	ug/kg	
218-01-9	Chrysene	2160	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	331	38	17	ug/kg	
206-44-0	Fluoranthene	5240 [a]	190	85	ug/kg	
86-73-7	Fluorene	290	38	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	1480	38	18	ug/kg	
91-20-3	Naphthalene	19.8	38	11	ug/kg	J
85-01-8	Phenanthrene	2660	38	13	ug/kg	
129-00-0	Pyrene	4630 [a]	190	61	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	63%	58%	26-134%
321-60-8	2-Fluorobiphenyl	59%	56%	39-124%
1718-51-0	Terphenyl-d14	59%	57%	36-134%

(a) Result is from Run# 2

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-W(1.0-1.5)
Lab Sample ID: JC95957-8
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 89.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187603.D	1	10/04/19 04:04	CS	10/03/19 05:15	OP23086	EF8083
Run #2							

	Initial Weight	Final Volume
Run #1	31.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	23.4	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	19.0	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	23.8	36	16	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	18.0	36	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	44.6	36	16	ug/kg	
86-73-7	Fluorene	ND	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	38.9	36	12	ug/kg	
129-00-0	Pyrene	39.6	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	68%		26-134%
321-60-8	2-Fluorobiphenyl	62%		39-124%
1718-51-0	Terphenyl-d14	68%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-B(1.0-1.5)
Lab Sample ID: JC95957-9
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 90.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187608A.D	1	10/04/19 08:04	CS	10/03/19 05:15	OP23086	EF8083
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	13	ug/kg	
208-96-8	Acenaphthylene	73.6	36	18	ug/kg	
120-12-7	Anthracene	41.6	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	73.9	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	118	36	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	110	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	105	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	40.0	36	17	ug/kg	
218-01-9	Chrysene	94.3	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	29.2	36	16	ug/kg	J
206-44-0	Fluoranthene	66.7	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	92.0	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	27.9	36	12	ug/kg	J
129-00-0	Pyrene	121	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	61%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS16-N(0.0-0.5)
Lab Sample ID: JC95957-10
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 89.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187606.D	1	10/04/19 05:33	CS	10/03/19 05:15	OP23086	EF8083
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	107	37	11	ug/kg	
50-32-8	Benzo(a)pyrene	114	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	131	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	70.5	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	47.2	37	17	ug/kg	
218-01-9	Chrysene	104	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	18.7	37	16	ug/kg	J
206-44-0	Fluoranthene	196	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	75.8	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	41.5	37	12	ug/kg	
129-00-0	Pyrene	193	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	63%		26-134%
321-60-8	2-Fluorobiphenyl	58%		39-124%
1718-51-0	Terphenyl-d14	68%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS16-N(2.5-3.0)
Lab Sample ID: JC95957-11
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 88.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F187604.D	1	10/04/19 04:34	CS	10/03/19 05:15	OP23086	EF8083
Run #2							

	Initial Weight	Final Volume
Run #1	31.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	13.9	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	14.1	36	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	21.6	36	16	ug/kg	J
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	24.0	36	12	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		26-134%
321-60-8	2-Fluorobiphenyl	60%		39-124%
1718-51-0	Terphenyl-d14	65%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS16-S(0.0-0.5)		
Lab Sample ID:	JC95957-12	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.2
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132084.D	1	10/04/19 01:57	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	13	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	12.5	36	12	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	65%		26-134%
321-60-8	2-Fluorobiphenyl	69%		39-124%
1718-51-0	Terphenyl-d14	63%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS16-S(2.5-3.0)		
Lab Sample ID:	JC95957-13	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.7
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132085.D	1	10/04/19 02:24	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	13	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	ND	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	66%		26-134%
321-60-8	2-Fluorobiphenyl	65%		39-124%
1718-51-0	Terphenyl-d14	60%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS16-E(0.0-0.5)		
Lab Sample ID:	JC95957-14	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.2
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132092.D	1	10/04/19 05:31	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	21.6	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	21.4	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	28.3	36	16	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	21.6	36	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene [a]	ND	36	16	ug/kg	
206-44-0	Fluoranthene	32.3	36	16	ug/kg	J
86-73-7	Fluorene	ND	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	13.7	36	12	ug/kg	J
129-00-0	Pyrene	29.2	36	11	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	67%		26-134%
321-60-8	2-Fluorobiphenyl	67%		39-124%
1718-51-0	Terphenyl-d14	64%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS16-E(2.5-3.0)		
Lab Sample ID:	JC95957-15	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.8
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132086.D	1	10/04/19 02:50	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	22	ug/kg	
56-55-3	Benzo(a)anthracene	15.4	37	10	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	16.3	37	12	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene [a]	ND	37	16	ug/kg	
206-44-0	Fluoranthene	21.5	37	16	ug/kg	J
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	ND	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	19.7	37	12	ug/kg	J
129-00-0	Pyrene	24.1	37	12	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	65%		26-134%
321-60-8	2-Fluorobiphenyl	60%		39-124%
1718-51-0	Terphenyl-d14	60%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS16-ED(2.5-3.0)		
Lab Sample ID:	JC95957-16	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	88.1
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132087.D	1	10/04/19 03:17	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	37	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	ND	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	ND	37	17	ug/kg	
206-44-0	Fluoranthene	ND	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	ND	37	18	ug/kg	
91-20-3	Naphthalene	ND	37	11	ug/kg	
85-01-8	Phenanthrene	ND	37	13	ug/kg	
129-00-0	Pyrene	ND	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	66%		26-134%
321-60-8	2-Fluorobiphenyl	65%		39-124%
1718-51-0	Terphenyl-d14	63%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS16-W(0.0-0.5)		
Lab Sample ID:	JC95957-17	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.3
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132099.D	1	10/04/19 08:38	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	23.5	37	13	ug/kg	J
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	38.2	37	22	ug/kg	
56-55-3	Benzo(a)anthracene	172	37	10	ug/kg	
50-32-8	Benzo(a)pyrene	184	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	237	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	126	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	83.6	37	17	ug/kg	
218-01-9	Chrysene	193	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	30.7	37	16	ug/kg	J
206-44-0	Fluoranthene	345	37	16	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	144	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	121	37	12	ug/kg	
129-00-0	Pyrene	331	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	58%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	63%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS16-W(2.5-3.0)		
Lab Sample ID:	JC95957-18	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.7
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132093.D	1	10/04/19 05:58	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	34.6	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	29.9	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	35.2	36	16	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	19.3	36	18	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	33.8	36	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene [a]	ND	36	16	ug/kg	
206-44-0	Fluoranthene	71.2	36	16	ug/kg	
86-73-7	Fluorene	ND	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [b]	21.9	36	17	ug/kg	J
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	61.3	36	12	ug/kg	
129-00-0	Pyrene	52.8	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	67%		26-134%
321-60-8	2-Fluorobiphenyl	64%		39-124%
1718-51-0	Terphenyl-d14	61%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS16-B(2.5-3.0)		
Lab Sample ID:	JC95957-19	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	86.9
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132088.D	1	10/04/19 03:44	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	19	ug/kg	
120-12-7	Anthracene	ND	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	ND	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	ND	38	17	ug/kg	
206-44-0	Fluoranthene	ND	38	17	ug/kg	
86-73-7	Fluorene	ND	38	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	ND	38	18	ug/kg	
91-20-3	Naphthalene	ND	38	11	ug/kg	
85-01-8	Phenanthrene	ND	38	13	ug/kg	
129-00-0	Pyrene	ND	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	68%		26-134%
321-60-8	2-Fluorobiphenyl	72%		39-124%
1718-51-0	Terphenyl-d14	65%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-N(0.0-0.5)		
Lab Sample ID:	JC95957-20	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	87.4
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132102.D	1	10/04/19 09:59	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	18.4	38	13	ug/kg	J
208-96-8	Acenaphthylene	49.9	38	19	ug/kg	
120-12-7	Anthracene	81.6	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	544	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	604	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	732	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	448	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	271	38	18	ug/kg	
218-01-9	Chrysene	548	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	107	38	17	ug/kg	
206-44-0	Fluoranthene	736	38	17	ug/kg	
86-73-7	Fluorene	ND	38	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	493	38	18	ug/kg	
91-20-3	Naphthalene	ND	38	11	ug/kg	
85-01-8	Phenanthrene	215	38	13	ug/kg	
129-00-0	Pyrene	920	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	59%		26-134%
321-60-8	2-Fluorobiphenyl	60%		39-124%
1718-51-0	Terphenyl-d14	65%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-N(1.0-1.5)
Lab Sample ID: JC95957-21
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 90.9

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132094.D	1	10/04/19 06:25	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	13	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	63.4	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	67.6	36	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	83.0	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	49.9	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	30.6	36	17	ug/kg	J
218-01-9	Chrysene	69.2	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	ND	36	16	ug/kg	
206-44-0	Fluoranthene	107	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [b]	52.5	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	55.5	36	12	ug/kg	
129-00-0	Pyrene	102	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	57%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	56%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-S(0.0-0.5)		
Lab Sample ID:	JC95957-22	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	85.0
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132103.D	1	10/04/19 10:26	CS	10/03/19 05:15	OP23087	EP5990
Run #2	P132104.D	5	10/04/19 10:52	CS	10/03/19 05:15	OP23087	EP5990

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2	30.5 g	1.0 ml

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	524	39	13	ug/kg	
208-96-8	Acenaphthylene	86.8	39	20	ug/kg	
120-12-7	Anthracene	1500	39	24	ug/kg	
56-55-3	Benzo(a)anthracene	4600 [a]	190	55	ug/kg	
50-32-8	Benzo(a)pyrene	4050 [a]	190	88	ug/kg	
205-99-2	Benzo(b)fluoranthene	5040 [a]	190	85	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2610	39	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	1790 [a]	190	90	ug/kg	
218-01-9	Chrysene	4090 [a]	190	61	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [b]	709	39	17	ug/kg	
206-44-0	Fluoranthene	8230 [a]	190	86	ug/kg	
86-73-7	Fluorene	559	39	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [b]	3080	39	18	ug/kg	
91-20-3	Naphthalene	34.8	39	11	ug/kg	J
85-01-8	Phenanthrene	4900 [a]	190	65	ug/kg	
129-00-0	Pyrene	8870 [a]	190	62	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	50%	45%	26-134%
321-60-8	2-Fluorobiphenyl	58%	53%	39-124%
1718-51-0	Terphenyl-d14	61%	55%	36-134%

(a) Result is from Run# 2
(b) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-S(1.0-1.5)		
Lab Sample ID:	JC95957-23	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.9
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132095.D	1	10/04/19 06:51	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	13	ug/kg	
208-96-8	Acenaphthylene	ND	36	19	ug/kg	
120-12-7	Anthracene	41.1	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	239	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	242	36	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	285	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	148	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	111	36	17	ug/kg	
218-01-9	Chrysene	230	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	32.6	36	16	ug/kg	J
206-44-0	Fluoranthene	345	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	171	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	138	36	12	ug/kg	
129-00-0	Pyrene	352	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	61%		26-134%
321-60-8	2-Fluorobiphenyl	62%		39-124%
1718-51-0	Terphenyl-d14	51%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-E(0.0-0.5)		
Lab Sample ID:	JC95957-24	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.7
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132098.D	1	10/04/19 08:11	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	138	37	13	ug/kg	
208-96-8	Acenaphthylene	189	37	19	ug/kg	
120-12-7	Anthracene	659	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	1270	37	10	ug/kg	
50-32-8	Benzo(a)pyrene	1060	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	1260	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	583	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	484	37	17	ug/kg	
218-01-9	Chrysene	1120	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	155	37	16	ug/kg	
206-44-0	Fluoranthene	2490	37	16	ug/kg	
86-73-7	Fluorene	285	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	712	37	17	ug/kg	
91-20-3	Naphthalene	33.6	37	10	ug/kg	J
85-01-8	Phenanthrene	2150	37	12	ug/kg	
129-00-0	Pyrene	2390	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	52%		26-134%
321-60-8	2-Fluorobiphenyl	58%		39-124%
1718-51-0	Terphenyl-d14	64%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-E(1.0-1.5)		
Lab Sample ID:	JC95957-25	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.5
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132096.D	1	10/04/19 07:18	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	31.5	36	13	ug/kg	J
208-96-8	Acenaphthylene	ND	36	19	ug/kg	
120-12-7	Anthracene	101	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	157	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	143	36	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	166	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	92.8	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	64.3	36	17	ug/kg	
218-01-9	Chrysene	184	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	25.4	36	16	ug/kg	J
206-44-0	Fluoranthene	427	36	16	ug/kg	
86-73-7	Fluorene	39.1	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	103	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	394	36	12	ug/kg	
129-00-0	Pyrene	369	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	54%		26-134%
321-60-8	2-Fluorobiphenyl	61%		39-124%
1718-51-0	Terphenyl-d14	62%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-W(0.0-0.5)		
Lab Sample ID:	JC95957-26	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.1
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132097.D	1	10/04/19 07:44	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	31.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	14.4	36	12	ug/kg	J
208-96-8	Acenaphthylene	48.6	36	18	ug/kg	
120-12-7	Anthracene	53.3	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	403	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	391	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	497	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	250	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	180	36	17	ug/kg	
218-01-9	Chrysene	421	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	62.8	36	16	ug/kg	
206-44-0	Fluoranthene	572	36	16	ug/kg	
86-73-7	Fluorene	ND	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	293	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	119	36	12	ug/kg	
129-00-0	Pyrene	703	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	57%		26-134%
321-60-8	2-Fluorobiphenyl	58%		39-124%
1718-51-0	Terphenyl-d14	59%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-W(1.0-1.5)		
Lab Sample ID:	JC95957-27	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	88.7
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132100.D	1	10/04/19 09:05	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	31.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	410	35	12	ug/kg	
208-96-8	Acenaphthylene	136	35	18	ug/kg	
120-12-7	Anthracene	853	35	22	ug/kg	
56-55-3	Benzo(a)anthracene	1650	35	10	ug/kg	
50-32-8	Benzo(a)pyrene	1470	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	1770	35	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	913	35	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	607	35	17	ug/kg	
218-01-9	Chrysene	1570	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	231	35	16	ug/kg	
206-44-0	Fluoranthene	3160	35	16	ug/kg	
86-73-7	Fluorene	374	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	1060	35	17	ug/kg	
91-20-3	Naphthalene	118	35	10	ug/kg	
85-01-8	Phenanthrene	3010	35	12	ug/kg	
129-00-0	Pyrene	3050	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	57%		26-134%
321-60-8	2-Fluorobiphenyl	62%		39-124%
1718-51-0	Terphenyl-d14	67%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-B(1.0-1.5)		
Lab Sample ID:	JC95957-28	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	85.5
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132101.D	1	10/04/19 09:32	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	277	39	13	ug/kg	
208-96-8	Acenaphthylene	137	39	20	ug/kg	
120-12-7	Anthracene	647	39	24	ug/kg	
56-55-3	Benzo(a)anthracene	1210	39	11	ug/kg	
50-32-8	Benzo(a)pyrene	1090	39	18	ug/kg	
205-99-2	Benzo(b)fluoranthene	1290	39	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	661	39	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	451	39	18	ug/kg	
218-01-9	Chrysene	1160	39	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	164	39	17	ug/kg	
206-44-0	Fluoranthene	2420	39	17	ug/kg	
86-73-7	Fluorene	313	39	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	783	39	18	ug/kg	
91-20-3	Naphthalene	73.9	39	11	ug/kg	
85-01-8	Phenanthrene	2420	39	13	ug/kg	
129-00-0	Pyrene	2330	39	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	60%		26-134%
321-60-8	2-Fluorobiphenyl	72%		39-124%
1718-51-0	Terphenyl-d14	71%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-N(0.0-0.5)		
Lab Sample ID:	JC95957-29	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	93.2
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132091.D	1	10/04/19 05:05	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	24.0	35	21	ug/kg	J
56-55-3	Benzo(a)anthracene	54.2	35	9.8	ug/kg	
50-32-8	Benzo(a)pyrene	57.4	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	61.4	35	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	41.1	35	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	25.7	35	16	ug/kg	J
218-01-9	Chrysene	57.5	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	ND	35	15	ug/kg	
206-44-0	Fluoranthene	125	35	15	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [b]	41.9	35	16	ug/kg	
91-20-3	Naphthalene	ND	35	9.8	ug/kg	
85-01-8	Phenanthrene	107	35	12	ug/kg	
129-00-0	Pyrene	105	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	59%		26-134%
321-60-8	2-Fluorobiphenyl	56%		39-124%
1718-51-0	Terphenyl-d14	58%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-N(1.0-1.5)		
Lab Sample ID:	JC95957-30	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	88.3
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132089.D	1	10/04/19 04:11	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	22	ug/kg	
56-55-3	Benzo(a)anthracene	12.2	37	10	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	ND	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	ND	37	16	ug/kg	
206-44-0	Fluoranthene	ND	37	16	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	ND	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	22.3	37	12	ug/kg	J
129-00-0	Pyrene	13.8	37	12	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	63%		26-134%
321-60-8	2-Fluorobiphenyl	68%		39-124%
1718-51-0	Terphenyl-d14	60%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-S(0.0-0.5)		
Lab Sample ID:	JC95957-31	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	94.6
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P132090.D	1	10/04/19 04:38	CS	10/03/19 05:15	OP23087	EP5990
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	21	ug/kg	
56-55-3	Benzo(a)anthracene	ND	35	9.9	ug/kg	
50-32-8	Benzo(a)pyrene	ND	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	35	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	35	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	35	16	ug/kg	
218-01-9	Chrysene	ND	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene [a]	ND	35	15	ug/kg	
206-44-0	Fluoranthene	ND	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene [a]	ND	35	16	ug/kg	
91-20-3	Naphthalene	ND	35	9.8	ug/kg	
85-01-8	Phenanthrene	ND	35	12	ug/kg	
129-00-0	Pyrene	ND	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	63%		26-134%
321-60-8	2-Fluorobiphenyl	61%		39-124%
1718-51-0	Terphenyl-d14	65%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-S(1.0-1.5)		
Lab Sample ID:	JC95957-32	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.2
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90127.D	1	10/04/19 00:49	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	31.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	12.7	36	12	ug/kg	J
129-00-0	Pyrene	ND	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	67%		26-134%
321-60-8	2-Fluorobiphenyl	54%		39-124%
1718-51-0	Terphenyl-d14	62%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS21-E(0.0-0.5)
Lab Sample ID: JC95957-33
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 91.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90128.D	1	10/04/19 01:14	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	ND	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	56%		26-134%
321-60-8	2-Fluorobiphenyl	46%		39-124%
1718-51-0	Terphenyl-d14	52%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-E(1.0-1.5)		
Lab Sample ID:	JC95957-34	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	87.1
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90129.D	1	10/04/19 01:39	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	19	ug/kg	
120-12-7	Anthracene	ND	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	ND	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
206-44-0	Fluoranthene	ND	38	17	ug/kg	
86-73-7	Fluorene	ND	38	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	38	18	ug/kg	
91-20-3	Naphthalene	ND	38	11	ug/kg	
85-01-8	Phenanthrene	ND	38	13	ug/kg	
129-00-0	Pyrene	ND	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	61%		26-134%
321-60-8	2-Fluorobiphenyl	51%		39-124%
1718-51-0	Terphenyl-d14	62%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-W(0.0-0.5)		
Lab Sample ID:	JC95957-35	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	92.8
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90130.D	1	10/04/19 02:04	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	ND	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	69%		26-134%
321-60-8	2-Fluorobiphenyl	58%		39-124%
1718-51-0	Terphenyl-d14	67%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-W(1.0-1.5)		
Lab Sample ID:	JC95957-36	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	92.4
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90131.D	1	10/04/19 02:29	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	ND	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	62%		26-134%
321-60-8	2-Fluorobiphenyl	51%		39-124%
1718-51-0	Terphenyl-d14	56%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-B(1.0-1.5)		
Lab Sample ID:	JC95957-37	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	92.9
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90132.D	1	10/04/19 02:54	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	10.6	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	19.5	36	16	ug/kg	J
86-73-7	Fluorene	ND	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	32.1	36	12	ug/kg	J
129-00-0	Pyrene	17.9	36	11	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	68%		26-134%
321-60-8	2-Fluorobiphenyl	55%		39-124%
1718-51-0	Terphenyl-d14	63%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS21-BD(1.0-1.5)		
Lab Sample ID:	JC95957-38	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	93.9
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90133.D	1	10/04/19 03:19	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	35	9.9	ug/kg	
50-32-8	Benzo(a)pyrene	ND	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	35	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	35	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	35	16	ug/kg	
218-01-9	Chrysene	ND	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	35	16	ug/kg	
206-44-0	Fluoranthene	ND	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	35	16	ug/kg	
91-20-3	Naphthalene	ND	35	9.9	ug/kg	
85-01-8	Phenanthrene	ND	35	12	ug/kg	
129-00-0	Pyrene	ND	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	66%		26-134%
321-60-8	2-Fluorobiphenyl	54%		39-124%
1718-51-0	Terphenyl-d14	66%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS17-N(0.0-0.5)		
Lab Sample ID:	JC95957-39	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.7
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90134.D	1	10/04/19 03:43	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	ND	36	12	ug/kg	
129-00-0	Pyrene	ND	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	63%		26-134%
321-60-8	2-Fluorobiphenyl	52%		39-124%
1718-51-0	Terphenyl-d14	66%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS17-N(1.0-1.5)		
Lab Sample ID:	JC95957-40	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.8
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90135.D	1	10/04/19 04:08	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	31.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	35	9.9	ug/kg	
50-32-8	Benzo(a)pyrene	ND	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	35	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	35	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	35	16	ug/kg	
218-01-9	Chrysene	ND	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	35	16	ug/kg	
206-44-0	Fluoranthene	ND	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	35	16	ug/kg	
91-20-3	Naphthalene	ND	35	9.9	ug/kg	
85-01-8	Phenanthrene	ND	35	12	ug/kg	
129-00-0	Pyrene	ND	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	65%		26-134%
321-60-8	2-Fluorobiphenyl	53%		39-124%
1718-51-0	Terphenyl-d14	63%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS17-S(0.0-0.5)
Lab Sample ID: JC95957-41
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 94.8

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90136.D	1	10/04/19 04:34	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	21	ug/kg	
56-55-3	Benzo(a)anthracene	ND	35	9.9	ug/kg	
50-32-8	Benzo(a)pyrene	ND	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	35	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	35	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	35	16	ug/kg	
218-01-9	Chrysene	ND	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	35	15	ug/kg	
206-44-0	Fluoranthene	ND	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	35	16	ug/kg	
91-20-3	Naphthalene	ND	35	9.8	ug/kg	
85-01-8	Phenanthrene	ND	35	12	ug/kg	
129-00-0	Pyrene	ND	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	70%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	72%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS17-S(1.0-1.5)		
Lab Sample ID:	JC95957-42	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.0
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90137.D	1	10/04/19 04:58	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	37	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	ND	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
206-44-0	Fluoranthene	ND	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	ND	37	12	ug/kg	
129-00-0	Pyrene	ND	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	74%		26-134%
321-60-8	2-Fluorobiphenyl	60%		39-124%
1718-51-0	Terphenyl-d14	71%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS17-E(0.0-0.5)
Lab Sample ID: JC95957-43
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 97.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90144.D	1	10/04/19 07:51	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	33	12	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.5	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	16	ug/kg	
218-01-9	Chrysene	ND	33	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	26.5	33	16	ug/kg	J
91-20-3	Naphthalene	ND	33	9.4	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	77%		26-134%
321-60-8	2-Fluorobiphenyl	63%		39-124%
1718-51-0	Terphenyl-d14	77%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS17-E(1.0-1.5)
Lab Sample ID: JC95957-44
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 92.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90138.D	1	10/04/19 05:23	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	31.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	21	ug/kg	
56-55-3	Benzo(a)anthracene	ND	35	9.8	ug/kg	
50-32-8	Benzo(a)pyrene	ND	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	35	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	35	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	35	16	ug/kg	
218-01-9	Chrysene	ND	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	35	15	ug/kg	
206-44-0	Fluoranthene	ND	35	15	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	35	16	ug/kg	
91-20-3	Naphthalene	ND	35	9.8	ug/kg	
85-01-8	Phenanthrene	ND	35	12	ug/kg	
129-00-0	Pyrene	ND	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	65%		26-134%
321-60-8	2-Fluorobiphenyl	53%		39-124%
1718-51-0	Terphenyl-d14	62%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS17-W(0.0-0.5)		
Lab Sample ID:	JC95957-45	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	96.0
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90139.D	1	10/04/19 05:48	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	ND	34	17	ug/kg	
120-12-7	Anthracene	ND	34	21	ug/kg	
56-55-3	Benzo(a)anthracene	18.6	34	9.7	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	34	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	34	16	ug/kg	
218-01-9	Chrysene	17.1	34	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	34	15	ug/kg	
206-44-0	Fluoranthene	18.4	34	15	ug/kg	J
86-73-7	Fluorene	ND	34	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	20.7	34	16	ug/kg	J
91-20-3	Naphthalene	ND	34	9.7	ug/kg	
85-01-8	Phenanthrene	40.6	34	12	ug/kg	
129-00-0	Pyrene	34.5	34	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	61%		26-134%
321-60-8	2-Fluorobiphenyl	48%		39-124%
1718-51-0	Terphenyl-d14	52%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS17-W(1.0-1.5)		
Lab Sample ID:	JC95957-46	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.6
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90140.D	1	10/04/19 06:13	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	ND	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	ND	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	ND	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	ND	36	16	ug/kg	
86-73-7	Fluorene	ND	36	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	14.0	36	12	ug/kg	J
129-00-0	Pyrene	ND	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	54%		26-134%
321-60-8	2-Fluorobiphenyl	43%		39-124%
1718-51-0	Terphenyl-d14	51%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS17-B(1.0-1.5)		
Lab Sample ID:	JC95957-47	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	88.5
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90146.D	1	10/04/19 08:41	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	31.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	92.0	36	18	ug/kg	
120-12-7	Anthracene	60.0	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	119	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	180	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	186	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	139	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	57.6	36	17	ug/kg	
218-01-9	Chrysene	141	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	32.4	36	16	ug/kg	J
206-44-0	Fluoranthene	148	36	16	ug/kg	
86-73-7	Fluorene	28.8	36	16	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	142	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	118	36	12	ug/kg	
129-00-0	Pyrene	216	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		26-134%
321-60-8	2-Fluorobiphenyl	54%		39-124%
1718-51-0	Terphenyl-d14	65%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS17-BD(1.0-1.5)		
Lab Sample ID:	JC95957-48	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.3
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90145.D	1	10/04/19 08:16	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	31.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	32.4	35	18	ug/kg	J
120-12-7	Anthracene	ND	35	22	ug/kg	
56-55-3	Benzo(a)anthracene	30.2	35	10	ug/kg	J
50-32-8	Benzo(a)pyrene	47.2	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	45.4	35	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	39.2	35	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	16.5	35	16	ug/kg	J
218-01-9	Chrysene	35.2	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	35	16	ug/kg	
206-44-0	Fluoranthene	17.1	35	16	ug/kg	J
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	49.6	35	17	ug/kg	
91-20-3	Naphthalene	ND	35	9.9	ug/kg	
85-01-8	Phenanthrene	17.0	35	12	ug/kg	J
129-00-0	Pyrene	40.4	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	53%		26-134%
321-60-8	2-Fluorobiphenyl	43%		39-124%
1718-51-0	Terphenyl-d14	50%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS29-N(0.0-0.5)
Lab Sample ID: JC95957-49
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 95.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90141.D	1	10/04/19 06:37	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	31.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
56-55-3	Benzo(a)anthracene	ND	33	9.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	33	15	ug/kg	
205-99-2	Benzo(b)fluoranthene [a]	ND	33	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	33	16	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
218-01-9	Chrysene	ND	33	10	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
206-44-0	Fluoranthene	ND	33	15	ug/kg	
86-73-7	Fluorene	ND	33	15	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	33	15	ug/kg	
91-20-3	Naphthalene	ND	33	9.3	ug/kg	
85-01-8	Phenanthrene	ND	33	11	ug/kg	
129-00-0	Pyrene	ND	33	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	83%		26-134%
321-60-8	2-Fluorobiphenyl	69%		39-124%
1718-51-0	Terphenyl-d14	81%		36-134%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS29-N(1.0-1.5)		
Lab Sample ID:	JC95957-50	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	88.1
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90143.D	1	10/04/19 07:27	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	31.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	ND	36	18	ug/kg	
120-12-7	Anthracene	ND	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	24.0	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	23.4	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene [a]	23.6	36	16	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	36	17	ug/kg	
218-01-9	Chrysene	26.9	36	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	19.8	36	16	ug/kg	J
86-73-7	Fluorene	ND	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	31.2	36	17	ug/kg	J
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	26.9	36	12	ug/kg	J
129-00-0	Pyrene	38.4	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	72%		26-134%
321-60-8	2-Fluorobiphenyl	58%		39-124%
1718-51-0	Terphenyl-d14	69%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS29-S(0.0-0.5)		
Lab Sample ID:	JC95957-51	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	95.9
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90142.D	1	10/04/19 07:02	CS	10/03/19 17:45	OP23088	E2P3989
Run #2							

	Initial Weight	Final Volume
Run #1	31.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	33	11	ug/kg	
208-96-8	Acenaphthylene	ND	33	17	ug/kg	
120-12-7	Anthracene	ND	33	20	ug/kg	
56-55-3	Benzo(a)anthracene	26.5	33	9.4	ug/kg	J
50-32-8	Benzo(a)pyrene	19.5	33	15	ug/kg	J
205-99-2	Benzo(b)fluoranthene [a]	21.5	33	15	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	33	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	33	15	ug/kg	
218-01-9	Chrysene	27.4	33	10	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	33	15	ug/kg	
206-44-0	Fluoranthene	27.9	33	15	ug/kg	J
86-73-7	Fluorene	ND	33	15	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	27.4	33	16	ug/kg	J
91-20-3	Naphthalene	ND	33	9.3	ug/kg	
85-01-8	Phenanthrene	21.1	33	11	ug/kg	J
129-00-0	Pyrene	46.9	33	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	85%		26-134%
321-60-8	2-Fluorobiphenyl	70%		39-124%
1718-51-0	Terphenyl-d14	82%		36-134%

(a) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS29-S(1.0-1.5)
Lab Sample ID: JC95957-52
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 90.6

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90164.D	1	10/04/19 18:54	JC	10/03/19 17:45	OP23089	E2P3990
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	30.0	36	18	ug/kg	J
120-12-7	Anthracene	25.2	36	22	ug/kg	J
56-55-3	Benzo(a)anthracene	68.1	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	53.2	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	57.2	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	31.8	36	18	ug/kg	J
207-08-9	Benzo(k)fluoranthene	19.3	36	17	ug/kg	J
218-01-9	Chrysene	74.6	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
206-44-0	Fluoranthene	73.9	36	16	ug/kg	
86-73-7	Fluorene	17.6	36	17	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	47.8	36	17	ug/kg	
91-20-3	Naphthalene	ND	36	10	ug/kg	
85-01-8	Phenanthrene	110	36	12	ug/kg	
129-00-0	Pyrene	146	36	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		26-134%
321-60-8	2-Fluorobiphenyl	53%		39-124%
1718-51-0	Terphenyl-d14	64%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS29-E(0.0-0.5)
Lab Sample ID: JC95957-53
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 96.6

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90166.D	1	10/04/19 19:46	JC	10/03/19 17:45	OP23089	E2P3990
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	88.3	34	17	ug/kg	
120-12-7	Anthracene	42.1	34	21	ug/kg	
56-55-3	Benzo(a)anthracene	106	34	9.6	ug/kg	
50-32-8	Benzo(a)pyrene	142	34	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	151	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	122	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	50.0	34	16	ug/kg	
218-01-9	Chrysene	137	34	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	33.6	34	15	ug/kg	J
206-44-0	Fluoranthene	53.6	34	15	ug/kg	
86-73-7	Fluorene	19.5	34	16	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	128	34	16	ug/kg	
91-20-3	Naphthalene	ND	34	9.6	ug/kg	
85-01-8	Phenanthrene	48.5	34	11	ug/kg	
129-00-0	Pyrene	110	34	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	76%		26-134%
321-60-8	2-Fluorobiphenyl	63%		39-124%
1718-51-0	Terphenyl-d14	71%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS29-E(1.0-1.5)
Lab Sample ID: JC95957-54
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 91.0

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90160.D	1	10/04/19 17:08	JC	10/03/19 17:45	OP23089	E2P3990
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	22	ug/kg	
56-55-3	Benzo(a)anthracene	32.0	37	10	ug/kg	J
50-32-8	Benzo(a)pyrene	21.7	37	17	ug/kg	J
205-99-2	Benzo(b)fluoranthene	19.7	37	16	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	33.5	37	12	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
206-44-0	Fluoranthene	37.3	37	16	ug/kg	
86-73-7	Fluorene	17.5	37	17	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	28.4	37	17	ug/kg	J
91-20-3	Naphthalene	ND	37	10	ug/kg	
85-01-8	Phenanthrene	84.1	37	12	ug/kg	
129-00-0	Pyrene	67.1	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	63%		26-134%
321-60-8	2-Fluorobiphenyl	53%		39-124%
1718-51-0	Terphenyl-d14	61%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS29-W(0.0-0.5)		
Lab Sample ID:	JC95957-55	**Date Sampled:**	10/01/19
Matrix:	SO - Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3546	**Percent Solids:**	94.7
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90161.D	1	10/04/19 17:34	JC	10/03/19 17:45	OP23089	E2P3990
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	21	ug/kg	
56-55-3	Benzo(a)anthracene	16.4	35	9.8	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	35	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	35	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	35	16	ug/kg	
218-01-9	Chrysene	17.3	35	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	35	15	ug/kg	
206-44-0	Fluoranthene	ND	35	15	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	24.2	35	16	ug/kg	J
91-20-3	Naphthalene	ND	35	9.8	ug/kg	
85-01-8	Phenanthrene	13.8	35	12	ug/kg	J
129-00-0	Pyrene	23.5	35	11	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	78%		26-134%
321-60-8	2-Fluorobiphenyl	64%		39-124%
1718-51-0	Terphenyl-d14	77%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS29-W(1.0-1.5)
Lab Sample ID: JC95957-56
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 88.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90158.D	1	10/04/19 16:14	JC	10/03/19 17:45	OP23089	E2P3990
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	19.5	37	10	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	13.3	37	12	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
206-44-0	Fluoranthene	31.0	37	16	ug/kg	J
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	23.8	37	17	ug/kg	J
91-20-3	Naphthalene	14.4	37	10	ug/kg	J
85-01-8	Phenanthrene	29.0	37	12	ug/kg	J
129-00-0	Pyrene	26.2	37	12	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	62%		26-134%
321-60-8	2-Fluorobiphenyl	51%		39-124%
1718-51-0	Terphenyl-d14	58%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS29-B(1.0-1.5)
Lab Sample ID: JC95957-57
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/01/19
Date Received: 10/01/19
Percent Solids: 94.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90162.D	1	10/04/19 18:01	JC	10/03/19 17:45	OP23089	E2P3990
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	ND	35	18	ug/kg	
120-12-7	Anthracene	ND	35	21	ug/kg	
56-55-3	Benzo(a)anthracene	16.3	35	9.9	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	35	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	35	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	35	16	ug/kg	
218-01-9	Chrysene	16.9	35	11	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	35	15	ug/kg	
206-44-0	Fluoranthene	ND	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	24.2	35	16	ug/kg	J
91-20-3	Naphthalene	ND	35	9.9	ug/kg	
85-01-8	Phenanthrene	14.0	35	12	ug/kg	J
129-00-0	Pyrene	25.1	35	11	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	72%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	67%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	2019-10-01-P57-FB		
Lab Sample ID:	JC95957-58	**Date Sampled:**	10/01/19
Matrix:	AQ - Field Blank Soil	**Date Received:**	10/01/19
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	n/a
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Z140655.D	1	10/04/19 02:57	CS	10/02/19 22:00	OP23096	EZ6940
Run #2							

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.0	0.19	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.14	ug/l	
120-12-7	Anthracene	ND	1.0	0.21	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.0	0.20	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.0	0.21	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.0	0.21	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.0	0.34	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.0	0.21	ug/l	
218-01-9	Chrysene	ND	1.0	0.18	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.0	0.33	ug/l	
206-44-0	Fluoranthene	ND	1.0	0.17	ug/l	
86-73-7	Fluorene	ND	1.0	0.17	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.0	0.33	ug/l	
91-20-3	Naphthalene	ND	1.0	0.23	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.18	ug/l	
129-00-0	Pyrene	ND	1.0	0.22	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		34-128%
321-60-8	2-Fluorobiphenyl	49%		38-119%
1718-51-0	Terphenyl-d14	62%		26-129%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

SO
FB

SGS CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Page 1 of 5

PN

FED EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC95957

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd Suite B-1
City: Chestnut Ridge State: NY Zip: 10977
Project Contact: Al. Lopilato E-mail:
Phone #: 845-425-4994
Sampler(s) Name(s): Christine DeAmbrogio Phone #: Al. Lopilato

Project Information

Project Name: FTMM-Parcel 57
Street:
City: State:
Project #: 60587637
Client Purchase Order #:
Project Manager:

Billing Information (If different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis

PAHs

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB - Field Blank
EB-Equipment Blank
RB - Rinse Blank
TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) / Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	EnCore	PAHs	LAB USE ONLY
1	P57-SS18-W(0.0-0.5)		10/1/19	0835	CD	G	SO	1						1			X	DFLR
2	P57-SS18-N(1.1-1.5)		10/1/19	0830	CD	G	SO	1						1			X	
3	P57-SS18-S(0.0-0.5)		10/1/19	0835	CD	G	SO	1						1			X	
4	P57-SS18-S(1.1-1.5)		10/1/19	0840	CD	G	SO	1						1			X	E100
5	P57-SS18-E(0.0-0.5)		10/1/19	0845	CD	G	SO	1						1			X	
6	P57-SS18-E(1.1-1.5)		10/1/19	0850	CD	G	SO	1						1			X	
7	P57-SS18-W(0.0-0.5)		10/1/19	0855	CD	G	SO	1						1			X	
8	P57-SS18-W(1.0-1.5)		10/1/19	0900	CD	G	SO	1						1			X	
9	P57-SS18-B(1.0-1.5)		10/1/19	0905	CD	G	SO	1						1			X	
10	P57-SS16-N(0.0-0.5)		10/1/19	0950	CD	G	SO	1						1			X	
11	P57-SS16-N(2.5-3.0)		10/1/19	0955	CD	G	SO	1						1			X	
12	P57-SS16-S(0.0-0.5)		10/1/19	1000	CD	G	SO	1						1			X	

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [x] 3 Business Days
- [ ] 2 Business Days
- [ ] 1 Business Day
- [ ] Other

All data available via Lablink

Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [x] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria
- [ ] CT RCP Criteria
- [ ] State Forms
- [ ] EDD Format
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:
1	C.D	10/1/1605	1
2			2
3	Relinquished by:	Date / Time:	Received By: 3
4	Relinquished By:	Date / Time: 10/1/19 1705	Received By: 4
5	Relinquished by:	Date / Time:	Received By: 5

Custody Seals: Intact / Not Intact | Preserved where applicable: Absent | Therm. ID: | On Ice | Cooler Temp. °C

03.4 03.3 SYP

Initial Assessment 2AYH

Label Verification

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC95957

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd. Suite B-1
City: Chestnut Ridge State: NY Zip: 10977
Project Contact: Al Lapilato E-mail:
Phone #: 845-425-4994
Sampler(s) Name(s): C. DeAmbraggio Phone #:

Project Information

Project Name: FTMM - Parcel 57
Project #: 60587637
Client Purchase Order #:
Project Manager: Al Lapilato

Billing Information (if different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB - Field Blank; EB-Equipment Blank; RB - Rinse Blank; TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO_3	H_2SO_4	NONE	DI Water	MEOH	ENCORE	PAHs	LAB USE ONLY
13	P57-SS16-S(2.5-3.0)		10/1/19	1005	CD	G	SO	1						1			X	
14	P57-SS16-E(0.0-0.5)		10/1/19	1000	CD	G	SO	1						1			X	
15	P57-SS16-E(2.5-3.0)		10/1/19	1015	CD	G	SO	1						1			X	
16	P57-SS16-ED(2.5-3.0)		10/1/19	1020	CD	G	SO	1						1			X	
17	P57-SS16-W(0.0-0.5)		10/1/19	1025	CD	G	SO	1						1			X	
18	P57-SS16-W(2.5-3.0)		10/1/19	1030	CD	G	SO	1						1			X	
19	P57-SS16-B(2.5-3.0)		10/1/19	1035	CD	G	SO	1						1			X	
20	P57-SS14-N(0.0-0.5)		10/1/19	1050	CD	G	SO	1						1			X	
21	P57-SS14-N(1.0-1.5)		10/1/19	1055	CD	G	SO	1						1			X	
22	P57-SS14-S(0.0-0.5)		10/1/19	1100	CD	G	SO	1						1			X	
23	P57-SS14-S(1.0-1.5)		10/1/19	1105	CD	G	SO	1						1			X	
24	P57-SS14-E(0.0-0.5)		10/1/19	1110	CD	G	SO	1						1				

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [x] 3 Business Days
- [ ] 2 Business Days
- [ ] 1 Business Day
- [ ] Other

All data available via Lablink

Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [x] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria
- [ ] CT RCP Criteria
- [ ] State Forms
- [ ] EDD Format
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special instructions

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:
1	C. DeAmbraggio	10/1/19 1605	1
2		10-1-19 1705	2
3			3
4			4
5			5

Custody Seal # | Intact | Not intact | Preserved where applicable | Absent | On Ice | Cooler Temp. °C | Therm. ID:

07.4 03.3 SO

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC95957

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd. Suite B-1
City: Chestnut Ridge State: NY Zip: 10977
Project Contact: AL Laplata E-mail:
Phone #: 845.425.4994
Sampler(s) Name(s): Christine DeAmbrogio Phone #:

Project Information

Project Name: FTMN-Parcel 57
Street:
Billing Information (if different from Report to)
Company Name:
Street Address:
City: State: Zip:
Project #: 60587637
Client Purchase Order #:
Project Manager: AL Laplata
Attention:

Requested Analysis

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB - Field Blank; EB-Equipment Blank; RB - Rinse Blank; TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO_3	H_2SO_4	NONE	DI Water	MEOH	ENCORE	PAHs	LAB USE ONLY
25	PS7-SS14E(1.0-1.5)		10/1/19	1115	CD	G	SO	1					1				X	
26	PS7-SS14-W(0.0-0.5)		10/1/19	1120	CD	G	SO	1					1				X	
27	PS7-SS14-W(1.0-1.5)		10/1/19	1125	CD	G	SO	1					1				X	
28	PS7-SS14-B(1.0-1.5)		10/1/19	1130	CD	G	SO	1					1				X	
29	PS7-SS21-N(0.0-0.5)		10/1/19	1305	CD	G	SO	1					1				X	
30	PS7-SS21-N(1.0-1.5)		10/1/19	1310	CD	G	SO	1					1				X	
31	PS7-SS21-S(0.0-0.5)		10/1/19	1315	CD	G	SO	1					1				X	
32	PS7-SS21-S(1.0-1.5		10/1/19	1320	CD	G	SO	1					1				X	
33	PS7-SS21-E(0.0-0.5)		10/1/19	1325	CD	G	SO	1					1				X	
34	PS7-SS21-E(1.0-1.5)		10/1/19	1330	CD	G	SO	1					1				X	
35	PS7-SS21-W(0.0-0.5)		10/1/19	1335	CD	G	SO	1					1				X	
36	PS7-SS21-W(1.0-1.5)		10/1/19	1340	CD	G	SO	1					1				X	

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [x] 3 Business Days
- [ ] 2 Business Days
- [ ] 1 Business Day
- [ ] Other

All data available via Lablink
Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [x] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria
- [ ] CT RCP Criteria
- [ ] State Forms
- [ ] EDD Format
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:
1	CD	10-1-19 1605	1
2		10-1-19 1705	2
3			3
4			4
5			5

Custody Seal #: Intact / Not Intact | Preserved where applicable | Absent | Therm. ID: | On Ice | Cooler Temp. °C

03.4 03.3 SP

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC95957

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd Suite B1
City State Zip: Chestnut Ridge, NY
Project Contact E-mail: Al Lopilato
Phone #: 845-425-4994
Sampler(s) Name(s) Phone #: C. DeAmbrogio

Project Information

Project Name: FTMM-Parcel 57
Street:
City State:
Project #: 60587637
Client Purchase Order #:
Project Manager: Al. Lopilato

Billing Information (If different from Report to)

Company Name:
Street Address:
City State Zip:
Attention:

Requested Analysis

PAH's

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB - Field Blank
EB-Equipment Blank
RB - Rinse Blank
TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	LAB USE ONLY
37	PS7-SS21B (1.0-1.5)		10/1/19	1345	CD	G	SO	1					1				X
38	PS7-SS21-BD (1.0-1.5)		10/1/19	1350	CD	G	SO	1					1				X
39	PS7-SS17-N (0.0-0.5)		10/1/19	1410	CD	G	SO	1					1				X
40	PS7-SS17-N (1.0-1.5)		10/1/19	1415	CD	G	SO	1					1				X
41	PS7-SS17-S (0.0-0.5)		10/1/19	1420	CD	G	SO	1					1				X
42	PS7-SS17-S (1.0-1.5)		10/1/19	1425	CD	G	SO	1					1				X
43	PS7-SS17-E (0.0-0.5)		10/1/19	1430	CD	G	SO	1					1				X
44	PS7-SS17-E (1.0-1.5)		10/1/19	1435	CD	G	SO	1					1				X
45	PS7-SS17-W (0.0-0.5)		10/1/19	1440	CD	G	SO	1					1				X
46	PS7-SS17-W (1.0-1.5)		10/1/19	1445	CD	G	SO	1					1				X
47	PS7-SS17-B (1.0-1.5)		10/1/19	1450	CD	G	SO	1					1				X
48	PS7-SS17-BD (1.0-1.5)		10/1/19	1455	CD	G	SO	1					1				X

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [x] 3 Business Days
- [ ] 2 Business Days
- [ ] 1 Business Day
- [ ] Other

All data available via Labilink

Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [x] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria
- [ ] CT RCP Criteria
- [ ] State Forms
- [ ] EDD Format
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:
1	C DeAmbrogio	10-1-19 1605	
2		10-1-19 1705	
3			
4			
5			

Custody Seal # | Intact | Not Intact | Preserved where applicable | Absent | Therm. ID: | On Ice | Cooler Temp. °C

03.4 08.3

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3480
www.sgs.com/ehsusa

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC95957

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd. Suite B1
City / State / Zip: Chestnut Ridge, NY 10977
Project Contact: Al Lopilato | E-mail:
Phone #: 845-425-4994
Sampler(s) Name(s): C. DeAmbrogio | Phone #:

Project Information

Project Name: FTMM- Parcel 57
Street:
City / State / Zip:
Project #: 60587637
Client Purchase Order #:
Project Manager: A. Lopilato

Billing Information (if different from Report to)

Company Name:
Street Address:
City / State / Zip:
Attention:

Requested Analysis

PAHs

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB - Field Blank
EB-Equipment Blank
RB - Rinse Blank
TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	LAB USE ONLY
49	PS7-SS29-N(0.0-0.5)		10/1/19	1505	CD	G	SO	1						1			X
50	PS7-SS29-N(1.0-1.5)		10/1/19	1510	CD	G	SO	1						1			X
51	PS7-SS29-S(0.0-0.5)		10/1/19	1515	CD	G	SO	1						1			X
52	PS7-SS29-S(1.0-1.5)		10/1/19	1520	CD	G	SO	1						1			X
53	PS7-SS29-E(0.0-0.5)		10/1/19	1525	CD	G	SO	1						1			X
54	PS7-SS29-E(1.0-1.5)		10/1/19	1530	CD	G	SO	1						1			X
55	PS7-SS29-W(0.0-0.5)		10/1/19	1535	CD	G	SO	1						1			X
56	PS7-SS29-W(1.0-1.5)		10/1/19	1540	CD	G	SO	1						1			X
57	PS7-SS29-B(0.0-1.5)		10/1/19	1545	CD	G	SO	1						1			X
*	PS7-SS29-BD(1.0-1.5)		10/1/19	1550	CD	G	SO	1						1			X
58	2019-10-01-PS7-FB		10/1/19	1555	CD	G	FB	2						2			X

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [x] 3 Business Days*
- [ ] 2 Business Days*
- [ ] 1 Business Day*
- [ ] Other

All data available via Lablink

* Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [x] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria
- [ ] CT RCP Criteria
- [ ] State Forms
- [ ] EDD Format
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

*PS7-SS29-BD(1.0-1.5) ~~to missing~~

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:
1	C. DeAmbrogio	10/1/1605	1
2		10-1-19 1705	2
3	Relinquished by:	Date / Time:	Received By: 3
4	Relinquished by:	Date / Time:	Received By: 4
5	Relinquished by:	Date / Time:	Received By: 5

Custody Seal #: [ ] Intact [ ] Not Intact
Preserved where applicable: [ ] Absent
[ ] On Ice
Cooler Temp. °C: 3.4 3.3 CTP
Therm. ID:

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

SGS Sample Receipt Summary

Job Number: JC95957 **Client:** AECOM, INC. **Project:** FORT MONMOUTH

Date / Time Received: 10/1/2019 5:05:00 PM **Delivery Method:** Accutest Courier **Airbill #'s:**

Cooler Temps (Raw Measured) °C: Cooler 1: (3.4); Cooler 2: (3.3);

Cooler Temps (Corrected) °C: Cooler 1: (3.3); Cooler 2: (3.2);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Cooler temp verification:	IR Gun		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	2		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☐		☑
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Test Strip Lot #s: pH 1-12: 229517 pH 12+: 208717 Other: (Specify)

Comments: Did not receive sample P57-SS29-BD (1.0-1.5).

SM089-02 Rev. Date 12/1/16

Responded to by: ak

Response Date: 10/2

please proceed

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report



Technical Report for

AECOM, INC.

Fort Monmouth, NJ

60587637 - PARCEL 57

SGS Job Number: JC96270

Sampling Date: 10/04/19

Report to:

AECOM, INC.

Alfred.LoPilato@aecom.com

ATTN: Alfred LoPilato

Total number of pages in report: 38

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Laura Degenhardt
General Manager

Client Service contact: Ayesha Kapadia 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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Test results relate only to samples analyzed.

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Please share your ideas about how we can serve you better at:
EHS.US.CustomerCare@sgs.com

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Sample Summary

AECOM, INC.

Job No: JC96270

Fort Monmouth, NJ
Project No: 60587637 - PARCEL 57

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
This report contains results reported as ND = Not detected. The following applies:							
Organics ND	= Not detected above the MDL						
JC96270-1	10/04/19	09:10	CD	10/04/19	SO	Soil	P57-SS13-N(0.0-0.5)
JC96270-2	10/04/19	09:15	CD	10/04/19	SO	Soil	P57-SS13-N(1.0-1.5)
JC96270-3	10/04/19	09:20	CD	10/04/19	SO	Soil	P57-SS13-S(0.0-0.5)
JC96270-4	10/04/19	09:25	CD	10/04/19	SO	Soil	P57-SS13-S(1.0-1.5)
JC96270-5	10/04/19	09:30	CD	10/04/19	SO	Soil	P57-SS13-E(0.0-0.5)
JC96270-6	10/04/19	09:35	CD	10/04/19	SO	Soil	P57-SS13-E(1.0-1.5)
JC96270-7	10/04/19	09:40	CD	10/04/19	SO	Soil	P57-SS13-W(0.0-0.5)
JC96270-8	10/04/19	09:45	CD	10/04/19	SO	Soil	P57-SS13-W(1.0-1.5)
JC96270-9	10/04/19	09:50	CD	10/04/19	SO	Soil	P57-SS13-B(1.0-1.5)
JC96270-10	10/04/19	09:55	CD	10/04/19	SO	Soil	P57-SS13-BD(1.0-1.5)
JC96270-11	10/04/19	11:00	CD	10/04/19	SO	Soil	P57-SS12-N(0.0-0.5)
JC96270-12	10/04/19	11:05	CD	10/04/19	SO	Soil	P57-SS12-N(1.0-1.5)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Sample Summary
(continued)

AECOM, INC.

Job No: JC96270

Fort Monmouth, NJ
Project No: 60587637 - PARCEL 57

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC96270-13	10/04/19	11:10	CD	10/04/19	SO	Soil	P57-SS12-S(0.0-0.5)
JC96270-14	10/04/19	11:15	CD	10/04/19	SO	Soil	P57-SS12-S(1.0-1.5)
JC96270-15	10/04/19	11:20	CD	10/04/19	SO	Soil	P57-SS12-E(0.0-0.5)
JC96270-16	10/04/19	11:25	CD	10/04/19	SO	Soil	P57-SS12-E(1.0-1.5)
JC96270-17	10/04/19	11:30	CD	10/04/19	SO	Soil	P57-SS12-W(0.0-0.5)
JC96270-18	10/04/19	11:35	CD	10/04/19	SO	Soil	P57-SS12-W(1.0-1.5)
JC96270-19	10/04/19	11:40	CD	10/04/19	SO	Soil	P57-SS12-B(1.0-1.5)
JC96270-20	10/04/19	11:45	CD	10/04/19	SO	Soil	P57-SS12-BD(1.0-1.5)
JC96270-21	10/04/19	12:00	CD	10/04/19	AQ	Field Blank Soil	2019-10-04-P57-FB

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

CASE NARRATIVE / CONFORMANCE SUMMARY

Client:	AECOM, INC.	**Job No**	JC96270
Site:	Fort Monmouth, NJ	**Report Date**	10/14/2019 10:39:05 A

On 10/04/2019, 20 Sample(s), 0 Trip Blank(s) and 1 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 3 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC96270 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

MS Semi-volatiles By Method SW846 8270D

Matrix: AQ **Batch ID:** OP23204

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

Matrix: SO **Batch ID:** OP23212

- All samples were extracted within the recommended method holding time.
- Sample(s) JC96270-3MS, JC96270-3MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- RPD(s) for MSD for Acenaphthene, Acenaphthylene, Anthracene, Benzo(g,h,i)perylene, Dibenzo(a,h)anthracene, Fluorene, Naphthalene are outside control limits for sample OP23212-MSD. Analytical precision exceeds in-house control limits.

General Chemistry By Method SM2540 G 18TH ED MOD

Matrix: SO **Batch ID:** GN916

- Sample(s) JC96224-1DUP were used as the QC samples for Solids, Percent.

Matrix: SO **Batch ID:** GN917

- Sample(s) JC96270-9DUP were used as the QC samples for Solids, Percent.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

Summary of Hits

Job Number: JC96270
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/04/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC96270-1	**P57-SS13-N(0.0-0.5)**					
Anthracene		42.7	37	23	ug/kg	SW846 8270D
Benzo(a)anthracene		216	37	11	ug/kg	SW846 8270D
Benzo(a)pyrene		200	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		242	37	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		152	37	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		95.6	37	17	ug/kg	SW846 8270D
Chrysene		238	37	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		34.3 J	37	16	ug/kg	SW846 8270D
Fluoranthene		323	37	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		174	37	17	ug/kg	SW846 8270D
Naphthalene		41.4	37	11	ug/kg	SW846 8270D
Phenanthrene		126	37	13	ug/kg	SW846 8270D
Pyrene		382	37	12	ug/kg	SW846 8270D
JC96270-2	**P57-SS13-N(1.0-1.5)**					
Benzo(a)anthracene		27.3 J	38	11	ug/kg	SW846 8270D
Benzo(b)fluoranthene		17.5 J	38	17	ug/kg	SW846 8270D
Chrysene		25.8 J	38	12	ug/kg	SW846 8270D
Fluoranthene		58.0	38	17	ug/kg	SW846 8270D
Fluorene		22.2 J	38	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		46.8	38	18	ug/kg	SW846 8270D
Naphthalene		29.2 J	38	11	ug/kg	SW846 8270D
Phenanthrene		98.2	38	13	ug/kg	SW846 8270D
Pyrene		57.1	38	12	ug/kg	SW846 8270D
JC96270-3	**P57-SS13-S(0.0-0.5)**					
Acenaphthylene		43.2	37	19	ug/kg	SW846 8270D
Anthracene		86.0	37	23	ug/kg	SW846 8270D
Benzo(a)anthracene		299	37	11	ug/kg	SW846 8270D
Benzo(a)pyrene		301	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		354	37	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		248	37	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		146	37	17	ug/kg	SW846 8270D
Chrysene		353	37	12	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		57.1	37	16	ug/kg	SW846 8270D
Fluoranthene		440	37	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		243	37	17	ug/kg	SW846 8270D
Naphthalene		122	37	10	ug/kg	SW846 8270D
Phenanthrene		181	37	12	ug/kg	SW846 8270D
Pyrene		539	37	12	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC96270
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/04/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC96270-4	**P57-SS13-S(1.0-1.5)**					
Naphthalene		42.3	38	11	ug/kg	SW846 8270D
JC96270-5	**P57-SS13-E(0.0-0.5)**					
Acenaphthylene		59.1	43	22	ug/kg	SW846 8270D
Anthracene		85.3	43	26	ug/kg	SW846 8270D
Benzo(a)anthracene		252	43	12	ug/kg	SW846 8270D
Benzo(a)pyrene		255	43	20	ug/kg	SW846 8270D
Benzo(b)fluoranthene		288	43	19	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		202	43	22	ug/kg	SW846 8270D
Benzo(k)fluoranthene		109	43	20	ug/kg	SW846 8270D
Chrysene		301	43	14	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		47.5	43	19	ug/kg	SW846 8270D
Fluoranthene		293	43	19	ug/kg	SW846 8270D
Fluorene		22.8 J	43	20	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		203	43	20	ug/kg	SW846 8270D
Naphthalene		225	43	12	ug/kg	SW846 8270D
Phenanthrene		269	43	14	ug/kg	SW846 8270D
Pyrene		432	43	14	ug/kg	SW846 8270D
JC96270-6	**P57-SS13-E(1.0-1.5)**					
Naphthalene		19.9 J	38	11	ug/kg	SW846 8270D
JC96270-7	**P57-SS13-W(0.0-0.5)**					
No hits reported in this sample.						
JC96270-8	**P57-SS13-W(1.0-1.5)**					
No hits reported in this sample.						
JC96270-9	**P57-SS13-B(1.0-1.5)**					
Acenaphthene		16.3 J	39	14	ug/kg	SW846 8270D
Naphthalene		81.0	39	11	ug/kg	SW846 8270D
Phenanthrene		31.2 J	39	13	ug/kg	SW846 8270D
Pyrene		13.1 J	39	13	ug/kg	SW846 8270D
JC96270-10	**P57-SS13-BD(1.0-1.5)**					
Naphthalene		72.5	39	11	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC96270
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/04/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC96270-11	**P57-SS12-N(0.0-0.5)**					
Acenaphthylene		26.7 J	35	18	ug/kg	SW846 8270D
Anthracene		35.0	35	21	ug/kg	SW846 8270D
Benzo(a)anthracene		145	35	9.9	ug/kg	SW846 8270D
Benzo(a)pyrene		160	35	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		189	35	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		126	35	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		63.5	35	16	ug/kg	SW846 8270D
Chrysene		150	35	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		26.7 J	35	16	ug/kg	SW846 8270D
Fluoranthene		257	35	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		133	35	16	ug/kg	SW846 8270D
Naphthalene		24.6 J	35	9.9	ug/kg	SW846 8270D
Phenanthrene		96.3	35	12	ug/kg	SW846 8270D
Pyrene		237	35	11	ug/kg	SW846 8270D
JC96270-12	**P57-SS12-N(1.0-1.5)**					
Acenaphthene		25.6 J	36	12	ug/kg	SW846 8270D
Acenaphthylene		422	36	18	ug/kg	SW846 8270D
Anthracene		304	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		378	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		589	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		510	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		472	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		132	36	17	ug/kg	SW846 8270D
Chrysene		450	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		118	36	16	ug/kg	SW846 8270D
Fluoranthene		264	36	16	ug/kg	SW846 8270D
Fluorene		74.1	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		406	36	17	ug/kg	SW846 8270D
Naphthalene		37.5	36	10	ug/kg	SW846 8270D
Phenanthrene		133	36	12	ug/kg	SW846 8270D
Pyrene		538	36	11	ug/kg	SW846 8270D
JC96270-13	**P57-SS12-S(0.0-0.5)**					
Acenaphthylene		30.2 J	34	18	ug/kg	SW846 8270D
Anthracene		28.6 J	34	21	ug/kg	SW846 8270D
Benzo(a)anthracene		111	34	9.7	ug/kg	SW846 8270D
Benzo(a)pyrene		146	34	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		171	34	15	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		127	34	17	ug/kg	SW846 8270D
Benzo(k)fluoranthene		49.9	34	16	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC96270
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/04/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Chrysene		121	34	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		26.2 J	34	15	ug/kg	SW846 8270D
Fluoranthene		166	34	15	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		133	34	16	ug/kg	SW846 8270D
Naphthalene		55.5	34	9.7	ug/kg	SW846 8270D
Phenanthrene		61.5	34	12	ug/kg	SW846 8270D
Pyrene		171	34	11	ug/kg	SW846 8270D
JC96270-14	**P57-SS12-S(1.0-1.5)**					
Acenaphthene		14.8 J	34	12	ug/kg	SW846 8270D
Acenaphthylene		612	34	17	ug/kg	SW846 8270D
Anthracene		428	34	21	ug/kg	SW846 8270D
Benzo(a)anthracene		528	34	9.7	ug/kg	SW846 8270D
Benzo(a)pyrene		790	34	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		676	34	15	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		627	34	17	ug/kg	SW846 8270D
Benzo(k)fluoranthene		176	34	16	ug/kg	SW846 8270D
Chrysene		667	34	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		155	34	15	ug/kg	SW846 8270D
Fluoranthene		266	34	15	ug/kg	SW846 8270D
Fluorene		91.2	34	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		527	34	16	ug/kg	SW846 8270D
Naphthalene		40.9	34	9.7	ug/kg	SW846 8270D
Phenanthrene		79.1	34	12	ug/kg	SW846 8270D
Pyrene		713	34	11	ug/kg	SW846 8270D
JC96270-15	**P57-SS12-E(0.0-0.5)**					
Acenaphthylene		30.9 J	35	18	ug/kg	SW846 8270D
Anthracene		30.8 J	35	21	ug/kg	SW846 8270D
Benzo(a)anthracene		124	35	9.9	ug/kg	SW846 8270D
Benzo(a)pyrene		146	35	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		169	35	15	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		150	35	17	ug/kg	SW846 8270D
Benzo(k)fluoranthene		57.2	35	16	ug/kg	SW846 8270D
Chrysene		147	35	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		25.7 J	35	15	ug/kg	SW846 8270D
Fluoranthene		171	35	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		156	35	16	ug/kg	SW846 8270D
Naphthalene		47.6	35	9.8	ug/kg	SW846 8270D
Phenanthrene		95.6	35	12	ug/kg	SW846 8270D
Pyrene		231	35	11	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC96270
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/04/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC96270-16	**P57-SS12-E(1.0-1.5)**					
Acenaphthylene		69.3	34	17	ug/kg	SW846 8270D
Anthracene		78.5	34	21	ug/kg	SW846 8270D
Benzo(a)anthracene		209	34	9.7	ug/kg	SW846 8270D
Benzo(a)pyrene		214	34	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		246	34	15	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		149	34	17	ug/kg	SW846 8270D
Benzo(k)fluoranthene		76.1	34	16	ug/kg	SW846 8270D
Chrysene		227	34	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		39.0	34	15	ug/kg	SW846 8270D
Fluoranthene		334	34	15	ug/kg	SW846 8270D
Fluorene		18.6 J	34	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		161	34	16	ug/kg	SW846 8270D
Naphthalene		13.6 J	34	9.7	ug/kg	SW846 8270D
Phenanthrene		164	34	12	ug/kg	SW846 8270D
Pyrene		329	34	11	ug/kg	SW846 8270D
JC96270-17	**P57-SS12-W(0.0-0.5)**					
Acenaphthylene		21.2 J	34	17	ug/kg	SW846 8270D
Anthracene		42.5	34	21	ug/kg	SW846 8270D
Benzo(a)anthracene		199	34	9.6	ug/kg	SW846 8270D
Benzo(a)pyrene		211	34	15	ug/kg	SW846 8270D
Benzo(b)fluoranthene		241	34	15	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		182	34	17	ug/kg	SW846 8270D
Benzo(k)fluoranthene		91.4	34	16	ug/kg	SW846 8270D
Chrysene		231	34	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		39.9	34	15	ug/kg	SW846 8270D
Fluoranthene		314	34	15	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		188	34	16	ug/kg	SW846 8270D
Naphthalene		11.0 J	34	9.5	ug/kg	SW846 8270D
Phenanthrene		156	34	11	ug/kg	SW846 8270D
Pyrene		378	34	11	ug/kg	SW846 8270D
JC96270-18	**P57-SS12-W(1.0-1.5)**					
Acenaphthene		12.5 J	35	12	ug/kg	SW846 8270D
Acenaphthylene		496	35	18	ug/kg	SW846 8270D
Anthracene		326	35	22	ug/kg	SW846 8270D
Benzo(a)anthracene		425	35	10	ug/kg	SW846 8270D
Benzo(a)pyrene		592	35	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		506	35	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		589	35	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		141	35	16	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC96270
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/04/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Chrysene		562	35	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		152	35	16	ug/kg	SW846 8270D
Fluoranthene		204	35	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		425	35	17	ug/kg	SW846 8270D
Naphthalene		47.3	35	9.9	ug/kg	SW846 8270D
Phenanthrene		75.4	35	12	ug/kg	SW846 8270D
Pyrene		713	35	11	ug/kg	SW846 8270D
JC96270-19	**P57-SS12-B(1.0-1.5)**					
Acenaphthylene		153	34	17	ug/kg	SW846 8270D
Anthracene		113	34	21	ug/kg	SW846 8270D
Benzo(a)anthracene		185	34	9.7	ug/kg	SW846 8270D
Benzo(a)pyrene		195	34	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		205	34	15	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		192	34	17	ug/kg	SW846 8270D
Benzo(k)fluoranthene		69.2	34	16	ug/kg	SW846 8270D
Chrysene		265	34	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		51.5	34	15	ug/kg	SW846 8270D
Fluoranthene		172	34	15	ug/kg	SW846 8270D
Fluorene		33.1 J	34	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		175	34	16	ug/kg	SW846 8270D
Naphthalene		45.3	34	9.7	ug/kg	SW846 8270D
Phenanthrene		122	34	12	ug/kg	SW846 8270D
Pyrene		368	34	11	ug/kg	SW846 8270D
JC96270-20	**P57-SS12-BD(1.0-1.5)**					
Acenaphthylene		73.4	36	18	ug/kg	SW846 8270D
Anthracene		45.6	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		96.3	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		103	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		116	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		102	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		34.3 J	36	17	ug/kg	SW846 8270D
Chrysene		137	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		24.1 J	36	16	ug/kg	SW846 8270D
Fluoranthene		88.5	36	16	ug/kg	SW846 8270D
Fluorene		17.0 J	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		112	36	17	ug/kg	SW846 8270D
Naphthalene		39.7	36	10	ug/kg	SW846 8270D
Phenanthrene		61.0	36	12	ug/kg	SW846 8270D
Pyrene		177	36	11	ug/kg	SW846 8270D

Summary of Hits

Job Number: JC96270
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 10/04/19

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC96270-21	**2019-10-04-P57-FB**					

No hits reported in this sample.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID: P57-SS13-N(0.0-0.5)
Lab Sample ID: JC96270-1
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 88.0

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108510.D	1	10/11/19 14:13	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	42.7	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	216	37	11	ug/kg	
50-32-8	Benzo(a)pyrene	200	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	242	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	152	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	95.6	37	17	ug/kg	
218-01-9	Chrysene	238	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	34.3	37	16	ug/kg	J
206-44-0	Fluoranthene	323	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	174	37	17	ug/kg	
91-20-3	Naphthalene	41.4	37	11	ug/kg	
85-01-8	Phenanthrene	126	37	13	ug/kg	
129-00-0	Pyrene	382	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	54%		26-134%
321-60-8	2-Fluorobiphenyl	64%		39-124%
1718-51-0	Terphenyl-d14	74%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-N(1.0-1.5)
Lab Sample ID: JC96270-2
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 86.9

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108503.D	1	10/11/19 11:16	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	19	ug/kg	
120-12-7	Anthracene	ND	38	23	ug/kg	
56-55-3	Benzo(a)anthracene	27.3	38	11	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	17.5	38	17	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	25.8	38	12	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
206-44-0	Fluoranthene	58.0	38	17	ug/kg	
86-73-7	Fluorene	22.2	38	17	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	46.8	38	18	ug/kg	
91-20-3	Naphthalene	29.2	38	11	ug/kg	J
85-01-8	Phenanthrene	98.2	38	13	ug/kg	
129-00-0	Pyrene	57.1	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	57%		26-134%
321-60-8	2-Fluorobiphenyl	64%		39-124%
1718-51-0	Terphenyl-d14	74%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-S(0.0-0.5)
Lab Sample ID: JC96270-3
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 88.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108513.D	1	10/11/19 17:10	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	43.2	37	19	ug/kg	
120-12-7	Anthracene	86.0	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	299	37	11	ug/kg	
50-32-8	Benzo(a)pyrene	301	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	354	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	248	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	146	37	17	ug/kg	
218-01-9	Chrysene	353	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	57.1	37	16	ug/kg	
206-44-0	Fluoranthene	440	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	243	37	17	ug/kg	
91-20-3	Naphthalene	122	37	10	ug/kg	
85-01-8	Phenanthrene	181	37	12	ug/kg	
129-00-0	Pyrene	539	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	63%		26-134%
321-60-8	2-Fluorobiphenyl	71%		39-124%
1718-51-0	Terphenyl-d14	79%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-S(1.0-1.5)
Lab Sample ID: JC96270-4
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 85.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108504.D	1	10/11/19 11:41	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	19	ug/kg	
120-12-7	Anthracene	ND	38	24	ug/kg	
56-55-3	Benzo(a)anthracene	ND	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	ND	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
206-44-0	Fluoranthene	ND	38	17	ug/kg	
86-73-7	Fluorene	ND	38	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	38	18	ug/kg	
91-20-3	Naphthalene	42.3	38	11	ug/kg	
85-01-8	Phenanthrene	ND	38	13	ug/kg	
129-00-0	Pyrene	ND	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	58%		26-134%
321-60-8	2-Fluorobiphenyl	68%		39-124%
1718-51-0	Terphenyl-d14	75%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-E(0.0-0.5)
Lab Sample ID: JC96270-5
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 76.6

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108516.D	1	10/11/19 18:27	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	43	15	ug/kg	
208-96-8	Acenaphthylene	59.1	43	22	ug/kg	
120-12-7	Anthracene	85.3	43	26	ug/kg	
56-55-3	Benzo(a)anthracene	252	43	12	ug/kg	
50-32-8	Benzo(a)pyrene	255	43	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	288	43	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	202	43	22	ug/kg	
207-08-9	Benzo(k)fluoranthene	109	43	20	ug/kg	
218-01-9	Chrysene	301	43	14	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	47.5	43	19	ug/kg	
206-44-0	Fluoranthene	293	43	19	ug/kg	
86-73-7	Fluorene	22.8	43	20	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	203	43	20	ug/kg	
91-20-3	Naphthalene	225	43	12	ug/kg	
85-01-8	Phenanthrene	269	43	14	ug/kg	
129-00-0	Pyrene	432	43	14	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	55%		26-134%
321-60-8	2-Fluorobiphenyl	63%		39-124%
1718-51-0	Terphenyl-d14	71%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-E(1.0-1.5)
Lab Sample ID: JC96270-6
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 84.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108505.D	1	10/11/19 12:06	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	20	ug/kg	
120-12-7	Anthracene	ND	38	24	ug/kg	
56-55-3	Benzo(a)anthracene	ND	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	ND	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
206-44-0	Fluoranthene	ND	38	17	ug/kg	
86-73-7	Fluorene	ND	38	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	38	18	ug/kg	
91-20-3	Naphthalene	19.9	38	11	ug/kg	J
85-01-8	Phenanthrene	ND	38	13	ug/kg	
129-00-0	Pyrene	ND	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	63%		26-134%
321-60-8	2-Fluorobiphenyl	73%		39-124%
1718-51-0	Terphenyl-d14	84%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-W(0.0-0.5)
Lab Sample ID: JC96270-7
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 87.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108506.D	1	10/11/19 12:32	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
56-55-3	Benzo(a)anthracene	ND	37	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	37	17	ug/kg	
218-01-9	Chrysene	ND	37	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
206-44-0	Fluoranthene	ND	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	37	17	ug/kg	
91-20-3	Naphthalene	ND	37	11	ug/kg	
85-01-8	Phenanthrene	ND	37	13	ug/kg	
129-00-0	Pyrene	ND	37	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	57%		26-134%
321-60-8	2-Fluorobiphenyl	66%		39-124%
1718-51-0	Terphenyl-d14	75%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-W(1.0-1.5)
Lab Sample ID: JC96270-8
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 85.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108507.D	1	10/11/19 12:57	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	38	13	ug/kg	
208-96-8	Acenaphthylene	ND	38	20	ug/kg	
120-12-7	Anthracene	ND	38	24	ug/kg	
56-55-3	Benzo(a)anthracene	ND	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	38	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	38	18	ug/kg	
218-01-9	Chrysene	ND	38	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
206-44-0	Fluoranthene	ND	38	17	ug/kg	
86-73-7	Fluorene	ND	38	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	38	18	ug/kg	
91-20-3	Naphthalene	ND	38	11	ug/kg	
85-01-8	Phenanthrene	ND	38	13	ug/kg	
129-00-0	Pyrene	ND	38	12	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	58%		26-134%
321-60-8	2-Fluorobiphenyl	67%		39-124%
1718-51-0	Terphenyl-d14	74%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-B(1.0-1.5)
Lab Sample ID: JC96270-9
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 82.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108508.D	1	10/11/19 13:22	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	16.3	39	14	ug/kg	J
208-96-8	Acenaphthylene	ND	39	20	ug/kg	
120-12-7	Anthracene	ND	39	24	ug/kg	
56-55-3	Benzo(a)anthracene	ND	39	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	39	18	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	39	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	39	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	39	18	ug/kg	
218-01-9	Chrysene	ND	39	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	39	17	ug/kg	
206-44-0	Fluoranthene	ND	39	18	ug/kg	
86-73-7	Fluorene	ND	39	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	39	18	ug/kg	
91-20-3	Naphthalene	81.0	39	11	ug/kg	
85-01-8	Phenanthrene	31.2	39	13	ug/kg	J
129-00-0	Pyrene	13.1	39	13	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	59%		26-134%
321-60-8	2-Fluorobiphenyl	68%		39-124%
1718-51-0	Terphenyl-d14	73%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-BD(1.0-1.5)
Lab Sample ID: JC96270-10
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 83.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108509.D	1	10/11/19 13:48	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	39	14	ug/kg	
208-96-8	Acenaphthylene	ND	39	20	ug/kg	
120-12-7	Anthracene	ND	39	24	ug/kg	
56-55-3	Benzo(a)anthracene	ND	39	11	ug/kg	
50-32-8	Benzo(a)pyrene	ND	39	18	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	39	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	39	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	39	18	ug/kg	
218-01-9	Chrysene	ND	39	12	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	39	17	ug/kg	
206-44-0	Fluoranthene	ND	39	18	ug/kg	
86-73-7	Fluorene	ND	39	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	39	18	ug/kg	
91-20-3	Naphthalene	72.5	39	11	ug/kg	
85-01-8	Phenanthrene	ND	39	13	ug/kg	
129-00-0	Pyrene	ND	39	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	57%		26-134%
321-60-8	2-Fluorobiphenyl	66%		39-124%
1718-51-0	Terphenyl-d14	73%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-N(0.0-0.5)
Lab Sample ID: JC96270-11
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 93.8

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90338.D	1	10/11/19 17:17	JC	10/10/19 15:50	OP23212	E2P3998
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	26.7	35	18	ug/kg	J
120-12-7	Anthracene	35.0	35	21	ug/kg	
56-55-3	Benzo(a)anthracene	145	35	9.9	ug/kg	
50-32-8	Benzo(a)pyrene	160	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	189	35	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	126	35	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	63.5	35	16	ug/kg	
218-01-9	Chrysene	150	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	26.7	35	16	ug/kg	J
206-44-0	Fluoranthene	257	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	133	35	16	ug/kg	
91-20-3	Naphthalene	24.6	35	9.9	ug/kg	J
85-01-8	Phenanthrene	96.3	35	12	ug/kg	
129-00-0	Pyrene	237	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		26-134%
321-60-8	2-Fluorobiphenyl	54%		39-124%
1718-51-0	Terphenyl-d14	58%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-N(1.0-1.5)
Lab Sample ID: JC96270-12
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 92.2

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90339.D	1	10/11/19 17:42	JC	10/10/19 15:50	OP23212	E2P3998
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	25.6	36	12	ug/kg	J
208-96-8	Acenaphthylene	422	36	18	ug/kg	
120-12-7	Anthracene	304	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	378	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	589	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	510	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	472	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	132	36	17	ug/kg	
218-01-9	Chrysene	450	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	118	36	16	ug/kg	
206-44-0	Fluoranthene	264	36	16	ug/kg	
86-73-7	Fluorene	74.1	36	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	406	36	17	ug/kg	
91-20-3	Naphthalene	37.5	36	10	ug/kg	
85-01-8	Phenanthrene	133	36	12	ug/kg	
129-00-0	Pyrene	538	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	59%		26-134%
321-60-8	2-Fluorobiphenyl	53%		39-124%
1718-51-0	Terphenyl-d14	58%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-S(0.0-0.5)
Lab Sample ID: JC96270-13
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 95.8

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90340.D	1	10/11/19 18:06	JC	10/10/19 15:50	OP23212	E2P3998
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	30.2	34	18	ug/kg	J
120-12-7	Anthracene	28.6	34	21	ug/kg	J
56-55-3	Benzo(a)anthracene	111	34	9.7	ug/kg	
50-32-8	Benzo(a)pyrene	146	34	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	171	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	127	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	49.9	34	16	ug/kg	
218-01-9	Chrysene	121	34	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	26.2	34	15	ug/kg	J
206-44-0	Fluoranthene	166	34	15	ug/kg	
86-73-7	Fluorene	ND	34	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	133	34	16	ug/kg	
91-20-3	Naphthalene	55.5	34	9.7	ug/kg	
85-01-8	Phenanthrene	61.5	34	12	ug/kg	
129-00-0	Pyrene	171	34	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	70%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	62%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-S(1.0-1.5)
Lab Sample ID: JC96270-14
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 95.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90341.D	1	10/11/19 18:31	JC	10/10/19 15:50	OP23212	E2P3998
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	14.8	34	12	ug/kg	J
208-96-8	Acenaphthylene	612	34	17	ug/kg	
120-12-7	Anthracene	428	34	21	ug/kg	
56-55-3	Benzo(a)anthracene	528	34	9.7	ug/kg	
50-32-8	Benzo(a)pyrene	790	34	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	676	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	627	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	176	34	16	ug/kg	
218-01-9	Chrysene	667	34	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	155	34	15	ug/kg	
206-44-0	Fluoranthene	266	34	15	ug/kg	
86-73-7	Fluorene	91.2	34	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	527	34	16	ug/kg	
91-20-3	Naphthalene	40.9	34	9.7	ug/kg	
85-01-8	Phenanthrene	79.1	34	12	ug/kg	
129-00-0	Pyrene	713	34	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	61%		26-134%
321-60-8	2-Fluorobiphenyl	57%		39-124%
1718-51-0	Terphenyl-d14	60%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-E(0.0-0.5)
Lab Sample ID: JC96270-15
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 94.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108515.D	1	10/11/19 18:01	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	35	12	ug/kg	
208-96-8	Acenaphthylene	30.9	35	18	ug/kg	J
120-12-7	Anthracene	30.8	35	21	ug/kg	J
56-55-3	Benzo(a)anthracene	124	35	9.9	ug/kg	
50-32-8	Benzo(a)pyrene	146	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	169	35	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	150	35	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	57.2	35	16	ug/kg	
218-01-9	Chrysene	147	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	25.7	35	15	ug/kg	J
206-44-0	Fluoranthene	171	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	156	35	16	ug/kg	
91-20-3	Naphthalene	47.6	35	9.8	ug/kg	
85-01-8	Phenanthrene	95.6	35	12	ug/kg	
129-00-0	Pyrene	231	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	45%		26-134%
321-60-8	2-Fluorobiphenyl	51%		39-124%
1718-51-0	Terphenyl-d14	57%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-E(1.0-1.5)
Lab Sample ID: JC96270-16
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 95.4

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2P90342.D	1	10/11/19 18:56	JC	10/10/19 15:50	OP23212	E2P3998
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	69.3	34	17	ug/kg	
120-12-7	Anthracene	78.5	34	21	ug/kg	
56-55-3	Benzo(a)anthracene	209	34	9.7	ug/kg	
50-32-8	Benzo(a)pyrene	214	34	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	246	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	149	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	76.1	34	16	ug/kg	
218-01-9	Chrysene	227	34	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	39.0	34	15	ug/kg	
206-44-0	Fluoranthene	334	34	15	ug/kg	
86-73-7	Fluorene	18.6	34	16	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	161	34	16	ug/kg	
91-20-3	Naphthalene	13.6	34	9.7	ug/kg	J
85-01-8	Phenanthrene	164	34	12	ug/kg	
129-00-0	Pyrene	329	34	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	60%		26-134%
321-60-8	2-Fluorobiphenyl	53%		39-124%
1718-51-0	Terphenyl-d14	57%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-W(0.0-0.5)
Lab Sample ID: JC96270-17
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 96.2

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108517.D	1	10/11/19 18:52	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.7 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	21.2	34	17	ug/kg	J
120-12-7	Anthracene	42.5	34	21	ug/kg	
56-55-3	Benzo(a)anthracene	199	34	9.6	ug/kg	
50-32-8	Benzo(a)pyrene	211	34	15	ug/kg	
205-99-2	Benzo(b)fluoranthene	241	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	182	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	91.4	34	16	ug/kg	
218-01-9	Chrysene	231	34	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	39.9	34	15	ug/kg	
206-44-0	Fluoranthene	314	34	15	ug/kg	
86-73-7	Fluorene	ND	34	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	188	34	16	ug/kg	
91-20-3	Naphthalene	11.0	34	9.5	ug/kg	J
85-01-8	Phenanthrene	156	34	11	ug/kg	
129-00-0	Pyrene	378	34	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	58%		26-134%
321-60-8	2-Fluorobiphenyl	61%		39-124%
1718-51-0	Terphenyl-d14	72%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-W(1.0-1.5)
Lab Sample ID: JC96270-18
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 93.9

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108518.D	1	10/11/19 19:17	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	12.5	35	12	ug/kg	J
208-96-8	Acenaphthylene	496	35	18	ug/kg	
120-12-7	Anthracene	326	35	22	ug/kg	
56-55-3	Benzo(a)anthracene	425	35	10	ug/kg	
50-32-8	Benzo(a)pyrene	592	35	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	506	35	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	589	35	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	141	35	16	ug/kg	
218-01-9	Chrysene	562	35	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	152	35	16	ug/kg	
206-44-0	Fluoranthene	204	35	16	ug/kg	
86-73-7	Fluorene	ND	35	16	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	425	35	17	ug/kg	
91-20-3	Naphthalene	47.3	35	9.9	ug/kg	
85-01-8	Phenanthrene	75.4	35	12	ug/kg	
129-00-0	Pyrene	713	35	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	55%		26-134%
321-60-8	2-Fluorobiphenyl	59%		39-124%
1718-51-0	Terphenyl-d14	68%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-B(1.0-1.5)
Lab Sample ID: JC96270-19
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 94.2

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108519.D	1	10/11/19 19:43	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	31.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	34	12	ug/kg	
208-96-8	Acenaphthylene	153	34	17	ug/kg	
120-12-7	Anthracene	113	34	21	ug/kg	
56-55-3	Benzo(a)anthracene	185	34	9.7	ug/kg	
50-32-8	Benzo(a)pyrene	195	34	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	205	34	15	ug/kg	
191-24-2	Benzo(g,h,i)perylene	192	34	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	69.2	34	16	ug/kg	
218-01-9	Chrysene	265	34	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	51.5	34	15	ug/kg	
206-44-0	Fluoranthene	172	34	15	ug/kg	
86-73-7	Fluorene	33.1	34	16	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	175	34	16	ug/kg	
91-20-3	Naphthalene	45.3	34	9.7	ug/kg	
85-01-8	Phenanthrene	122	34	12	ug/kg	
129-00-0	Pyrene	368	34	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	50%		26-134%
321-60-8	2-Fluorobiphenyl	56%		39-124%
1718-51-0	Terphenyl-d14	61%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-BD(1.0-1.5)
Lab Sample ID: JC96270-20
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 10/04/19
Date Received: 10/04/19
Percent Solids: 93.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E108514.D	1	10/11/19 17:36	AR	10/10/19 15:50	OP23212	E3E4879
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	73.4	36	18	ug/kg	
120-12-7	Anthracene	45.6	36	22	ug/kg	
56-55-3	Benzo(a)anthracene	96.3	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	103	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	116	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	102	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	34.3	36	17	ug/kg	J
218-01-9	Chrysene	137	36	11	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	24.1	36	16	ug/kg	J
206-44-0	Fluoranthene	88.5	36	16	ug/kg	
86-73-7	Fluorene	17.0	36	16	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	112	36	17	ug/kg	
91-20-3	Naphthalene	39.7	36	10	ug/kg	
85-01-8	Phenanthrene	61.0	36	12	ug/kg	
129-00-0	Pyrene	177	36	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	49%		26-134%
321-60-8	2-Fluorobiphenyl	57%		39-124%
1718-51-0	Terphenyl-d14	64%		36-134%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	2019-10-04-P57-FB		
Lab Sample ID:	JC96270-21	**Date Sampled:**	10/04/19
Matrix:	AQ - Field Blank Soil	**Date Received:**	10/04/19
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	n/a
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M160238.D	1	10/11/19 14:37	HSS	10/10/19 21:00	OP23204	EM6781
Run #2							

	Initial Volume	Final Volume
Run #1	870 ml	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	0.22	ug/l	
208-96-8	Acenaphthylene	ND	1.1	0.16	ug/l	
120-12-7	Anthracene	ND	1.1	0.24	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.1	0.23	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.1	0.24	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.1	0.24	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.1	0.39	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.1	0.24	ug/l	
218-01-9	Chrysene	ND	1.1	0.20	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.1	0.38	ug/l	
206-44-0	Fluoranthene	ND	1.1	0.20	ug/l	
86-73-7	Fluorene	ND	1.1	0.20	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.1	0.38	ug/l	
91-20-3	Naphthalene	ND	1.1	0.27	ug/l	
85-01-8	Phenanthrene	ND	1.1	0.20	ug/l	
129-00-0	Pyrene	ND	1.1	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	60%		34-128%
321-60-8	2-Fluorobiphenyl	63%		38-119%
1718-51-0	Terphenyl-d14	58%		26-129%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC96270

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd Suite B-1
City State Zip: Chestnut Ridge, NY 10977
Project Contact: Al Laplata | E-mail:
Phone #: 845-425-4994
Sampler(s) Name(s): C DeAmbrogio | Phone #:

Project Information

Project Name: FTMM- Parcel 57
Project #: 60587637
Client Purchase Order #:
Project Manager: Al. Laplata

Billing Information (If different from Report to)

Company Name:
Street Address:
City State Zip:
Attention:

Requested Analysis

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB - Field Blank; EB-Equipment Blank; RB - Rinse Blank; TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO_3	H_2SO_4	NONE	DI Water	MEOH	ENCORE	PAHs	LAB USE ONLY
1	PS7-SS13-N(0.0-0.5)		10/4/19	0910	CD	G	SO	1						1			X	D7
2	PS7-SS13-N(1.0-1.5)		10/4/19	0915	CD	G	SO	1						1			X	
3	PS7-SS13-S(0.0-0.5)		10/4/19	0930	CD	G	SO	1						1			X	EDD
4	PS7-SS13-S(1.0-1.5)		10/4/19	0935	CD	G	SO	1						1			X	
5	PS7-SS13-E(0.0-0.5)		10/4/19	0930	CD	G	SO	1						1			X	
6	PS7-SS13-E(1.0-1.5)		10/4/19	0935	CD	G	SO	1						1			X	
7	PS7-SS13-W(0.0-0.5)		10/4/19	0940	CD	G	SO	1						1			X	
8	PS7-SS13-W(1.0-1.5)		10/4/19	0945	CD	G	SO	1						1			X	
9	PS7-SS13-B(0.0-0.5)		10/4/19	0950	CD	G	SO	1						1			X	
10	PS7-SS13-BD(1.0-1.5)		10/4/19	0955	CD	G	SO	1						1			X	
11	PS7-SS12-N(0.0-0.5)		10/4/19	1100	CD	G	SO	1						1			X	
12	PS7-SS12-N(1.0-1.5)		10/4/19	1105	CD	G	SO	1						1			X	

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- ☐ 10 Business Days
- ☐ 5 Business Days
- ☐ 3 Business Days
- ☐ 2 Business Days
- ☐ 1 Business Day
- ☒ Other 7 Day

All data available via Labilink | Approval needed for 1-3 Business Day TAT

Deliverable

- ☐ Commercial "A" (Level 1)
- ☐ Commercial "B" (Level 2)
- ☒ NJ Reduced (Level 3)
- ☐ Full Tier I (Level 4)
- ☐ Commercial "C"
- ☐ NJ DKQP
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ MA MCP Criteria_____
- ☐ CT RCP Criteria_____
- ☐ State Forms
- ☐ EDD Format _____
- ☐ DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:	Relinquished By:	Date / Time:	Received By:
1		10/4/19 1235	1	2	10/4/19 1656	2
2			2			
3			3	4		4
4			4			
5			5			

Custody Seal # ☐ Intact ☐ Not Intact | Preserved where applicable ☐ Absent | On Ice ☐ Therm. ID: | Cooler Temp. °C

03.1 C

FINAL ASSESSMENT 3A YK

VERIFICATION_____

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Page 2 of 2

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC96270

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd Suite B-1
City / State / Zip: Chestnut Ridge, NY 10977
Project Contact / E-mail: Al LaPlata
Phone #: 845-425-4994
Sampler(s) Name(s) / Phone #: Christine DeAmbrogio
Project Manager: A. LaPlata

Project Information

Project Name: FTMM-Parcel 57
Street:
Billing Information (if different from Report to)
Company Name:
Street Address:
City / State / Zip:
Project #: 60587637
Client Purchase Order #:
Attention:

Requested Analysis

PAHs

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
SED - Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB - Field Blank
EB - Equipment Blank
RB - Rinse Blank
TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO_3	H_2SO_4	NONE	DI Water	MEOH	ENCORE	PAHs	LAB USE ONLY
13	P57-SS12-S(0.0-0.5)		10/4/19	1110	CD	G	SO	1					1				X	
14	P57-SS12-S(1.0-1.5)		10/4/19	1115	CD	G	SO	1					1				X	
15	P57-SS12-E(0.0-0.5)		10/4/19	1120	CD	G	SO	1					1				X	
16	P57-SS12-E(1.0-1.5)		10/4/19	1125	CD	G	SO	1					1				X	
17	P57-SS12-W(0.0-0.5)		10/4/19	1130	CD	G	SO	1					1				X	
18	P57-SS12-W(1.0-1.5)		10/4/19	1135	CD	G	SO	1					1				X	
19	P57-SS12-B(1.0-1.5)		10/4/19	1140	CD	G	SO	1					1				X	
20	P57-SS12-BD(1.0-1.5)		10/4/19	1145	CD	G	SO	1					1				X	
21	2019-10-04-P57-FB		10/4/19	1000	CD		FB	2					2				X	

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [ ] 3 Business Days
- [ ] 2 Business Days
- [ ] 1 Business Day
- [X] Other 7 Day

All data available via Lablink
Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [X] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria_____
- [ ] CT RCP Criteria_____
- [ ] State Forms
- [ ] EDD Format_____
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:
1	C.D	10/4/19 1235	1
2		10/4/19 1656	2
3			3
4			4
5			5

Custody Seal # | Intact / Not intact | Preserved where applicable / Absent | Therm. ID: | On Ice | Cooler Temp. °C: 03.1

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

SGS Sample Receipt Summary

Job Number: JC96270 **Client:** AECOM, INC. **Project:** FORT MONMOUTH

Date / Time Received: 10/4/2019 4:56:00 PM **Delivery Method:** **Airbill #'s:**

Cooler Temps (Raw Measured) °C: Cooler 1: (3.1);

Cooler Temps (Corrected) °C: Cooler 1: (3.0);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Cooler temp verification:	IR Gun		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	1		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Test Strip Lot #s: pH 1-12: 229517 pH 12+: 208717 Other: (Specify)

Comments

SM089-03
Rev. Date 12/7/17

JC96270: Chain of Custody
Page 3 of 3

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report



Technical Report for

AECOM, INC.

Fort Monmouth, NJ

60587637 - PARCEL 57

SGS Job Number: JD1903

Sampling Dates: 01/15/20 - 01/16/20

Report to:

AECOM, INC.

Alfred.LoPilato@aecom.com

ATTN: Alfred LoPilato

Total number of pages in report: 72

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Laura Degenhardt
General Manager

Client Service contact: Ayesha Kapadia 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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EHS.US.CustomerCare@sgs.com

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Sample Summary

AECOM, INC.

Job No: JD1903

Fort Monmouth, NJ
Project No: 60587637 - PARCEL 57

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
This report contains results reported as ND = Not detected. The following applies: Organics ND = Not detected above the MDL							
JD1903-1	01/15/20	10:50	CD	01/16/20	SO	Soil	P57-SS12-2N(2.5-3.0)
JD1903-2	01/15/20	10:07	CD	01/16/20	SO	Soil	P57-SS12-2S(2.5-3.0)
JD1903-2R	01/15/20	10:07	CD	01/16/20	SO	Soil	P57-SS12-2S(2.5-3.0)
JD1903-3	01/15/20	10:09	CD	01/16/20	SO	Soil	P57-SS12-2W(2.5-3.0)
JD1903-4	01/15/20	11:25	CD	01/16/20	SO	Soil	P57-SS13-2E(2.5-3.0)
JD1903-5	01/15/20	11:30	CD	01/16/20	SO	Soil	P57-SS13-2S(2.5-3.0)
JD1903-6	01/16/20	09:15	CD	01/16/20	SO	Soil	P57-SS14-2S(2.5-3.0)
JD1903-7	01/16/20	10:00	CD	01/16/20	SO	Soil	P57-SS14-2N(2.5-3.0)
JD1903-8	01/16/20	10:05	CD	01/16/20	SO	Soil	P57-SS14-2S(2.5-3.0)
JD1903-9	01/16/20	10:10	CD	01/16/20	SO	Soil	P57-SS14-2E(2.5-3.0)
JD1903-10	01/16/20	10:15	CD	01/16/20	SO	Soil	P57-SS14-2W(2.5-3.0)
JD1903-11	01/16/20	10:20	CD	01/16/20	SO	Soil	P57-SS14-2B(2.5-3.0)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Sample Summary
(continued)

AECOM, INC.

Job No: JD1903

Fort Monmouth, NJ
Project No: 60587637 - PARCEL 57

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JD1903-12	01/16/20	10:25	CD	01/16/20	SO	Soil	P57-SS14-2BD(2.5-3.0)
JD1903-13	01/16/20	11:00	CD	01/16/20	AQ	Field Blank Soil	2020-01-16-F57-FB
JD1903-14	01/16/20	13:10	CD	01/16/20	SO	Soil	P57-SS18-2N(0.0-0.5)
JD1903-15	01/16/20	13:15	CD	01/16/20	SO	Soil	P57-SS18-2S(0.0-0.5)
JD1903-16	01/16/20	13:20	CD	01/16/20	SO	Soil	P57-SS18-2N(1.5-2.0)
JD1903-17	01/16/20	13:25	CD	01/16/20	SO	Soil	P57-SS18-2S(1.5-2.0)
JD1903-18	01/16/20	13:30	CD	01/16/20	SO	Soil	P57-SS18-2E(1.5-2.0)
JD1903-19	01/16/20	13:35	CD	01/16/20	SO	Soil	P57-SS18-2W(1.5-2.0)

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: AECOM, INC. **Job No** JD1903

Site: Fort Monmouth, NJ **Report Date** 2/18/2020 12:02:23 P

On 01/16/2020, 18 Sample(s), 0 Trip Blank(s) and 1 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 3.2 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JD1903 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

MS Semi-volatiles By Method SW846 8270D

Matrix: AQ **Batch ID:** OP25359

- The data for SW846 8270D meets quality control requirements.
- JD1903-13: Confirmation run.

Matrix: AQ **Batch ID:** OP25464

- All method blanks for this batch meet method specific criteria.
- JD1903-13: Sample extracted outside the holding time due to lab contamination of the batch associated BSD on the original extract. Original prep date was within holding time.

Matrix: LEACHATE **Batch ID:** OP25562

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD1903-6LS, JD1903-6MS, JD1903-6MSD were used as the QC samples indicated.
- JD1903-14 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.

Matrix: LEACHATE **Batch ID:** OP25563

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- JD1903-13 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.

Matrix: SO **Batch ID:** OP25397

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD1903-4MS, JD1903-4MSD were used as the QC samples indicated.
- JD1903-3 for 4,6-Dinitro-o-cresol: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for 4-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for Atrazine: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for 4-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for 2,6-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-7 for 2,6-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for 2-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for Pentachlorophenol: Associated CCV outside of control limits high, sample was ND.

MS Semi-volatiles By Method SW846 8270D

Matrix: SO **Batch ID:** OP25397

- JD1903-6 for 4,6-Dinitro-o-cresol: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for 2-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for 2,6-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for 4,6-Dinitro-o-cresol: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for 2,4-Dinitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for Hexachlorocyclopentadiene: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for 2,6-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-14 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-14 for 2-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-14 for 4,6-Dinitro-o-cresol: Associated CCV outside of control limits high, sample was ND.
- JD1903-14 for 4-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-14 for Atrazine: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for Atrazine: Associated CCV outside of control limits high, sample was ND.
- JD1903-14 for Pentachlorophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-14 for 2,6-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-14 for Caprolactam: Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.
- JD1903-14 for Hexachlorocyclopentadiene: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for Caprolactam: Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.
- JD1903-2 for Pentachlorophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for Hexachlorocyclopentadiene: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for Caprolactam: Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.
- JD1903-14 for 2,4-Dinitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for 4-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for 2,4-Dinitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-2 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for 2-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for 4,6-Dinitro-o-cresol: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for 4-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-6 for Pentachlorophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for Hexachlorocyclopentadiene: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for 2-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for 2,6-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-2 for 2,4-Dinitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-3 for 2,4-Dinitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-2 for 2,6-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-2 for 2-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-2 for 4,6-Dinitro-o-cresol: Associated CCV outside of control limits high, sample was ND.
- JD1903-2 for 4-Nitrophenol: Associated CCV outside of control limits high, sample was ND.

MS Semi-volatiles By Method SW846 8270D

Matrix: SO **Batch ID:** OP25397

- JD1903-2 for Atrazine: Associated CCV outside of control limits high, sample was ND.
- JD1903-2 for Hexachlorocyclopentadiene: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for Atrazine: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for Caprolactam: Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.
- JD1903-7 for 4,6-Dinitro-o-cresol: Associated CCV outside of control limits high, sample was ND.
- JD1903-7 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-2 for Caprolactam: Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.
- JD1903-7 for 2-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for 2,4-Dinitrotoluene: Associated CCV outside of control limits high, sample was ND.
- JD1903-7 for 4-Nitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-7 for Atrazine: Associated CCV outside of control limits high, sample was ND.
- JD1903-7 for Hexachlorocyclopentadiene: Associated CCV outside of control limits high, sample was ND.
- JD1903-7 for Pentachlorophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-7 for 2,4-Dinitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-1 for Pentachlorophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for Atrazine: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for Hexachlorocyclopentadiene: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for Pentachlorophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-15 for Caprolactam: Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.
- JD1903-1 for 2,4-Dinitrophenol: Associated CCV outside of control limits high, sample was ND.
- JD1903-7 for Caprolactam: Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.

General Chemistry By Method LLOYD KAHN 1988 MOD

Matrix: SO **Batch ID:** GP26342

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC98071-30RDUP, JC98071-30RMS were used as the QC samples for Total Organic Carbon.
- JD1903-14 for Total Organic Carbon: Multiple injections indicate possible sample non-homogeneity.
- JD1903-15 for Total Organic Carbon: Multiple injections indicate possible sample non-homogeneity.
- JD1903-6 for Total Organic Carbon: Analysis done last day of holding time.

General Chemistry By Method SM2540 G 18TH ED MOD

Matrix: SO **Batch ID:** GN4707

- Sample(s) JD1903-1DUP were used as the QC samples for Moisture, Percent, Solids, Percent.

General Chemistry By Method SM5310 B-11

Matrix: AQ	Batch ID: GP26316

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JD1766-1MS, JD1766-1MSD were used as the QC samples for Total Organic Carbon.

General Chemistry By Method SW846 1312

Matrix: ALL	Batch ID: GN4830

- The data for SW846 1312 meets quality control requirements.

Matrix: ALL	Batch ID: GN5366

- The data for SW846 1312 meets quality control requirements.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

Summary of Hits

Job Number: JD1903
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 01/15/20 thru 01/16/20

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JD1903-1	**P57-SS12-2N(2.5-3.0)**					
Acenaphthylene		27.5 J	36	18	ug/kg	SW846 8270D
Anthracene		22.1 J	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		57.1	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		58.2	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		84.1	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		53.4	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		27.1 J	36	17	ug/kg	SW846 8270D
1,1'-Biphenyl		11.5 J	72	4.9	ug/kg	SW846 8270D
Carbazole		9.1 J	72	5.2	ug/kg	SW846 8270D
Chrysene		79.5	36	11	ug/kg	SW846 8270D
Di-n-butyl phthalate		37.6 J	72	5.8	ug/kg	SW846 8270D
bis(2-Ethylhexyl)phthalate		25.8 J	72	8.4	ug/kg	SW846 8270D
Fluoranthene		102	36	16	ug/kg	SW846 8270D
Fluorene		16.8 J	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		45.9	36	17	ug/kg	SW846 8270D
2-Methylnaphthalene		49.6	36	8.1	ug/kg	SW846 8270D
Naphthalene		23.8 J	36	10	ug/kg	SW846 8270D
Phenanthrene		73.0	36	12	ug/kg	SW846 8270D
Pyrene		126	36	11	ug/kg	SW846 8270D
Total TIC, Semi-Volatile		460 J			ug/kg	
JD1903-2	**P57-SS12-2S(2.5-3.0)**					
Acenaphthylene		137	36	18	ug/kg	SW846 8270D
Anthracene		74.1	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		164	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		243	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		224	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		190	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		78.9	36	17	ug/kg	SW846 8270D
1,1'-Biphenyl		10.5 J	71	4.9	ug/kg	SW846 8270D
Carbazole		6.8 J	71	5.2	ug/kg	SW846 8270D
Chrysene		201	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		45.0	36	16	ug/kg	SW846 8270D
bis(2-Ethylhexyl)phthalate		20.0 J	71	8.3	ug/kg	SW846 8270D
Fluoranthene		137	36	16	ug/kg	SW846 8270D
Fluorene		31.2 J	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		155	36	17	ug/kg	SW846 8270D
2-Methylnaphthalene		47.6	36	8.1	ug/kg	SW846 8270D
Naphthalene		26.6 J	36	10	ug/kg	SW846 8270D
Phenanthrene		71.9	36	12	ug/kg	SW846 8270D
Pyrene		280	36	11	ug/kg	SW846 8270D
Total TIC, Semi-Volatile		900 J			ug/kg	

Summary of Hits

Job Number: JD1903
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 01/15/20 thru 01/16/20

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JD1903-2R	**P57-SS12-2S(2.5-3.0)**					
pH, SPLP Leachate		8.35			su	SW846 1312
Volume, SPLP Leachate		2.017			l	SW846 1312
Weight, SPLP Leachate		0.1085			kg	SW846 1312
Dry Weight, SPLP Leachate		0.09248			kg	SW846 1312
JD1903-3	**P57-SS12-2W(2.5-3.0)**					
Acenaphthene		15.4 J	36	13	ug/kg	SW846 8270D
Acenaphthylene		99.5	36	19	ug/kg	SW846 8270D
Anthracene		62.7	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		137	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		190	36	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		185	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		147	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		65.8	36	17	ug/kg	SW846 8270D
1,1'-Biphenyl		11.4 J	73	5.0	ug/kg	SW846 8270D
Carbazole		6.5 J	73	5.3	ug/kg	SW846 8270D
Chrysene		161	36	11	ug/kg	SW846 8270D
Dibenzo(a,h)anthracene		36.8	36	16	ug/kg	SW846 8270D
bis(2-Ethylhexyl)phthalate		24.2 J	73	8.5	ug/kg	SW846 8270D
Fluoranthene		141	36	16	ug/kg	SW846 8270D
Fluorene		32.3 J	36	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		124	36	17	ug/kg	SW846 8270D
2-Methylnaphthalene		44.3	36	8.2	ug/kg	SW846 8270D
Naphthalene		23.5 J	36	10	ug/kg	SW846 8270D
Phenanthrene		87.0	36	12	ug/kg	SW846 8270D
Pyrene		242	36	12	ug/kg	SW846 8270D
Total TIC, Semi-Volatile		320 J			ug/kg	
JD1903-4	**P57-SS13-2E(2.5-3.0)**					
No hits reported in this sample.						
JD1903-5	**P57-SS13-2S(2.5-3.0)**					
No hits reported in this sample.						
JD1903-6	**P57-SS14-2S(2.5-3.0)**					
Benzo(a)anthracene		68.4	37	11	ug/kg	SW846 8270D
Benzo(a)pyrene		64.2	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		74.5	37	16	ug/kg	SW846 8270D

Summary of Hits

Job Number: JD1903
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 01/15/20 thru 01/16/20

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Benzo(g,h,i)perylene		45.3	37	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		27.1 J	37	17	ug/kg	SW846 8270D
1,1'-Biphenyl		5.6 J	74	5.1	ug/kg	SW846 8270D
Carbazole		5.7 J	74	5.4	ug/kg	SW846 8270D
Chrysene		69.5	37	12	ug/kg	SW846 8270D
bis(2-Ethylhexyl)phthalate		16.0 J	74	8.7	ug/kg	SW846 8270D
Fluoranthene		98.4	37	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		39.1	37	17	ug/kg	SW846 8270D
Phenanthrene		53.2	37	12	ug/kg	SW846 8270D
Pyrene		138	37	12	ug/kg	SW846 8270D
Total TIC, Semi-Volatile		400 J			ug/kg	
pH, SPLP Leachate		6.58			su	SW846 1312
Volume, SPLP Leachate		2.006			l	SW846 1312
Weight, SPLP Leachate		0.1003			kg	SW846 1312
Dry Weight, SPLP Leachate		0.08855			kg	SW846 1312
Total Organic Carbon [a]		1230	110		mg/kg	LLOYD KAHN 1988 MOD
JD1903-7	**P57-SS14-2N(2.5-3.0)**					
Acenaphthylene		25.7 J	36	18	ug/kg	SW846 8270D
Anthracene		22.1 J	36	22	ug/kg	SW846 8270D
Benzo(a)anthracene		59.7	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		65.0	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		76.4	36	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		50.6	36	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		22.5 J	36	17	ug/kg	SW846 8270D
1,1'-Biphenyl		7.1 J	72	4.9	ug/kg	SW846 8270D
Carbazole		9.1 J	72	5.2	ug/kg	SW846 8270D
Chrysene		59.4	36	11	ug/kg	SW846 8270D
Di-n-butyl phthalate		47.1 J	72	5.8	ug/kg	SW846 8270D
bis(2-Ethylhexyl)phthalate		48.3 J	72	8.4	ug/kg	SW846 8270D
Fluoranthene		79.7	36	16	ug/kg	SW846 8270D
Fluorene		23.1 J	36	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		48.1	36	17	ug/kg	SW846 8270D
2-Methylnaphthalene		19.9 J	36	8.1	ug/kg	SW846 8270D
Naphthalene		12.9 J	36	10	ug/kg	SW846 8270D
Phenanthrene		66.5	36	12	ug/kg	SW846 8270D
Pyrene		92.0	36	11	ug/kg	SW846 8270D
Total TIC, Semi-Volatile		1440 J			ug/kg	
JD1903-8	**P57-SS14-2S(2.5-3.0)**					
Benzo(a)anthracene		10.8 J	37	10	ug/kg	SW846 8270D

Summary of Hits

Job Number: JD1903
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 01/15/20 thru 01/16/20

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JD1903-9	**P57-SS14-2E(2.5-3.0)**					
Benzo(a)anthracene		16.2 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		17.7 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		18.5 J	36	16	ug/kg	SW846 8270D
JD1903-10	**P57-SS14-2W(2.5-3.0)**					
Benzo(a)anthracene		32.4 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		34.1 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		33.0 J	36	16	ug/kg	SW846 8270D
JD1903-11	**P57-SS14-2B(2.5-3.0)**					
Benzo(a)anthracene		21.3 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		25.8 J	36	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		25.3 J	36	16	ug/kg	SW846 8270D
JD1903-12	**P57-SS14-2BD(2.5-3.0)**					
Benzo(a)anthracene		25.3 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		34.4 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		31.6 J	36	16	ug/kg	SW846 8270D
JD1903-13	**2020-01-16-F57-FB**					
bis(2-Ethylhexyl)phthalate [b]		1.9 J	2.0	1.7	ug/l	SW846 8270D
JD1903-14	**P57-SS18-2N(0.0-0.5)**					
Acenaphthene		15.9 J	38	13	ug/kg	SW846 8270D
Acenaphthylene		32.8 J	38	19	ug/kg	SW846 8270D
Anthracene		32.3 J	38	23	ug/kg	SW846 8270D
Benzo(a)anthracene		39.7	38	11	ug/kg	SW846 8270D
Benzo(a)pyrene		44.4	38	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		53.7	38	17	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		37.8 J	38	19	ug/kg	SW846 8270D
Benzo(k)fluoranthene		19.7 J	38	18	ug/kg	SW846 8270D
1,1'-Biphenyl		22.1 J	76	5.2	ug/kg	SW846 8270D
Chrysene		58.9	38	12	ug/kg	SW846 8270D
Di-n-butyl phthalate		35.1 J	76	6.2	ug/kg	SW846 8270D
Fluoranthene		71.4	38	17	ug/kg	SW846 8270D
Fluorene		37.0 J	38	17	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		33.4 J	38	18	ug/kg	SW846 8270D
2-Methylnaphthalene		61.1	38	8.6	ug/kg	SW846 8270D

Summary of Hits

Job Number: JD1903
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 01/15/20 thru 01/16/20

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Naphthalene		22.1 J	38	11	ug/kg	SW846 8270D
Phenanthrene		72.4	38	13	ug/kg	SW846 8270D
Pyrene		124	38	12	ug/kg	SW846 8270D
Total TIC, Semi-Volatile		18130 J			ug/kg	
pH, SPLP Leachate		6.78			su	SW846 1312
Volume, SPLP Leachate		2.007			l	SW846 1312
Weight, SPLP Leachate		0.1004			kg	SW846 1312
Dry Weight, SPLP Leachate		0.08791			kg	SW846 1312
Total Organic Carbon [c]		6720	110		mg/kg	LLOYD KAHN 1988 MOD
JD1903-15	**P57-SS18-2S(0.0-0.5)**					
Benzo(a)anthracene		38.4	37	10	ug/kg	SW846 8270D
Benzo(a)pyrene		49.8	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		56.9	37	16	ug/kg	SW846 8270D
Benzo(g,h,i)perylene		40.0	37	18	ug/kg	SW846 8270D
Benzo(k)fluoranthene		21.3 J	37	17	ug/kg	SW846 8270D
Chrysene		42.4	37	12	ug/kg	SW846 8270D
Di-n-butyl phthalate		7.1 J	73	6.0	ug/kg	SW846 8270D
bis(2-Ethylhexyl)phthalate		11.7 J	73	8.5	ug/kg	SW846 8270D
Fluoranthene		75.5	37	16	ug/kg	SW846 8270D
Indeno(1,2,3-cd)pyrene		37.6	37	17	ug/kg	SW846 8270D
Phenanthrene		29.2 J	37	12	ug/kg	SW846 8270D
Pyrene		78.7	37	12	ug/kg	SW846 8270D
pH, SPLP Leachate		9.42			su	SW846 1312
Volume, SPLP Leachate		2.009			l	SW846 1312
Weight, SPLP Leachate		0.1005			kg	SW846 1312
Dry Weight, SPLP Leachate		0.08900			kg	SW846 1312
Total Organic Carbon [c]		2750	110		mg/kg	LLOYD KAHN 1988 MOD
Pentachlorophenol		9.8 J	13	1.7	ug/l	SW846 8270D
JD1903-16	**P57-SS18-2N(1.5-2.0)**					
Benzo(a)anthracene		33.9 J	38	11	ug/kg	SW846 8270D
Benzo(a)pyrene		34.4 J	38	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		39.7	38	17	ug/kg	SW846 8270D
JD1903-17	**P57-SS18-2S(1.5-2.0)**					
Benzo(a)anthracene		40.7	37	10	ug/kg	SW846 8270D
Benzo(a)pyrene		42.4	37	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		50.9	37	16	ug/kg	SW846 8270D

Summary of Hits

Job Number: JD1903
Account: AECOM, INC.
Project: Fort Monmouth, NJ
Collected: 01/15/20 thru 01/16/20

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JD1903-18	**P57-SS18-2E(1.5-2.0)**					
Benzo(a)anthracene		33.9 J	36	10	ug/kg	SW846 8270D
Benzo(a)pyrene		30.8 J	36	16	ug/kg	SW846 8270D
Benzo(b)fluoranthene		36.9	36	16	ug/kg	SW846 8270D
JD1903-19	**P57-SS18-2W(1.5-2.0)**					
Benzo(a)anthracene		39.6	38	11	ug/kg	SW846 8270D
Benzo(a)pyrene		44.9	38	17	ug/kg	SW846 8270D
Benzo(b)fluoranthene		57.5	38	17	ug/kg	SW846 8270D

(a) Analysis done last day of holding time.
(b) Sample extracted outside the holding time due to lab contamination of the batch associated BSD on the original extract. Original prep date was within holding time. Associated CCV outside of control limits high.
(c) Multiple injections indicate possible sample non-homogeneity.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID: P57-SS12-2N(2.5-3.0)
Lab Sample ID: JD1903-1
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 89.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190187.D	1	01/30/20 14:00	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	31.3 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	72	18	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	22	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	31	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	64	ug/kg	
51-28-5	2,4-Dinitrophenol [a]	ND	180	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol [a]	ND	180	38	ug/kg	
95-48-7	2-Methylphenol	ND	72	23	ug/kg	
	3&4-Methylphenol	ND	72	29	ug/kg	
88-75-5	2-Nitrophenol [a]	ND	180	24	ug/kg	
100-02-7	4-Nitrophenol [a]	ND	360	96	ug/kg	
87-86-5	Pentachlorophenol [a]	ND	140	34	ug/kg	
108-95-2	Phenol	ND	72	19	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	180	24	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	27	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	21	ug/kg	
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	27.5	36	18	ug/kg	J
98-86-2	Acetophenone	ND	180	7.7	ug/kg	
120-12-7	Anthracene	22.1	36	22	ug/kg	J
1912-24-9	Atrazine [a]	ND	72	15	ug/kg	
56-55-3	Benzo(a)anthracene	57.1	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	58.2	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	84.1	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	53.4	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	27.1	36	17	ug/kg	J
101-55-3	4-Bromophenyl phenyl ether	ND	72	14	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	72	8.7	ug/kg	
92-52-4	1,1'-Biphenyl	11.5	72	4.9	ug/kg	J
100-52-7	Benzaldehyde	ND	180	8.9	ug/kg	
91-58-7	2-Chloronaphthalene	ND	72	8.5	ug/kg	
106-47-8	4-Chloroaniline	ND	180	13	ug/kg	
86-74-8	Carbazole	9.1	72	5.2	ug/kg	J

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-2N(2.5-3.0)
Lab Sample ID: JD1903-1
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 89.1

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam [b]	ND	72	14	ug/kg	
218-01-9	Chrysene	79.5	36	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	72	7.7	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	72	15	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	72	13	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	72	12	ug/kg	
121-14-2	2,4-Dinitrotoluene [a]	ND	36	11	ug/kg	
606-20-2	2,6-Dinitrotoluene [a]	ND	36	18	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	72	30	ug/kg	
123-91-1	1,4-Dioxane	ND	36	24	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
132-64-9	Dibenzofuran	ND	72	15	ug/kg	
84-74-2	Di-n-butyl phthalate	37.6	72	5.8	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	72	8.9	ug/kg	
84-66-2	Diethyl phthalate	ND	72	7.6	ug/kg	
131-11-3	Dimethyl phthalate	ND	72	6.4	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	25.8	72	8.4	ug/kg	J
206-44-0	Fluoranthene	102	36	16	ug/kg	
86-73-7	Fluorene	16.8	36	16	ug/kg	J
118-74-1	Hexachlorobenzene	ND	72	9.1	ug/kg	
87-68-3	Hexachlorobutadiene	ND	36	14	ug/kg	
77-47-4	Hexachlorocyclopentadiene [a]	ND	360	14	ug/kg	
67-72-1	Hexachloroethane	ND	180	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	45.9	36	17	ug/kg	
78-59-1	Isophorone	ND	72	7.7	ug/kg	
91-57-6	2-Methylnaphthalene	49.6	36	8.1	ug/kg	
88-74-4	2-Nitroaniline	ND	180	8.5	ug/kg	
99-09-2	3-Nitroaniline	ND	180	9.0	ug/kg	
100-01-6	4-Nitroaniline	ND	180	9.3	ug/kg	
91-20-3	Naphthalene	23.8	36	10	ug/kg	J
98-95-3	Nitrobenzene	ND	72	14	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	72	10	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	13	ug/kg	
85-01-8	Phenanthrene	73.0	36	12	ug/kg	
129-00-0	Pyrene	126	36	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	180	9.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	59%		19-93%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS12-2N(2.5-3.0)		
Lab Sample ID:	JD1903-1	**Date Sampled:**	01/15/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3546	**Percent Solids:**	89.1
Project:	Fort Monmouth, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	60%		20-95%
118-79-6	2,4,6-Tribromophenol	100%		15-110%
4165-60-0	Nitrobenzene-d5	67%		18-112%
321-60-8	2-Fluorobiphenyl	79%		24-100%
1718-51-0	Terphenyl-d14	96%		28-109%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact/aldol-condensation	3.33	3300	ug/kg	J
	alkane	7.94	270	ug/kg	J
	alkane	10.06	190	ug/kg	J
	Total TIC, Semi-Volatile		460	ug/kg	J

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS12-2N(2.5-3.0)		
Lab Sample ID:	JD1903-1	**Date Sampled:**	01/15/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
		Percent Solids:	89.1
Project:	Fort Monmouth, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Moisture, Percent	10.9		%	1	01/27/20 15:50	BG	SM2540 G 18TH ED MOD

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS12-2S(2.5-3.0)
Lab Sample ID: JD1903-2
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 91.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190188.D	1	01/30/20 14:26	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	71	18	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	22	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	30	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	63	ug/kg	
51-28-5	2,4-Dinitrophenol [a]	ND	180	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol [a]	ND	180	38	ug/kg	
95-48-7	2-Methylphenol	ND	71	23	ug/kg	
	3&4-Methylphenol	ND	71	29	ug/kg	
88-75-5	2-Nitrophenol [a]	ND	180	24	ug/kg	
100-02-7	4-Nitrophenol [a]	ND	360	95	ug/kg	
87-86-5	Pentachlorophenol [a]	ND	140	33	ug/kg	
108-95-2	Phenol	ND	71	19	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	180	24	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	27	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	21	ug/kg	
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	137	36	18	ug/kg	
98-86-2	Acetophenone	ND	180	7.7	ug/kg	
120-12-7	Anthracene	74.1	36	22	ug/kg	
1912-24-9	Atrazine [a]	ND	71	15	ug/kg	
56-55-3	Benzo(a)anthracene	164	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	243	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	224	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	190	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	78.9	36	17	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	71	14	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	71	8.7	ug/kg	
92-52-4	1,1'-Biphenyl	10.5	71	4.9	ug/kg	J
100-52-7	Benzaldehyde	ND	180	8.8	ug/kg	
91-58-7	2-Chloronaphthalene	ND	71	8.5	ug/kg	
106-47-8	4-Chloroaniline	ND	180	13	ug/kg	
86-74-8	Carbazole	6.8	71	5.2	ug/kg	J

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-2S(2.5-3.0)
Lab Sample ID: JD1903-2
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 91.7

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam [b]	ND	71	14	ug/kg	
218-01-9	Chrysene	201	36	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	71	7.6	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	71	15	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	71	13	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	71	12	ug/kg	
121-14-2	2,4-Dinitrotoluene [a]	ND	36	11	ug/kg	
606-20-2	2,6-Dinitrotoluene [a]	ND	36	18	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	71	30	ug/kg	
123-91-1	1,4-Dioxane	ND	36	24	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	45.0	36	16	ug/kg	
132-64-9	Dibenzofuran	ND	71	15	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	71	5.8	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	71	8.9	ug/kg	
84-66-2	Diethyl phthalate	ND	71	7.6	ug/kg	
131-11-3	Dimethyl phthalate	ND	71	6.3	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	20.0	71	8.3	ug/kg	J
206-44-0	Fluoranthene	137	36	16	ug/kg	
86-73-7	Fluorene	31.2	36	16	ug/kg	J
118-74-1	Hexachlorobenzene	ND	71	9.0	ug/kg	
87-68-3	Hexachlorobutadiene	ND	36	14	ug/kg	
77-47-4	Hexachlorocyclopentadiene [a]	ND	360	14	ug/kg	
67-72-1	Hexachloroethane	ND	180	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	155	36	17	ug/kg	
78-59-1	Isophorone	ND	71	7.6	ug/kg	
91-57-6	2-Methylnaphthalene	47.6	36	8.1	ug/kg	
88-74-4	2-Nitroaniline	ND	180	8.4	ug/kg	
99-09-2	3-Nitroaniline	ND	180	8.9	ug/kg	
100-01-6	4-Nitroaniline	ND	180	9.2	ug/kg	
91-20-3	Naphthalene	26.6	36	10	ug/kg	J
98-95-3	Nitrobenzene	ND	71	14	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	71	10	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	13	ug/kg	
85-01-8	Phenanthrene	71.9	36	12	ug/kg	
129-00-0	Pyrene	280	36	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	180	9.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	39%		19-93%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-2S(2.5-3.0)
Lab Sample ID: JD1903-2
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 91.7

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	39%		20-95%
118-79-6	2,4,6-Tribromophenol	58%		15-110%
4165-60-0	Nitrobenzene-d5	46%		18-112%
321-60-8	2-Fluorobiphenyl	49%		24-100%
1718-51-0	Terphenyl-d14	60%		28-109%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact/aldol-condensation	3.32	970	ug/kg	J
	Phenanthrene dimethyl	10.52	150	ug/kg	J
	Pyrene dimethyl-	13.03	170	ug/kg	J
	Chrysene methyl	14.74	220	ug/kg	J
	unknown PAH substance	16.63	200	ug/kg	J
	unknown	20.15	160	ug/kg	J
	Total TIC, Semi-Volatile		900	ug/kg	J

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS12-2S(2.5-3.0)		
Lab Sample ID:	JD1903-2	**Date Sampled:**	01/15/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
		Percent Solids:	91.7
Project:	Fort Monmouth, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Moisture, Percent	8.3		%	1	01/27/20 15:50	BG	SM2540 G 18TH ED MOD

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS12-2S(2.5-3.0)
Lab Sample ID: JD1903-2R
Matrix: SO - Soil
Method: SW846 8270D SW846 3510C
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 91.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	P134610.D	1	02/11/20 18:44	AR	02/06/20 10:30	OP25562	EP6115
Run #2							

	Initial Volume	Final Volume
Run #1	875 ml	1.0 ml
Run #2		

ABN SPLP Leachate **SPLP Leachate method SW846 1312**

CAS No.	Compound	Result	MCL	RL	MDL	Units	Q
95-48-7	2-Methylphenol	ND		2.3	1.0	ug/l	
	3&4-Methylphenol	ND		2.3	1.0	ug/l	
87-86-5	Pentachlorophenol	ND		11	1.6	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND		5.7	1.5	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND		5.7	1.1	ug/l	
106-46-7	1,4-Dichlorobenzene	ND		2.3	0.20	ug/l	
121-14-2	2,4-Dinitrotoluene	ND		2.3	0.63	ug/l	
118-74-1	Hexachlorobenzene	ND		2.3	0.37	ug/l	
87-68-3	Hexachlorobutadiene	ND		1.1	0.56	ug/l	
67-72-1	Hexachloroethane	ND		5.7	0.45	ug/l	
98-95-3	Nitrobenzene	ND		2.3	0.73	ug/l	
110-86-1	Pyridine	ND		2.3	0.44	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	59%		10-73%
4165-62-2	Phenol-d5	50%		10-64%
118-79-6	2,4,6-Tribromophenol	82%		31-130%
4165-60-0	Nitrobenzene-d5	76%		28-126%
321-60-8	2-Fluorobiphenyl	77%		26-114%
1718-51-0	Terphenyl-d14	56%		16-122%

ND = Not detected MDL = Method Detection Limit
MCL = Maximum Contamination Level (not available)
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS12-2S(2.5-3.0)		
Lab Sample ID:	JD1903-2R	**Date Sampled:**	01/15/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
		Percent Solids:	91.7
Project:	Fort Monmouth, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	8.35		su	1	02/06/20 10:20	TM	SW846 1312
Volume, SPLP Leachate	2.017		l	1	02/06/20 10:20	TM	SW846 1312
Weight, SPLP Leachate	0.1085		kg	1	02/06/20 10:20	TM	SW846 1312
Dry Weight, SPLP Leachate	0.09248		kg	1	02/06/20 10:20	TM	SW846 1312

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS12-2W(2.5-3.0)
Lab Sample ID: JD1903-3
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 90.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190189.D	1	01/30/20 14:53	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	73	18	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	22	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	31	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	65	ug/kg	
51-28-5	2,4-Dinitrophenol [a]	ND	180	140	ug/kg	
534-52-1	4,6-Dinitro-o-cresol [a]	ND	180	39	ug/kg	
95-48-7	2-Methylphenol	ND	73	23	ug/kg	
	3&4-Methylphenol	ND	73	30	ug/kg	
88-75-5	2-Nitrophenol [a]	ND	180	24	ug/kg	
100-02-7	4-Nitrophenol [a]	ND	360	97	ug/kg	
87-86-5	Pentachlorophenol [a]	ND	150	34	ug/kg	
108-95-2	Phenol	ND	73	19	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	180	24	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	27	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	22	ug/kg	
83-32-9	Acenaphthene	15.4	36	13	ug/kg	J
208-96-8	Acenaphthylene	99.5	36	19	ug/kg	
98-86-2	Acetophenone	ND	180	7.8	ug/kg	
120-12-7	Anthracene	62.7	36	22	ug/kg	
1912-24-9	Atrazine [a]	ND	73	16	ug/kg	
56-55-3	Benzo(a)anthracene	137	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	190	36	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	185	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	147	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	65.8	36	17	ug/kg	
101-55-3	4-Bromophenyl phenyl ether	ND	73	14	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	73	8.9	ug/kg	
92-52-4	1,1'-Biphenyl	11.4	73	5.0	ug/kg	J
100-52-7	Benzaldehyde	ND	180	9.0	ug/kg	
91-58-7	2-Chloronaphthalene	ND	73	8.7	ug/kg	
106-47-8	4-Chloroaniline	ND	180	13	ug/kg	
86-74-8	Carbazole	6.5	73	5.3	ug/kg	J

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS12-2W(2.5-3.0)
Lab Sample ID: JD1903-3
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 90.5

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam [b]	ND	73	14	ug/kg	
218-01-9	Chrysene	161	36	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	73	7.8	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	73	16	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	73	13	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	73	12	ug/kg	
121-14-2	2,4-Dinitrotoluene [a]	ND	36	11	ug/kg	
606-20-2	2,6-Dinitrotoluene [a]	ND	36	18	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	73	30	ug/kg	
123-91-1	1,4-Dioxane	ND	36	24	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	36.8	36	16	ug/kg	
132-64-9	Dibenzofuran	ND	73	15	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	73	5.9	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	73	9.1	ug/kg	
84-66-2	Diethyl phthalate	ND	73	7.8	ug/kg	
131-11-3	Dimethyl phthalate	ND	73	6.5	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	24.2	73	8.5	ug/kg	J
206-44-0	Fluoranthene	141	36	16	ug/kg	
86-73-7	Fluorene	32.3	36	17	ug/kg	J
118-74-1	Hexachlorobenzene	ND	73	9.2	ug/kg	
87-68-3	Hexachlorobutadiene	ND	36	15	ug/kg	
77-47-4	Hexachlorocyclopentadiene [a]	ND	360	15	ug/kg	
67-72-1	Hexachloroethane	ND	180	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	124	36	17	ug/kg	
78-59-1	Isophorone	ND	73	7.8	ug/kg	
91-57-6	2-Methylnaphthalene	44.3	36	8.2	ug/kg	
88-74-4	2-Nitroaniline	ND	180	8.6	ug/kg	
99-09-2	3-Nitroaniline	ND	180	9.1	ug/kg	
100-01-6	4-Nitroaniline	ND	180	9.4	ug/kg	
91-20-3	Naphthalene	23.5	36	10	ug/kg	J
98-95-3	Nitrobenzene	ND	73	14	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	73	11	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	13	ug/kg	
85-01-8	Phenanthrene	87.0	36	12	ug/kg	
129-00-0	Pyrene	242	36	12	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	180	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	56%		19-93%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS12-2W(2.5-3.0)		
Lab Sample ID:	JD1903-3	**Date Sampled:**	01/15/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3546	**Percent Solids:**	90.5
Project:	Fort Monmouth, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	55%		20-95%
118-79-6	2,4,6-Tribromophenol	84%		15-110%
4165-60-0	Nitrobenzene-d5	63%		18-112%
321-60-8	2-Fluorobiphenyl	73%		24-100%
1718-51-0	Terphenyl-d14	83%		28-109%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact/aldol-condensation	3.32	3000	ug/kg	J
	Chrysene methyl	14.74	170	ug/kg	J
	unknown	18.02	150	ug/kg	J
	Total TIC, Semi-Volatile		320	ug/kg	J

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS12-2W(2.5-3.0)		
Lab Sample ID:	JD1903-3	**Date Sampled:**	01/15/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
		Percent Solids:	90.5
Project:	Fort Monmouth, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Moisture, Percent	9.5		%	1	01/27/20 15:50	BG	SM2540 G 18TH ED MOD

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS13-2E(2.5-3.0)
Lab Sample ID: JD1903-4
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 84.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190177.D	1	01/30/20 08:11	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
50-32-8	Benzo(a)pyrene	ND	40	18	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		18-112%
321-60-8	2-Fluorobiphenyl	71%		24-100%
1718-51-0	Terphenyl-d14	90%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS13-2S(2.5-3.0)
Lab Sample ID: JD1903-5
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/15/20
Date Received: 01/16/20
Percent Solids: 82.8

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M163319.D	1	01/30/20 09:20	CS	01/28/20 15:30	OP25397	EM6910
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
50-32-8	Benzo(a)pyrene	ND	40	18	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	69%		18-112%
321-60-8	2-Fluorobiphenyl	72%		24-100%
1718-51-0	Terphenyl-d14	81%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2S(2.5-3.0)
Lab Sample ID: JD1903-6
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 88.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190178.D	1	01/30/20 08:38	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	74	18	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	23	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	32	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	66	ug/kg	
51-28-5	2,4-Dinitrophenol [a]	ND	190	140	ug/kg	
534-52-1	4,6-Dinitro-o-cresol [a]	ND	190	40	ug/kg	
95-48-7	2-Methylphenol	ND	74	24	ug/kg	
	3&4-Methylphenol	ND	74	31	ug/kg	
88-75-5	2-Nitrophenol [a]	ND	190	25	ug/kg	
100-02-7	4-Nitrophenol [a]	ND	370	99	ug/kg	
87-86-5	Pentachlorophenol [a]	ND	150	35	ug/kg	
108-95-2	Phenol	ND	74	19	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	190	25	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	28	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	22	ug/kg	
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
98-86-2	Acetophenone	ND	190	8.0	ug/kg	
120-12-7	Anthracene	ND	37	23	ug/kg	
1912-24-9	Atrazine [a]	ND	74	16	ug/kg	
56-55-3	Benzo(a)anthracene	68.4	37	11	ug/kg	
50-32-8	Benzo(a)pyrene	64.2	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	74.5	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	45.3	37	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	27.1	37	17	ug/kg	J
101-55-3	4-Bromophenyl phenyl ether	ND	74	14	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	74	9.1	ug/kg	
92-52-4	1,1'-Biphenyl	5.6	74	5.1	ug/kg	J
100-52-7	Benzaldehyde	ND	190	9.2	ug/kg	
91-58-7	2-Chloronaphthalene	ND	74	8.8	ug/kg	
106-47-8	4-Chloroaniline	ND	190	13	ug/kg	
86-74-8	Carbazole	5.7	74	5.4	ug/kg	J

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2S(2.5-3.0)
Lab Sample ID: JD1903-6
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 88.3

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam [b]	ND	74	15	ug/kg	
218-01-9	Chrysene	69.5	37	12	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	74	7.9	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	74	16	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	74	13	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	74	12	ug/kg	
121-14-2	2,4-Dinitrotoluene [a]	ND	37	12	ug/kg	
606-20-2	2,6-Dinitrotoluene [a]	ND	37	19	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	74	31	ug/kg	
123-91-1	1,4-Dioxane	ND	37	25	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
132-64-9	Dibenzofuran	ND	74	15	ug/kg	
84-74-2	Di-n-butyl phthalate	ND	74	6.1	ug/kg	
117-84-0	Di-n-octyl phthalate	ND	74	9.2	ug/kg	
84-66-2	Diethyl phthalate	ND	74	7.9	ug/kg	
131-11-3	Dimethyl phthalate	ND	74	6.6	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	16.0	74	8.7	ug/kg	J
206-44-0	Fluoranthene	98.4	37	17	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
118-74-1	Hexachlorobenzene	ND	74	9.4	ug/kg	
87-68-3	Hexachlorobutadiene	ND	37	15	ug/kg	
77-47-4	Hexachlorocyclopentadiene [a]	ND	370	15	ug/kg	
67-72-1	Hexachloroethane	ND	190	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	39.1	37	17	ug/kg	
78-59-1	Isophorone	ND	74	7.9	ug/kg	
91-57-6	2-Methylnaphthalene	ND	37	8.4	ug/kg	
88-74-4	2-Nitroaniline	ND	190	8.8	ug/kg	
99-09-2	3-Nitroaniline	ND	190	9.3	ug/kg	
100-01-6	4-Nitroaniline	ND	190	9.6	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
98-95-3	Nitrobenzene	ND	74	14	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	74	11	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	14	ug/kg	
85-01-8	Phenanthrene	53.2	37	12	ug/kg	
129-00-0	Pyrene	138	37	12	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	190	9.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	56%		19-93%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-2S(2.5-3.0)		
Lab Sample ID:	JD1903-6	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3546	**Percent Solids:**	88.3
Project:	Fort Monmouth, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	55%		20-95%
118-79-6	2,4,6-Tribromophenol	70%		15-110%
4165-60-0	Nitrobenzene-d5	63%		18-112%
321-60-8	2-Fluorobiphenyl	73%		24-100%
1718-51-0	Terphenyl-d14	86%		28-109%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact/aldol-condensation	3.33	3700	ug/kg	J
	alkane	7.92	210	ug/kg	J
	unknown	10.04	190	ug/kg	J
	Total TIC, Semi-Volatile		400	ug/kg	J

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2S(2.5-3.0)
Lab Sample ID: JD1903-6
Matrix: SO - Soil
Method: SW846 8270D SW846 3510C
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 88.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E109583.D	1	01/31/20 19:55	AR	01/31/20 07:10	OP25562	E3E4938
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

ABN SPLP Leachate **SPLP Leachate method SW846 1312**

CAS No.	Compound	Result	MCL	RL	MDL	Units	Q
95-48-7	2-Methylphenol	ND		2.5	1.1	ug/l	
	3&4-Methylphenol	ND		2.5	1.1	ug/l	
87-86-5	Pentachlorophenol	ND		13	1.7	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND		6.3	1.7	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND		6.3	1.2	ug/l	
106-46-7	1,4-Dichlorobenzene	ND		2.5	0.22	ug/l	
121-14-2	2,4-Dinitrotoluene [a]	ND		2.5	0.69	ug/l	
118-74-1	Hexachlorobenzene	ND		2.5	0.41	ug/l	
87-68-3	Hexachlorobutadiene	ND		1.3	0.62	ug/l	
67-72-1	Hexachloroethane	ND		6.3	0.49	ug/l	
98-95-3	Nitrobenzene	ND		2.5	0.80	ug/l	
110-86-1	Pyridine	ND		2.5	0.49	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	47%		10-73%
4165-62-2	Phenol-d5	36%		10-64%
118-79-6	2,4,6-Tribromophenol	79%		31-130%
4165-60-0	Nitrobenzene-d5	86%		28-126%
321-60-8	2-Fluorobiphenyl	79%		26-114%
1718-51-0	Terphenyl-d14	66%		16-122%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
MCL = Maximum Contamination Level (not available)
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2S(2.5-3.0)
Lab Sample ID: JD1903-6
Matrix: SO - Soil
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 88.3

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	6.58		su	1	01/29/20 09:50	AI	SW846 1312
Volume, SPLP Leachate	2.006		l	1	01/29/20 09:50	AI	SW846 1312
Weight, SPLP Leachate	0.1003		kg	1	01/29/20 09:50	AI	SW846 1312
Dry Weight, SPLP Leachate	0.08855		kg	1	01/29/20 09:50	AI	SW846 1312
Moisture, Percent	11.7		%	1	01/27/20 15:50	BG	SM2540 G 18TH ED MOD
Total Organic Carbon [a]	1230	110	mg/kg	1	01/30/20 11:10	CD	LLOYD KAHN 1988 MOD

(a) Analysis done last day of holding time.

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS14-2N(2.5-3.0)
Lab Sample ID: JD1903-7
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 90.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190190.D	1	01/30/20 15:19	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	72	18	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	22	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	31	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	64	ug/kg	
51-28-5	2,4-Dinitrophenol [a]	ND	180	130	ug/kg	
534-52-1	4,6-Dinitro-o-cresol [a]	ND	180	38	ug/kg	
95-48-7	2-Methylphenol	ND	72	23	ug/kg	
	3&4-Methylphenol	ND	72	29	ug/kg	
88-75-5	2-Nitrophenol [a]	ND	180	24	ug/kg	
100-02-7	4-Nitrophenol [a]	ND	360	96	ug/kg	
87-86-5	Pentachlorophenol [a]	ND	140	34	ug/kg	
108-95-2	Phenol	ND	72	19	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	180	24	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	27	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	21	ug/kg	
83-32-9	Acenaphthene	ND	36	12	ug/kg	
208-96-8	Acenaphthylene	25.7	36	18	ug/kg	J
98-86-2	Acetophenone	ND	180	7.7	ug/kg	
120-12-7	Anthracene	22.1	36	22	ug/kg	J
1912-24-9	Atrazine [a]	ND	72	15	ug/kg	
56-55-3	Benzo(a)anthracene	59.7	36	10	ug/kg	
50-32-8	Benzo(a)pyrene	65.0	36	16	ug/kg	
205-99-2	Benzo(b)fluoranthene	76.4	36	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	50.6	36	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	22.5	36	17	ug/kg	J
101-55-3	4-Bromophenyl phenyl ether	ND	72	14	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	72	8.7	ug/kg	
92-52-4	1,1'-Biphenyl	7.1	72	4.9	ug/kg	J
100-52-7	Benzaldehyde	ND	180	8.9	ug/kg	
91-58-7	2-Chloronaphthalene	ND	72	8.5	ug/kg	
106-47-8	4-Chloroaniline	ND	180	13	ug/kg	
86-74-8	Carbazole	9.1	72	5.2	ug/kg	J

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2N(2.5-3.0)
Lab Sample ID: JD1903-7
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 90.7

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam [b]	ND	72	14	ug/kg	
218-01-9	Chrysene	59.4	36	11	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	72	7.7	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	72	15	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	72	13	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	72	12	ug/kg	
121-14-2	2,4-Dinitrotoluene [a]	ND	36	11	ug/kg	
606-20-2	2,6-Dinitrotoluene [a]	ND	36	18	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	72	30	ug/kg	
123-91-1	1,4-Dioxane	ND	36	24	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	
132-64-9	Dibenzofuran	ND	72	15	ug/kg	
84-74-2	Di-n-butyl phthalate	47.1	72	5.8	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	72	8.9	ug/kg	
84-66-2	Diethyl phthalate	ND	72	7.6	ug/kg	
131-11-3	Dimethyl phthalate	ND	72	6.4	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	48.3	72	8.4	ug/kg	J
206-44-0	Fluoranthene	79.7	36	16	ug/kg	
86-73-7	Fluorene	23.1	36	16	ug/kg	J
118-74-1	Hexachlorobenzene	ND	72	9.1	ug/kg	
87-68-3	Hexachlorobutadiene	ND	36	14	ug/kg	
77-47-4	Hexachlorocyclopentadiene [a]	ND	360	14	ug/kg	
67-72-1	Hexachloroethane	ND	180	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	48.1	36	17	ug/kg	
78-59-1	Isophorone	ND	72	7.7	ug/kg	
91-57-6	2-Methylnaphthalene	19.9	36	8.1	ug/kg	J
88-74-4	2-Nitroaniline	ND	180	8.4	ug/kg	
99-09-2	3-Nitroaniline	ND	180	8.9	ug/kg	
100-01-6	4-Nitroaniline	ND	180	9.3	ug/kg	
91-20-3	Naphthalene	12.9	36	10	ug/kg	J
98-95-3	Nitrobenzene	ND	72	14	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	72	10	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	13	ug/kg	
85-01-8	Phenanthrene	66.5	36	12	ug/kg	
129-00-0	Pyrene	92.0	36	11	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	180	9.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	53%		19-93%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2N(2.5-3.0)
Lab Sample ID: JD1903-7
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 90.7

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	53%		20-95%
118-79-6	2,4,6-Tribromophenol	87%		15-110%
4165-60-0	Nitrobenzene-d5	62%		18-112%
321-60-8	2-Fluorobiphenyl	73%		24-100%
1718-51-0	Terphenyl-d14	85%		28-109%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact/aldol-condensation	3.32	900	ug/kg	J
	alkane	7.33	250	ug/kg	J
	alkane	7.60	150	ug/kg	J
	alkane	7.93	420	ug/kg	J
	alkane	8.58	210	ug/kg	J
	alkane	9.30	210	ug/kg	J
	alkane	10.07	200	ug/kg	J
	Total TIC, Semi-Volatile		1440	ug/kg	J

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS14-2N(2.5-3.0)		
Lab Sample ID:	JD1903-7	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
		Percent Solids:	90.7
Project:	Fort Monmouth, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Moisture, Percent	9.3		%	1	01/27/20 15:50	BG	SM2540 G 18TH ED MOD

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS14-2S(2.5-3.0)
Lab Sample ID: JD1903-8
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 89.2

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M163320.D	1	01/30/20 10:51	CS	01/28/20 15:30	OP25397	EM6910
Run #2							

	Initial Weight	Final Volume
Run #1	30.5 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	10.8	37	10	ug/kg	J
50-32-8	Benzo(a)pyrene	ND	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	37	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	55%		18-112%
321-60-8	2-Fluorobiphenyl	63%		24-100%
1718-51-0	Terphenyl-d14	72%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2E(2.5-3.0)
Lab Sample ID: JD1903-9
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 89.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M163321.D	1	01/30/20 11:20	CS	01/28/20 15:30	OP25397	EM6910
Run #2							

	Initial Weight	Final Volume
Run #1	31.6 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	16.2	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	17.7	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	18.5	36	16	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	64%		18-112%
321-60-8	2-Fluorobiphenyl	69%		24-100%
1718-51-0	Terphenyl-d14	71%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2W(2.5-3.0)
Lab Sample ID: JD1903-10
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 90.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190179.D	1	01/30/20 09:04	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	32.4	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	34.1	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	33.0	36	16	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	56%		18-112%
321-60-8	2-Fluorobiphenyl	63%		24-100%
1718-51-0	Terphenyl-d14	81%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2B(2.5-3.0)
Lab Sample ID: JD1903-11
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 88.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190180.D	1	01/30/20 09:31	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	21.3	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	25.8	36	17	ug/kg	J
205-99-2	Benzo(b)fluoranthene	25.3	36	16	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	60%		18-112%
321-60-8	2-Fluorobiphenyl	71%		24-100%
1718-51-0	Terphenyl-d14	95%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS14-2BD(2.5-3.0)
Lab Sample ID: JD1903-12
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 90.0

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190181.D	1	01/30/20 09:57	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	31.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	25.3	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	34.4	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	31.6	36	16	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	62%		18-112%
321-60-8	2-Fluorobiphenyl	67%		24-100%
1718-51-0	Terphenyl-d14	86%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	2020-01-16-F57-FB		
Lab Sample ID:	JD1903-13	**Date Sampled:**	01/16/20
Matrix:	AQ - Field Blank Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	n/a
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	M163285.D	1	01/29/20 18:26	HSS	01/28/20 06:00	OP25464	EM6909
Run #2 [b]	3E109297.D	1	01/23/20 19:26	HSS	01/21/20 04:55	OP25359	E3E4927

	Initial Volume	Final Volume
Run #1	1000 ml	1.0 ml
Run #2	1040 ml	1.0 ml

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	5.0	0.82	ug/l	
59-50-7	4-Chloro-3-methyl phenol	ND	5.0	0.89	ug/l	
120-83-2	2,4-Dichlorophenol	ND	2.0	1.3	ug/l	
105-67-9	2,4-Dimethylphenol [c]	ND	5.0	2.4	ug/l	
51-28-5	2,4-Dinitrophenol [c]	ND	5.0	1.6	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	5.0	1.3	ug/l	
95-48-7	2-Methylphenol [c]	ND	2.0	0.89	ug/l	
	3&4-Methylphenol [c]	ND	2.0	0.88	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	0.96	ug/l	
100-02-7	4-Nitrophenol	ND	10	1.2	ug/l	
87-86-5	Pentachlorophenol [c]	ND	4.0	1.4	ug/l	
108-95-2	Phenol	ND	2.0	0.39	ug/l	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	5.0	1.5	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND	5.0	1.3	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	0.92	ug/l	
83-32-9	Acenaphthene	ND	1.0	0.19	ug/l	
208-96-8	Acenaphthylene	ND	1.0	0.14	ug/l	
98-86-2	Acetophenone	ND	2.0	0.21	ug/l	
120-12-7	Anthracene	ND	1.0	0.21	ug/l	
1912-24-9	Atrazine [c]	ND	2.0	0.45	ug/l	
100-52-7	Benzaldehyde	ND	5.0	0.29	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.0	0.20	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.0	0.21	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	1.0	0.21	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.0	0.34	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.0	0.21	ug/l	
101-55-3	4-Bromophenyl phenyl ether	ND	2.0	0.40	ug/l	
85-68-7	Butyl benzyl phthalate	ND	2.0	0.46	ug/l	
92-52-4	1,1'-Biphenyl	ND	1.0	0.21	ug/l	
91-58-7	2-Chloronaphthalene	ND	2.0	0.24	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	0.34	ug/l	
86-74-8	Carbazole	ND	1.0	0.23	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	2020-01-16-F57-FB		
Lab Sample ID:	JD1903-13	**Date Sampled:**	01/16/20
Matrix:	AQ - Field Blank Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	n/a
Project:	Fort Monmouth, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam	ND	2.0	0.65	ug/l	
218-01-9	Chrysene	ND	1.0	0.18	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	2.0	0.28	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	2.0	0.25	ug/l	
108-60-1	2,2'-Oxybis(1-chloropropane) [c]	ND	2.0	0.40	ug/l	
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.0	0.37	ug/l	
121-14-2	2,4-Dinitrotoluene	ND	1.0	0.55	ug/l	
606-20-2	2,6-Dinitrotoluene	ND	1.0	0.48	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	2.0	0.51	ug/l	
123-91-1	1,4-Dioxane	ND	1.0	0.66	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.0	0.33	ug/l	
132-64-9	Dibenzofuran	ND	5.0	0.22	ug/l	
84-74-2	Di-n-butyl phthalate	ND	2.0	0.50	ug/l	
117-84-0	Di-n-octyl phthalate	ND	2.0	0.23	ug/l	
84-66-2	Diethyl phthalate	ND	2.0	0.26	ug/l	
131-11-3	Dimethyl phthalate	ND	2.0	0.22	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate [d]	1.9	2.0	1.7	ug/l	J
206-44-0	Fluoranthene	ND	1.0	0.17	ug/l	
86-73-7	Fluorene	ND	1.0	0.17	ug/l	
118-74-1	Hexachlorobenzene	ND	1.0	0.33	ug/l	
87-68-3	Hexachlorobutadiene	ND	1.0	0.49	ug/l	
77-47-4	Hexachlorocyclopentadiene [c]	ND	10	2.8	ug/l	
67-72-1	Hexachloroethane	ND	2.0	0.39	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.0	0.33	ug/l	
78-59-1	Isophorone	ND	2.0	0.28	ug/l	
91-57-6	2-Methylnaphthalene	ND	1.0	0.21	ug/l	
88-74-4	2-Nitroaniline	ND	5.0	0.28	ug/l	
99-09-2	3-Nitroaniline	ND	5.0	0.39	ug/l	
100-01-6	4-Nitroaniline	ND	5.0	0.44	ug/l	
91-20-3	Naphthalene	ND	1.0	0.23	ug/l	
98-95-3	Nitrobenzene	ND	2.0	0.64	ug/l	
621-64-7	N-Nitroso-di-n-propylamine [c]	ND	2.0	0.48	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	0.22	ug/l	
85-01-8	Phenanthrene	ND	1.0	0.18	ug/l	
129-00-0	Pyrene	ND	1.0	0.22	ug/l	
95-94-3	1,2,4,5-Tetrachlorobenzene [c]	ND	2.0	0.37	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	50%	39%	10-73%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	2020-01-16-F57-FB		
Lab Sample ID:	JD1903-13	**Date Sampled:**	01/16/20
Matrix:	AQ - Field Blank Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	n/a
Project:	Fort Monmouth, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	41%	25%	10-64%
118-79-6	2,4,6-Tribromophenol	95%	86%	31-130%
4165-60-0	Nitrobenzene-d5	77%	88%	28-126%
321-60-8	2-Fluorobiphenyl	76%	68%	26-114%
1718-51-0	Terphenyl-d14	85%	91%	16-122%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Semi-Volatile		0	ug/l	

(a) Sample extracted outside the holding time due to lab contamination of the batch associated BSD on the original extract. Original prep date was within holding time.
(b) Confirmation run.
(c) Associated CCV outside of control limits high, sample was ND.
(d) Associated CCV outside of control limits high.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	2020-01-16-F57-FB		
Lab Sample ID:	JD1903-13	**Date Sampled:**	01/16/20
Matrix:	AQ - Field Blank Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	n/a
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E109584.D	1	01/31/20 20:19	AR	01/31/20 07:10	OP25563	E3E4938
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

ABN SPLP Leachate **SPLP Leachate method SW846 1312**

CAS No.	Compound	Result	MCL	RL	MDL	Units	Q
95-48-7	2-Methylphenol	ND		2.5	1.1	ug/l	
	3&4-Methylphenol	ND		2.5	1.1	ug/l	
87-86-5	Pentachlorophenol	ND		13	1.7	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND		6.3	1.7	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND		6.3	1.2	ug/l	
106-46-7	1,4-Dichlorobenzene	ND		2.5	0.22	ug/l	
121-14-2	2,4-Dinitrotoluene [a]	ND		2.5	0.69	ug/l	
118-74-1	Hexachlorobenzene	ND		2.5	0.41	ug/l	
87-68-3	Hexachlorobutadiene	ND		1.3	0.62	ug/l	
67-72-1	Hexachloroethane	ND		6.3	0.49	ug/l	
98-95-3	Nitrobenzene	ND		2.5	0.80	ug/l	
110-86-1	Pyridine	ND		2.5	0.49	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	44%		10-73%
4165-62-2	Phenol-d5	30%		10-64%
118-79-6	2,4,6-Tribromophenol	90%		31-130%
4165-60-0	Nitrobenzene-d5	91%		28-126%
321-60-8	2-Fluorobiphenyl	86%		26-114%
1718-51-0	Terphenyl-d14	97%		16-122%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
MCL = Maximum Contamination Level (not available)
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	2020-01-16-F57-FB		
Lab Sample ID:	JD1903-13	**Date Sampled:**	01/16/20
Matrix:	AQ - Field Blank Soil	**Date Received:**	01/16/20
		Percent Solids:	n/a
Project:	Fort Monmouth, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Total Organic Carbon	<1.0	1.0	mg/l	1	01/27/20 22:08	CD	SM5310 B-11

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS18-2N(0.0-0.5)
Lab Sample ID: JD1903-14
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 87.6

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190182.D	1	01/30/20 10:24	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	76	19	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	190	23	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	190	32	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	190	68	ug/kg	
51-28-5	2,4-Dinitrophenol [a]	ND	190	140	ug/kg	
534-52-1	4,6-Dinitro-o-cresol [a]	ND	190	41	ug/kg	
95-48-7	2-Methylphenol	ND	76	24	ug/kg	
	3&4-Methylphenol	ND	76	31	ug/kg	
88-75-5	2-Nitrophenol [a]	ND	190	25	ug/kg	
100-02-7	4-Nitrophenol [a]	ND	380	100	ug/kg	
87-86-5	Pentachlorophenol [a]	ND	150	36	ug/kg	
108-95-2	Phenol	ND	76	20	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	190	25	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	190	28	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	190	23	ug/kg	
83-32-9	Acenaphthene	15.9	38	13	ug/kg	J
208-96-8	Acenaphthylene	32.8	38	19	ug/kg	J
98-86-2	Acetophenone	ND	190	8.2	ug/kg	
120-12-7	Anthracene	32.3	38	23	ug/kg	J
1912-24-9	Atrazine [a]	ND	76	16	ug/kg	
56-55-3	Benzo(a)anthracene	39.7	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	44.4	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	53.7	38	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	37.8	38	19	ug/kg	J
207-08-9	Benzo(k)fluoranthene	19.7	38	18	ug/kg	J
101-55-3	4-Bromophenyl phenyl ether	ND	76	15	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	76	9.3	ug/kg	
92-52-4	1,1'-Biphenyl	22.1	76	5.2	ug/kg	J
100-52-7	Benzaldehyde	ND	190	9.4	ug/kg	
91-58-7	2-Chloronaphthalene	ND	76	9.0	ug/kg	
106-47-8	4-Chloroaniline	ND	190	14	ug/kg	
86-74-8	Carbazole	ND	76	5.5	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-2N(0.0-0.5)
Lab Sample ID: JD1903-14
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 87.6

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam [b]	ND	76	15	ug/kg	
218-01-9	Chrysene	58.9	38	12	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	76	8.1	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	76	16	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	76	14	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	76	12	ug/kg	
121-14-2	2,4-Dinitrotoluene [a]	ND	38	12	ug/kg	
606-20-2	2,6-Dinitrotoluene [a]	ND	38	19	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	76	32	ug/kg	
123-91-1	1,4-Dioxane	ND	38	25	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	
132-64-9	Dibenzofuran	ND	76	15	ug/kg	
84-74-2	Di-n-butyl phthalate	35.1	76	6.2	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	76	9.4	ug/kg	
84-66-2	Diethyl phthalate	ND	76	8.1	ug/kg	
131-11-3	Dimethyl phthalate	ND	76	6.8	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	76	8.9	ug/kg	
206-44-0	Fluoranthene	71.4	38	17	ug/kg	
86-73-7	Fluorene	37.0	38	17	ug/kg	J
118-74-1	Hexachlorobenzene	ND	76	9.6	ug/kg	
87-68-3	Hexachlorobutadiene	ND	38	15	ug/kg	
77-47-4	Hexachlorocyclopentadiene [a]	ND	380	15	ug/kg	
67-72-1	Hexachloroethane	ND	190	19	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	33.4	38	18	ug/kg	J
78-59-1	Isophorone	ND	76	8.1	ug/kg	
91-57-6	2-Methylnaphthalene	61.1	38	8.6	ug/kg	
88-74-4	2-Nitroaniline	ND	190	9.0	ug/kg	
99-09-2	3-Nitroaniline	ND	190	9.5	ug/kg	
100-01-6	4-Nitroaniline	ND	190	9.8	ug/kg	
91-20-3	Naphthalene	22.1	38	11	ug/kg	J
98-95-3	Nitrobenzene	ND	76	15	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	76	11	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	190	14	ug/kg	
85-01-8	Phenanthrene	72.4	38	13	ug/kg	
129-00-0	Pyrene	124	38	12	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	190	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	51%		19-93%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS18-2N(0.0-0.5)		
Lab Sample ID:	JD1903-14	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3546	**Percent Solids:**	87.6
Project:	Fort Monmouth, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	52%		20-95%
118-79-6	2,4,6-Tribromophenol	96%		15-110%
4165-60-0	Nitrobenzene-d5	63%		18-112%
321-60-8	2-Fluorobiphenyl	76%		24-100%
1718-51-0	Terphenyl-d14	91%		28-109%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact/aldol-condensation	3.32	2100	ug/kg	J
	unknown	5.80	390	ug/kg	J
	alkane	5.92	270	ug/kg	J
	unknown	6.56	310	ug/kg	J
	alkane	6.62	1100	ug/kg	J
	alkane	7.04	390	ug/kg	J
13798-23-7	Sulfur	7.14	940	ug/kg	JN
	unknown	7.18	410	ug/kg	J
	alkane	7.34	1300	ug/kg	J
	alkane	7.60	1500	ug/kg	J
	alkane	7.93	1700	ug/kg	J
	alkane	7.95	1400	ug/kg	J
	Naphthalene tetrahydro	7.99	300	ug/kg	J
	alkane	8.20	500	ug/kg	J
	alkane	8.25	410	ug/kg	J
	alkane	8.30	280	ug/kg	J
	alkane	8.59	1300	ug/kg	J
	unknown	8.88	430	ug/kg	J
	unknown	8.91	900	ug/kg	J
	alkane	9.23	500	ug/kg	J
	alkane	9.31	1200	ug/kg	J
	alkane	10.08	1300	ug/kg	J
	Phenanthrene dimethyl	10.39	290	ug/kg	J
	Phenanthrene dimethyl	10.53	400	ug/kg	J
	unknown	11.37	280	ug/kg	J
	unknown	11.43	330	ug/kg	J
	Total TIC, Semi-Volatile		18130	ug/kg	J

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS18-2N(0.0-0.5)		
Lab Sample ID:	JD1903-14	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	87.6
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E109585.D	1	01/31/20 20:44	AR	01/31/20 07:10	OP25562	E3E4938
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

ABN SPLP Leachate **SPLP Leachate method SW846 1312**

CAS No.	Compound	Result	MCL	RL	MDL	Units	Q
95-48-7	2-Methylphenol	ND		2.5	1.1	ug/l	
	3&4-Methylphenol	ND		2.5	1.1	ug/l	
87-86-5	Pentachlorophenol	ND		13	1.7	ug/l	
95-95-4	2,4,5-Trichlorophenol	ND		6.3	1.7	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND		6.3	1.2	ug/l	
106-46-7	1,4-Dichlorobenzene	ND		2.5	0.22	ug/l	
121-14-2	2,4-Dinitrotoluene [a]	ND		2.5	0.69	ug/l	
118-74-1	Hexachlorobenzene	ND		2.5	0.41	ug/l	
87-68-3	Hexachlorobutadiene	ND		1.3	0.62	ug/l	
67-72-1	Hexachloroethane	ND		6.3	0.49	ug/l	
98-95-3	Nitrobenzene	ND		2.5	0.80	ug/l	
110-86-1	Pyridine	ND		2.5	0.49	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	45%		10-73%
4165-62-2	Phenol-d5	33%		10-64%
118-79-6	2,4,6-Tribromophenol	85%		31-130%
4165-60-0	Nitrobenzene-d5	81%		28-126%
321-60-8	2-Fluorobiphenyl	78%		26-114%
1718-51-0	Terphenyl-d14	52%		16-122%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
MCL = Maximum Contamination Level (not available)
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS18-2N(0.0-0.5)		
Lab Sample ID:	JD1903-14	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
		Percent Solids:	87.6
Project:	Fort Monmouth, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	6.78		su	1	01/29/20 09:50	AI	SW846 1312
Volume, SPLP Leachate	2.007		l	1	01/29/20 09:50	AI	SW846 1312
Weight, SPLP Leachate	0.1004		kg	1	01/29/20 09:50	AI	SW846 1312
Dry Weight, SPLP Leachate	0.08791		kg	1	01/29/20 09:50	AI	SW846 1312
Moisture, Percent	12.4		%	1	01/27/20 15:50	BG	SM2540 G 18TH ED MOD
Total Organic Carbon [a]	6720	110	mg/kg	1	01/30/20 11:46	CD	LLOYD KAHN 1988 MOD

(a) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS18-2S(0.0-0.5)
Lab Sample ID: JD1903-15
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 88.6

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190183.D	1	01/30/20 11:16	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	1.0 ml
Run #2		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
95-57-8	2-Chlorophenol	ND	73	18	ug/kg	
59-50-7	4-Chloro-3-methyl phenol	ND	180	22	ug/kg	
120-83-2	2,4-Dichlorophenol	ND	180	31	ug/kg	
105-67-9	2,4-Dimethylphenol	ND	180	65	ug/kg	
51-28-5	2,4-Dinitrophenol [a]	ND	180	140	ug/kg	
534-52-1	4,6-Dinitro-o-cresol [a]	ND	180	39	ug/kg	
95-48-7	2-Methylphenol	ND	73	23	ug/kg	
	3&4-Methylphenol	ND	73	30	ug/kg	
88-75-5	2-Nitrophenol [a]	ND	180	24	ug/kg	
100-02-7	4-Nitrophenol [a]	ND	370	98	ug/kg	
87-86-5	Pentachlorophenol [a]	ND	150	34	ug/kg	
108-95-2	Phenol	ND	73	19	ug/kg	
58-90-2	2,3,4,6-Tetrachlorophenol	ND	180	24	ug/kg	
95-95-4	2,4,5-Trichlorophenol	ND	180	27	ug/kg	
88-06-2	2,4,6-Trichlorophenol	ND	180	22	ug/kg	
83-32-9	Acenaphthene	ND	37	13	ug/kg	
208-96-8	Acenaphthylene	ND	37	19	ug/kg	
98-86-2	Acetophenone	ND	180	7.9	ug/kg	
120-12-7	Anthracene	ND	37	22	ug/kg	
1912-24-9	Atrazine [a]	ND	73	16	ug/kg	
56-55-3	Benzo(a)anthracene	38.4	37	10	ug/kg	
50-32-8	Benzo(a)pyrene	49.8	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	56.9	37	16	ug/kg	
191-24-2	Benzo(g,h,i)perylene	40.0	37	18	ug/kg	
207-08-9	Benzo(k)fluoranthene	21.3	37	17	ug/kg	J
101-55-3	4-Bromophenyl phenyl ether	ND	73	14	ug/kg	
85-68-7	Butyl benzyl phthalate	ND	73	8.9	ug/kg	
92-52-4	1,1'-Biphenyl	ND	73	5.0	ug/kg	
100-52-7	Benzaldehyde	ND	180	9.1	ug/kg	
91-58-7	2-Chloronaphthalene	ND	73	8.7	ug/kg	
106-47-8	4-Chloroaniline	ND	180	13	ug/kg	
86-74-8	Carbazole	ND	73	5.3	ug/kg	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS18-2S(0.0-0.5)		
Lab Sample ID:	JD1903-15	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3546	**Percent Solids:**	88.6
Project:	Fort Monmouth, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Compound	Result	RL	MDL	Units	Q
105-60-2	Caprolactam [b]	ND	73	14	ug/kg	
218-01-9	Chrysene	42.4	37	12	ug/kg	
111-91-1	bis(2-Chloroethoxy)methane	ND	73	7.8	ug/kg	
111-44-4	bis(2-Chloroethyl)ether	ND	73	16	ug/kg	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	73	13	ug/kg	
7005-72-3	4-Chlorophenyl phenyl ether	ND	73	12	ug/kg	
121-14-2	2,4-Dinitrotoluene [a]	ND	37	11	ug/kg	
606-20-2	2,6-Dinitrotoluene [a]	ND	37	18	ug/kg	
91-94-1	3,3'-Dichlorobenzidine	ND	73	30	ug/kg	
123-91-1	1,4-Dioxane	ND	37	24	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	
132-64-9	Dibenzofuran	ND	73	15	ug/kg	
84-74-2	Di-n-butyl phthalate	7.1	73	6.0	ug/kg	J
117-84-0	Di-n-octyl phthalate	ND	73	9.1	ug/kg	
84-66-2	Diethyl phthalate	ND	73	7.8	ug/kg	
131-11-3	Dimethyl phthalate	ND	73	6.5	ug/kg	
117-81-7	bis(2-Ethylhexyl)phthalate	11.7	73	8.5	ug/kg	J
206-44-0	Fluoranthene	75.5	37	16	ug/kg	
86-73-7	Fluorene	ND	37	17	ug/kg	
118-74-1	Hexachlorobenzene	ND	73	9.2	ug/kg	
87-68-3	Hexachlorobutadiene	ND	37	15	ug/kg	
77-47-4	Hexachlorocyclopentadiene [a]	ND	370	15	ug/kg	
67-72-1	Hexachloroethane	ND	180	18	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	37.6	37	17	ug/kg	
78-59-1	Isophorone	ND	73	7.8	ug/kg	
91-57-6	2-Methylnaphthalene	ND	37	8.3	ug/kg	
88-74-4	2-Nitroaniline	ND	180	8.6	ug/kg	
99-09-2	3-Nitroaniline	ND	180	9.1	ug/kg	
100-01-6	4-Nitroaniline	ND	180	9.5	ug/kg	
91-20-3	Naphthalene	ND	37	10	ug/kg	
98-95-3	Nitrobenzene	ND	73	14	ug/kg	
621-64-7	N-Nitroso-di-n-propylamine	ND	73	11	ug/kg	
86-30-6	N-Nitrosodiphenylamine	ND	180	13	ug/kg	
85-01-8	Phenanthrene	29.2	37	12	ug/kg	J
129-00-0	Pyrene	78.7	37	12	ug/kg	
95-94-3	1,2,4,5-Tetrachlorobenzene	ND	180	9.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	52%		19-93%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS18-2S(0.0-0.5)		
Lab Sample ID:	JD1903-15	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3546	**Percent Solids:**	88.6
Project:	Fort Monmouth, NJ		

ABN TCL List (SOM0 2.0)

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-62-2	Phenol-d5	50%		20-95%
118-79-6	2,4,6-Tribromophenol	84%		15-110%
4165-60-0	Nitrobenzene-d5	59%		18-112%
321-60-8	2-Fluorobiphenyl	65%		24-100%
1718-51-0	Terphenyl-d14	87%		28-109%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	system artifact/aldol-condensation	3.33	2600	ug/kg	J
	Total TIC, Semi-Volatile		0	ug/kg	

(a) Associated CCV outside of control limits high, sample was ND.
(b) Associated CCV outside of control limits low. Low-level verification was analyzed to demonstrate system suitability to detect affected analytes. Sample was ND.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS18-2S(0.0-0.5)		
Lab Sample ID:	JD1903-15	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
Method:	SW846 8270D SW846 3510C	**Percent Solids:**	88.6
Project:	Fort Monmouth, NJ		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3E109586.D	1	01/31/20 21:09	AR	01/31/20 07:10	OP25562	E3E4938
Run #2							

	Initial Volume	Final Volume
Run #1	800 ml	1.0 ml
Run #2		

ABN SPLP Leachate **SPLP Leachate method SW846 1312**

CAS No.	Compound	Result	MCL	RL	MDL	Units	Q
95-48-7	2-Methylphenol	ND		2.5	1.1	ug/l	
	3&4-Methylphenol	ND		2.5	1.1	ug/l	
87-86-5	Pentachlorophenol	9.8		13	1.7	ug/l	J
95-95-4	2,4,5-Trichlorophenol	ND		6.3	1.7	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND		6.3	1.2	ug/l	
106-46-7	1,4-Dichlorobenzene	ND		2.5	0.22	ug/l	
121-14-2	2,4-Dinitrotoluene [a]	ND		2.5	0.69	ug/l	
118-74-1	Hexachlorobenzene	ND		2.5	0.41	ug/l	
87-68-3	Hexachlorobutadiene	ND		1.3	0.62	ug/l	
67-72-1	Hexachloroethane	ND		6.3	0.49	ug/l	
98-95-3	Nitrobenzene	ND		2.5	0.80	ug/l	
110-86-1	Pyridine	ND		2.5	0.49	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	43%		10-73%
4165-62-2	Phenol-d5	34%		10-64%
118-79-6	2,4,6-Tribromophenol	72%		31-130%
4165-60-0	Nitrobenzene-d5	92%		28-126%
321-60-8	2-Fluorobiphenyl	87%		26-114%
1718-51-0	Terphenyl-d14	71%		16-122%

(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected MDL = Method Detection Limit
MCL = Maximum Contamination Level (not available)
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P57-SS18-2S(0.0-0.5)		
Lab Sample ID:	JD1903-15	**Date Sampled:**	01/16/20
Matrix:	SO - Soil	**Date Received:**	01/16/20
		Percent Solids:	88.6
Project:	Fort Monmouth, NJ		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
SPLP Ratio for Extractables and Metals							
pH, SPLP Leachate	9.42		su	1	01/29/20 09:50	AI	SW846 1312
Volume, SPLP Leachate	2.009		l	1	01/29/20 09:50	AI	SW846 1312
Weight, SPLP Leachate	0.1005		kg	1	01/29/20 09:50	AI	SW846 1312
Dry Weight, SPLP Leachate	0.08900		kg	1	01/29/20 09:50	AI	SW846 1312
Moisture, Percent	11.4		%	1	01/27/20 15:50	BG	SM2540 G 18TH ED MOD
Total Organic Carbon [a]	2750	110	mg/kg	1	01/30/20 13:10	CD	LLOYD KAHN 1988 MOD

(a) Multiple injections indicate possible sample non-homogeneity.

RL = Reporting Limit

Report of Analysis

Client Sample ID: P57-SS18-2N(1.5-2.0)
Lab Sample ID: JD1903-16
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 87.1

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190184A.D	1	01/30/20 12:42	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	33.9	38	11	ug/kg	J
50-32-8	Benzo(a)pyrene	34.4	38	17	ug/kg	J
205-99-2	Benzo(b)fluoranthene	39.7	38	17	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	54%		18-112%
321-60-8	2-Fluorobiphenyl	64%		24-100%
1718-51-0	Terphenyl-d14	86%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-2S(1.5-2.0)
Lab Sample ID: JD1903-17
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 87.7

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190185.D	1	01/30/20 13:08	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	31.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	40.7	37	10	ug/kg	
50-32-8	Benzo(a)pyrene	42.4	37	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	50.9	37	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	16	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	60%		18-112%
321-60-8	2-Fluorobiphenyl	69%		24-100%
1718-51-0	Terphenyl-d14	88%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-2E(1.5-2.0)
Lab Sample ID: JD1903-18
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 89.3

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F190186.D	1	01/30/20 13:34	CS	01/28/20 15:30	OP25397	EF8210
Run #2							

	Initial Weight	Final Volume
Run #1	31.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	33.9	36	10	ug/kg	J
50-32-8	Benzo(a)pyrene	30.8	36	16	ug/kg	J
205-99-2	Benzo(b)fluoranthene	36.9	36	16	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	36	16	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	59%		18-112%
321-60-8	2-Fluorobiphenyl	67%		24-100%
1718-51-0	Terphenyl-d14	86%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: P57-SS18-2W(1.5-2.0)
Lab Sample ID: JD1903-19
Matrix: SO - Soil
Method: SW846 8270D SW846 3546
Project: Fort Monmouth, NJ

Date Sampled: 01/16/20
Date Received: 01/16/20
Percent Solids: 88.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	M163322.D	1	01/30/20 11:48	CS	01/28/20 15:30	OP25397	EM6910
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
56-55-3	Benzo(a)anthracene	39.6	38	11	ug/kg	
50-32-8	Benzo(a)pyrene	44.9	38	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	57.5	38	17	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	38	17	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	51%		18-112%
321-60-8	2-Fluorobiphenyl	65%		24-100%
1718-51-0	Terphenyl-d14	70%		28-109%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

SO
FB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Page 1 of 2

FED-EX Tracking #
SGS Quote #
~~Waste Order Quote #~~ AK-011420-HS
SGS Job # JD1903

Client / Reporting Information	Project Information	Billing Information (if different from Report to)
Company Name: AECOM	Project Name: FTMM-Parcel 57	Company Name
Street Address: 100 Red Schoolhouse Rd. Suite B-1	Street	Street Address
City / State / Zip: Chestnut Ridge, NY 10977	City / State / Zip	City / State / Zip
Project Contact / E-mail: A. Lupilato	Project #: 60587637	
Phone #: 845-425-4994	Client Purchase Order #	Attention:
Sampler(s) Name(s) / Phone #: Christine DeAmbrogio	Project Manager: A. Lupilato	

Requested Analysis

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB - Field Blank; EB-Equipment Blank; RB - Rinse Blank; TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO_3	H_2SO_4	NONE	DI Water	MEOH	ENCORE	Benzo(a)pyrene	Benzo(a)anthracene	Benzo(b)fluoranthene	Dibenzo(a,h)anthracene	Organic Carbon (Walkley-Black)	Total SVOC	SPLP SVOC w/ pH	% moisture	SPLP SVOC on HOLD	LAB USE ONLY
1	P57-SS12-2N(2.5-3.0)		1/15/20	1005	CD	6	SO	1					1				X					X	X	X	*	1680
2	P57-SS12-2S(2.5-3.0)		1/15/20	1007	CD	6	SO	1					1				X					X	X	X	*	1963
3	P57-SS12W(2.5-3.0)		1/15/20	1009	CD	6	SO	1					1				X					X	X	X	*	
4	P57-SS13-2E(2.5-3.0)		1/15/20	1125	CD	6	SO	1					1				X									C2
5	P57-SS13-2S(2.5-3.0)		1/15/20	1130	CD	6	SO	1					1													P1
6	P57-SS14-2S(0.0-0.5)		1/16/20	0915	CD	6	SO	3					3								X	X	X	X		
7	P57-SS14-2N(2.5-3.0)		1/16/20	1000	CD	6	SO	1					1				X	X	X	X		X	X	X	*	
8	P57-SS14-2S(2.5-3.0)		1/16/20	1005	CD	6	SO	1					1				X	X	X	X						
9	P57-SS14-2E(2.5-3.0)		1/16/20	1010	CD	6	SO	1					1				X	X	X	X						
10	P57-SS14-2W(2.5-3.0)		1/16/20	1015	CD	0	SO	1					1				X	X	X	X						
11	P57-SS14-2B(2.5-3.0)		1/16/20	1020	CD	6	SO	1					1				X	X	X	X						
					CD			CD									CD						CD			CD

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [ ] 3 Business Days*
- [ ] 2 Business Days*
- [ ] 1 Business Day*
- [ ] Other _____

Standard TAT

All data available via Lablink

* Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [x] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria_____
- [ ] CT RCP Criteria_____
- [ ] State Forms
- [ ] EDD Format _____
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

* SPLP SVOCs on hold contingent upon Total SVOC results

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:	Relinquished By:	Date / Time:	Received By:
1	C.D	1/16/20 1340	Cobin temp-16-20	2 Palm Temp	1-16-20 1720	2
3			3	4		4
5			5	Custody Seal # 2	Intact / Not Intact	Preserved where applicable / Absent

Therm. ID: IR7 On Ice Cooler Temp. °C 3.7/3.6

3.4C IP
2.9C IP

INITIAL ASSESSMENT 3B-P.P

LABEL VERIFICATION _____

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

FED-EX Tracking # | Bottle Order Control #
SGS Quote # | SGS Job # JD1903

Client / Reporting Information

Company Name: AECOM
Street Address: 100 Red Schoolhouse Rd Suite B-1
City State Zip: Chestnut Ridge NY 10977
Project Contact E-mail: Al. Lopilato
Phone #: 845-425-4994
Sampler(s) Name(s) Phone #: C. DeAmbrogio

Project Information

Project Name: FTMM - Parcel 57
Street
City State
Project #: 60587637
Client Purchase Order #
Project Manager: Al. Lopilato

Billing Information (if different from Report to)
Company Name
Street Address
City State Zip
Attention:

Requested Analysis

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB - Field Blank; EB-Equipment Blank; RB - Rinse Blank; TB - Trip Blank

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO_3	H_2SO_4	NONE	DI Water	MEOH	ENCORE	Benzo(a) pyrene	Benzo (a) anthracene	Benzo(b) fluoranthene	Dibenzo(a,h) anthracene	Organic Carbon (Kabd)	Total SVOC	SPLP SVOC w/pH	% moisture	LAB USE ONLY
12	P57-SS14-2BD(2.5-3.0)		1/16/20	1085	CD	G	SO	1					1				X	X	X	X					
13	20200116-P57-FB		1/16/20	1100	CD	FB	FB	3	1				6				X	X	X	X	X	X	X	X	
14	P57-SS18-2N (0.0-0.5)		1/16/20	1310	CD	G	SO	2					2								X	X	X	X	
15	P57-SS18-2S (0.0-0.5)		1/16/20	1315	CD	G	SO	2					2								X	X	X	X	
16	P57-SS18-2N (1.5-2.0)		1/16/20	1320	CD	G	SO	1					1				X	X	X	X					
17	P57-SS18-2S (1.5-2.0)		1/16/20	1325	CD	G	SO	1					1				X	X	X	X					
18	P57-SS18-2E (1.5-2.0)		1/16/20	1330	CD	G	SO	1					1				X	X	X	X					
19	P57-SS18-2W (1.5-2.0)		1/16/20	1335	CD	G	SO	1					1				X	X	X	X					

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [ ] 10 Business Days
- [ ] 5 Business Days
- [ ] 3 Business Days*
- [ ] 2 Business Days*
- [ ] 1 Business Day*
- [ ] Other

Standard TAT

All data available via Lablink * Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [x] Commercial "B" (Level 2)
- [ ] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria_____
- [ ] CT RCP Criteria_____
- [ ] State Forms
- [ ] EDD Format _____
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by:	Date / Time:	Received By:
1	C. D	1/16/20 1340	Robin Pompi 1-16-20 1340
2	Robin Pompi	1-16-20 1720	
3			
4			
5			

Custody Seal # | Intact | Not intact | Preserved where applicable | Absent | Therm. ID: | On Ice | Cooler Temp. °C

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

SGS Sample Receipt Summary

Job Number: JD1903 **Client:** AECOM, INC. **Project:** FORT MONMOUTH, NJ

Date / Time Received: 1/16/2020 5:20:00 PM **Delivery Method:** Accutest Courier **Airbill #'s:**

Cooler Temps (Raw Measured) °C: Cooler 1: (3.4); Cooler 2: (2.9);

Cooler Temps (Corrected) °C: Cooler 1: (3.2); Cooler 2: (2.7);

Cooler Security	Y	or	N		Y	or	N
1. Custody Seals Present:	☑		☐	3. COC Present:	☑		☐
2. Custody Seals Intact:	☑		☐	4. Smpl Dates/Time OK	☑		☐

Cooler Temperature	Y	or	N
1. Temp criteria achieved:	☑		☐
2. Cooler temp verification:	IR Gun		
3. Cooler media:	Ice (Bag)		
4. No. Coolers:	2		

Quality Control Preservation	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐
3. Samples preserved properly:	☑		☐	
4. VOCs headspace free:	☐		☐	☑

Sample Integrity - Documentation	Y	or	N
1. Sample labels present on bottles:	☑		☐
2. Container labeling complete:	☑		☐
3. Sample container label / COC agree:	☑		☐

Sample Integrity - Condition	Y	or	N
1. Sample recvd within HT:	☑		☐
2. All containers accounted for:	☑		☐
3. Condition of sample:	Intact		

Sample Integrity - Instructions	Y	or	N	N/A
1. Analysis requested is clear:	☑		☐	
2. Bottles received for unspecified tests	☐		☑	
3. Sufficient volume recvd for analysis:	☑		☐	
4. Compositing instructions clear:	☐		☐	☑
5. Filtering instructions clear:	☐		☐	☑

Test Strip Lot #s: pH 1-12: 229517 pH 12+: 208717 Other: (Specify)

Comments: -13 Sample is a FB but Moisture is requested.

SM089-02 Rev. Date 12/1/16

Responded to by: ak

Response Date: 1/21

Moisture isn't required for the field blank, please disregard.

Job Change Order: JD1903

Requested Date: 2/3/2020 **Received Date:** 1/16/2020
Account Name: AECOM, INC. **Due Date:** 1/30/2020
Project Description: Fort Monmouth, NJ **Deliverable:** REDT2
C/O Initiated By: AK **PM:** AK **TAT (Days):** 14

==========

Sample #: JD1903-2 **Change:**
Relog for AB8270SPLP, SPLPE, SPLPRATIO
Dept:
TAT: 14

P57-SS12-2S(2.5-3.0)

==========

Above Changes Per: Christine DeAmbrogio **Date/Time:** 2/3/2020 2:43:55 PM

To Client: This Change Order is confirmation of the revisions, previously discussed with the Client Service Representative.

Job Change Order: JD1903

Requested Date: 3/17/2020 **Received Date:** 1/16/2020
Account Name: AECOM, INC. **Due Date:** 1/30/2020
Project Description: Fort Monmouth, NJ **Deliverable:** REDT2
C/O Initiated By: AK **PM:** AK **TAT (Days):** 14

Sample #: JD1903-1, 3, 7 **Change:**
Dept: Relog for AB8270SPLPSIMNJ, SPLPE, SPLPRATIO
TAT: 14

Sample #: JD1903-2 **Change:**
Dept: RELOG FOR AB8270SPLPSIMNJ
TAT: 14

P57-SS12-2S(2.5-3.0)

Above Changes Per: Al Lopilato **Date/Time:** 3/17/2020 12:14:37 PM

To Client: This Change Order is confirmation of the revisions, previously discussed with the Client Service Representative.

Page 1 of 1

Job Change Order: JD1903T

Requested Date: 3/18/2020
Account Name: AECOM, INC.
Project Description: Fort Monmouth, NJ
C/O Initiated By: AK **PM:** AK

Received Date: 1/16/2020
Due Date: 3/31/2020
Deliverable: REDT2
TAT (Days): 14

==========

Sample #: JD1903T-2RT
Dept:
TAT: 14

P57-SS12-2S(2.5-3.0)

Change:
Please relog for SPLPE

==========

Above Changes Per: CSR **Date/Time:** 3/18/2020 9:00:24 AM

To Client: This Change Order is confirmation of the revisions, previously discussed with the Client Service Representative.

Page 1 of 1

JD1903: Chain of Custody
Page 7 of 7

Attachment 4

Clean Fill Certification

Maddox Materials, LLC
Quality Aggregates & Construction Soils

April 29, 2020

EISCO, Inc.
43 New Brunswick Ave. Unit #3
Hopelawn, NJ 08861

Attn: Jeff Thorne
Phone: 732-442-5152
Fax: 732-442-3331

Project: Ft Monmouth
Todd Avenue& Murphy Drive
Oceanport, NJ

To whom it may concern:

Please be advised that Maddox Materials, LLC delivered 75.25 tons of DGA stone on 12/19/19; and 100.22 tons of DGA on 12/20/19 to the above referenced project. The aggregates originated from Stavola Construction Materials Inc. State of New Jersey Department of Labor and Workforce Development mine registration certificate #004605. It is located at 409 Chimney Rock Road, Bridgewater, NJ. Somerset County tax map Block 711 Lot 6.01

The Aggregates are quarried and processed from virgin natural sources indigenous to the region. This material is considered clean uncontaminated material that does not contain extraneous debris or solid waste, it does not contain free liquids, and has not been subject to a discharged hazardous substance at any time.

If you need any additional information, please contact me at 732-251-0054.

Respectfully Submitted,

William Maddox
Member

Maddox Materials, LLC
Quality Aggregates & Construction Soils

April 29, 2020

EISCO, Inc.
43 New Brunswick Ave. Unit #3
Hopelawn, NJ 08861

Attn: Jeff Thorne
Phone: 732-442-5152
Fax: 732-442-3331

Project: Ft Monmouth
Todd Avenue& Murphy Drive
Oceanport, NJ

To whom it may concern:

Please be advised that Maddox Materials LLC delivered DGA to the above referenced project on multiple days listed below. The DGA stone originated from Trap Rock Industries in Kingston, NJ. The quarry is a permitted State of New Jersey Department of Labor and Workforce Development mine registration certificate # 004572. Somerset County tax map Block 1 Lots 1,2,3,38,39.

The DGA materials delivered as follows:
74.77 tons on 2/19/20; 25.46 tons on 2/12/20; 126.88 tons on 3/4/20; 77.29 tons on 3/5/20; 75.19 tons on 3/9/20; 50.37 tons on 3/11/20; 26.44 tons on 3/16/20; 101.99 tons on 3/18/20.

These aggregates are sourced from an undisturbed geological formation of diabase trap rock stone. The materials are not comingled with other materials or subject to processes that would result in the introduction of contaminates. To the best of my knowledge the mine is not suspected of being contaminated and has not been affected by any hazardous material or discharge of a regulated substance.

If you need any additional information, please contact me at 732-251-0054.

Respectfully Submitted,

William Maddox
Member

Attachment 5 Waste Manifests

Ticket No: 1082547

Weight: 20,220lbs
Date: 1/15/2020
Time: 12:48:11 - Standard

Scale

Customer: EXXON OF NEW JERSEY/2500056
10 NEW BRUNSWICK AVE
MONMOUTH, NJ 08861-

Gross: 77440 lb Im Scale 1
Tare: 57220 lb P.T.
Net: 20220 lb

Truck: 1H2534

Driver: 25

License: 4H438A
Truck Type: TRIAXLE

Carrier: EXXON

Profile: EXXON-EXTRA FORT MONMOUTH PARCEL ST PROJECT
Generator: FORT MONMOUTH PARCEL ST
Comment:

Manifest: 2050/TPH
Remaining: 0.00 TN

Origin Materials & Services Assembly Unit

Shipping Date: 1082 PCS Job Site Time

THE ABOVE IS CORRECT and NON-HAZARDOUS TO THE BEST OF MY KNOWLEDGE

Driver: Verified

Weighmaster: Mike

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
2719-1276	1	732-442-5152	10381794

GENERATOR

5. Generator's Name and Mailing Address: UNITED STATES ARMY, FT. MONMOUTH, 1060 SANGER AVE, OCEANPORT, NJ 07757
Generator's Phone: (732) 383-5104

Generator's Site Address (if different than mailing address): PARCEL 57, OCEANPORT, NJ

6. Transporter 1 Company Name: EISCO — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: CHAMBERS SOIL MANAGEMENT, 75 HANCOCKS ROAD, P.O. BOX 290, MEASBEY, NJ 08832
Facility's Phone: (732) 738-5000
U.S. EPA ID Number: NJ1EC5001522

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON HAZ PG SOIL	X1	DT	EST 25	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
EISCO - IN CASE OF EMERGENCY
DSW 2719-1276
TRUCK # D-60 PLATE # NJ-AK-238H

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William R Colvin for US Army — Signature: William R Colvin for US Army — Month 01 Day 15 Year 20

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Vernon Jackson — Signature — Month 1 Day 15 Year 20

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number: 131454

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Paula K Disbay — Signature: PKD — Month 1 Day 15 Year 20

Reynolds recycling corp.
75 Grove Mill Rd
PO Box 550
Keasbey, NJ 08832

Facility Loc: (2x20)

Hauler: (3x40)
Date: . 16 08:00
Time: (4x12)St - (4x12)End

Route

Customer: 81500 OF NEW JERSEY, Bundled
93 NEW SPRINGVILLA AVE
HOWELLMAN, NJ 08831-

Gross: 58x00 lb Tic Scale 1
Tare: 08560 lb ACT
Net: 20130 lb

Truck: 4L239H

Carrier: 81500

Profile: 2719-1176 FORT MONMOUTH PARCEL 57 PROJECT
Generator: FORT MONMOUTH PARCEL 57
Comment:

Load/Bin: 28

License Number
Route Type: FIXEDLES

Manifest: 2408.729
Remaining: 6.00 Tn

Origin	Marketable Service	Quantity Unit
Oceanport Boro	4067 PCS	20.00 Tons

THE ABOVE IS CORRECT AND ACCORDING TO THE BEST OF MY KNOWLEDGE

Driver: _____

Weighmaster: Joe P

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
2719-12-76	1	732-442-5152	0381799

GENERATOR

5. Generator's Name and Mailing Address: UNITED STATES ARMY, FT MONMOUTH, 1000 SANGER AVE, OCEANPORT, NJ 07757
Generator's Site Address (if different than mailing address): PARCEL 57, OCEAN, PORT, NJ
Generator's Phone: (732-383-5104

6. Transporter 1 Company Name: EISCO — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: RAYMARK SOIL MANAGEMENT, 75 CROSS HILL ROAD, P.O. BOX 290, KEASBEY, NJ 08832 — U.S. EPA ID Number: NJD225001522
Facility's Phone: (732) 738-5000

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON HAZ PC SOIL	XX1	DT	est 25	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
EISCO — IN CASE OF EMERGENCY CALL 732-442-5152
DOT 3279-NA2 — TRUCK D-60 — PLATE # AK-238H NJ

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William E Colvin for US Army — Signature: William E Colvin for US Army — Month: 01 — Day: 16 — Year: 20

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. — Port of entry/exit:
Transporter Signature (for exports only): — Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Veronica Jackson — Signature — Month: 01 — Day: 16 — Year:

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☑ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month — Day — Year

169-BLC-O 5 11977 (Rev. 9/09)

TRANSPORTER #2

Bayshore Recycling Corp.
35 Crows Mill Rd
PO Box 250
Keasbey, NJ 08832

Facility ID: 432257

Ticket: 1314455
Date: 10.15.2020
Time: 15:02:48 - 15:05:26

Scale

Customer: STATE OF NEW JERSEY DSHANYS
43 NEW BRUNSWICK AVE
HOPELAWN, NJ 08861-

Gross: 52520 lb, In Scale 2
Tare: 25560 lb S.T.
Net: 26960 lb

Truck: AM258M

Driver: JS

License: AM258M
Truck Type: TRUCKLE

Carriers: EJSCO

Manifest: 20201209
Remarks: 4.0% TH

Profile: 2719-16/76 FORT MONMOUTH PARCEL 57 PROJECT
Generator: FORT MONMOUTH PARCEL 57
Comments:

Origin	Materials & Services	Organic Unit
Ocean Port Dune	(DEF PCS	-5.TB Tons

THE ABOVE IS CORRECT AND NON-HAZARDOUS TO THE BEST OF MY KNOWLEDGE

Drivers: Vernon

Weighmaster: Steve

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
279-1276	1	732-442-5152	30381800

GENERATOR

5. Generator's Name and Mailing Address
UNITED STATES ARMY, FT MONMOUTH
1000 SANGER AVE.
OCEANPORT, NJ 07757
Generator's Phone: (732-383-5104

Generator's Site Address (if different than mailing address)
PARCEL - 57
OCEANPORT, NJ

6. Transporter 1 Company Name
EISCO
U.S. EPA ID Number

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
BAYSHORE SOIL MANAGEMENT
75 CROWS MILL ROAD, P.O. BOX 250
KEASBEY, NJ 08832
Facility's Phone: (732) 738-6000
U.S. EPA ID Number
NJ1225001582

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON HAZ PG SOIL	XX1	DT	EST. 25	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
EISCO - IN CASE OF EMERGENCY CALL 732-442-5152
279-1276
TRUCK # 0-601 PLATE # AK238H

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William R Colvin Jr US Army
Signature: William R Colvin, US Army
Month: 01 Day: 16 Year: 22

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Vernon Jackson
Signature:
Month: 01 Day: 16 Year: 22
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number: 1314455
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Philip R Dunlap
Signature: PRD
Month: 1 Day: 16 Year: 22

169-BLC-O 5 11977 (Rev. 9/09)

TRANSPORTER #2

Bayshore Recycling Corp.
75 Crows Mill Rd
PO Box 290
Keasbey, NJ 08832

Facility ID: 132397

Ticket: 1258884
Date: 9/30/2019
Time: 15:39:53 - 15:40:10

Scale

Customer: EISCO OF NEW JERSEY/BSN0096
43 NEW BRUNSWICK AVE
HOPELAWN, NJ 08861-

Gross: 80460 lb In Scale 1
Tare: 48360 lb P.T.
Net: 32100 lb

Truck: AK238H

CUYDs: 25

License: AK238H
Truck Type: TRIAXLE

Carrier: EISCO

Manifest: E0381818
Remaining: 0.00 TN

Profile: 2719-1276/FORT MONMOUTH PARCEL 57 PROJECT
Generator: FORT MONMOUTH PARCEL 57
Comment:

Origin	Materials & Services	Quantity	Unit
Oceanport Boro	ID27 PCS	16.05	Tons

THE ABOVE IS CORRECT AND NON-HAZARDOUS TO THE BEST OF MY KNOWLEDGE

Driver: _____

Weighmaster: Joe B

(3)

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	2719-1276	1	732-442-5152	E0381816

GENERATOR

5. Generator's Name and Mailing Address: UNITED STATES ARMY, FT MONMOUTH, 1000 SANGER AVE, OCEANPORT, NJ 07757
Generator's Phone: () 732-383-5164

Generator's Site Address (if different than mailing address): PARCEL 57, OCEANPORT, NJ

6. Transporter 1 Company Name: EISCO — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: BAYSHORE SOIL MANAGEMENT, 75 CROWS MILL ROAD, P.O. BOX 290, KEASBEY, NJ 08832 — U.S. EPA ID Number: NJ1225001522
Facility's Phone: (732) 738-6000

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON HAZ PC SOIL	X1	DT	est 22	T	16.05
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
EISCO
BSM# 2719-1276 (1276)
NJ PLATE # AK-238H D-60

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William R Colvin for US Army — Signature: William R Colvin for US Army — Month: 09 Day: 30 Year: 19

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Vernon Jackson — Signature: [signature] — Month: 9 Day: 30 Year: 19

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number: 258824

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month Day Year

169-BLC-O 5 11977 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

Bayshore Recycling Corp.
75 Crows Mill Rd
PO Box 280
Keasbey, NJ 08832.

Facility ID: 132397

Ticket: 1258379
Date: 10/1/2019
Time: 11:55:20 - 11:58:04

Scale

Customer: EISOO OF NEW JERSEY/BEM0096
43 NEW BRUNSWICK AVE
HOPELAWN, NJ 08861-

Gross: 74100 lb In Scale 2
Tare: 29380 lb P.T.
Net: 44720 lb

Truck: AR671E

CUYDs: 25

License: AR671E
Truck Type: TRIAXLE

Carrier: EISOO

Manifest: E0391817
Remaining: 0.00 TN

Profile: 2719-1276/FORT MONMOUTH PARCEL 87 PROJECT
Generator: FORT MONMOUTH PARCEL 87
Comment:

Origin	Materials & Services	Quantity	Unit
Oceanport Boro	1027 PCS	22.36	Tons

THE ABOVE IS CORRECT AND NON-HAZARDOUS TO THE BEST OF MY KNOWLEDGE

Driver: Miguel

Weighmaster: Paula

(2)

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
2719-1276	1	732-442-5152	E0381817

GENERATOR

5. Generator's Name and Mailing Address: UNITED STATES ARMY, FT MONMOUTH, 1600 SANGER AVE, OCEANPORT NJ 02757
Generator's Phone: ( ) 732-383-5104

Generator's Site Address (if different than mailing address): PARCEL 57, OCEANPORT, NJ

6. Transporter 1 Company Name: EISCO — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: BAYSHORE SOIL MANAGEMENT, 75 CROWS MILL ROAD, P.O. BOX 290, KEASBEY, NJ 08832
Facility's Phone: (732) 738-6000 — U.S. EPA ID Number: NJ1225001522

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	NON HAZ PC SOIL	X1	DT	est 22	T	
2.						2236
3.						
4.						

13. Special Handling Instructions and Additional Information
EISCO
BSM# 2719-1276
7b
Plate # NJ AR671E
Cab D-80

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William R Colvin for US Army — Signature: William R Colvin for US Army — Month: 10 Day: 1 Year: 19

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: MIGUEL RAMOS — Signature: M. Ramos — Month: 10 Day: 1 Year: 19

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number: 1259378

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Paula K Busby — Signature: PKB — Month: 10 Day: 01 Year: 19

Bayshore Recycling Corp.
75 Crows Mill Rd
PO Box 290
Keasbey, NJ 08832

Facility ID: 132397

Ticket: 1259803
Date: 10/2/2019
Time: 07:02:07 - 07:03:51

Customer: EISCO OF NEW JERSEY/BSM0096
43 NEW BRUNSWICK AVE
HOPELAWN, NJ 08861-

Truck: AK238H

Carrier: EISCO

Profiles: 2719-1276/FORT MONMOUTH PARCEL 57 PROJECT
Generator: FORT MONMOUTH PARCEL 57
Comments:

Scale

Gross: 52980 lb In Scale 1
Tare: 28360 lb P.T.
Net: 24620 lb

CUYDs: 25

License: AK238H
Truck Type: TRIAXLE

Manifest: E0381816
Remaining: 0.00 TN

Origin	Materials & Services	Quantity	Unit
Oceanport Boro	1027 PCS	12.26	Tons

THE ABOVE IS CORRECT AND NON-HAZARDOUS TO THE BEST OF MY KNOWLEDGE

Driver:

Weighmaster: Joe S

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
2719-1276	1	732-442-5152	003818

GENERATOR

5. Generator's Name and Mailing Address: FORT MONMOUTH, UNITED STATES ARMY, 1000 SANGER AVE, OCEANPORT, NJ 07757
Generator's Phone: (732) 532-5104

Generator's Site Address (if different than mailing address): PARCEL 57, OCEANPORT, NJ

6. Transporter 1 Company Name: ESCO — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: KEASBEY SOIL MANAGEMENT, 75 CROWS MILL ROAD, P.O. BOX 290, KEASBEY, NJ 08832 — U.S. EPA ID Number: NJ1225001582
Facility's Phone: (732) 738-6000

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON HAZ PC SOIL	1	CY	07.22 EST.	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
ESCO
BOL# 2719-1276 TO KEASBEY SOIL MANAGEMENT

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William R Colvin for US Army — Signature: for US Army — Month: 10 Day: 01 Year: 19

INT'L

15. International Shipments ☐ Import to U.S. ☒ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Vincent Rizzo — Signature — Month: 10 Day: 1 Year: 19

Transporter 2 Printed/Typed Name — Signature — Month — Day — Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number: 12C9x47

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month — Day — Year

169-BLC-O 5 11977 (Rev. 9/09) TRANSPORTER #2

Bayshore Recycling Corp.
3 Crane Mill Rd
PO Box 290
Keasbey, NJ 08832

Facility ID: 138307

Ticket: 126111
Date: 10/4/2019
Time: 13:55:53 - 15:56:00

Scale:

Customer: EISCO OF NEW JERSEY/BSM0096
43 NEW BRUNSWICK AVE
HOPELAWN, NJ 08861-

JOB# 4370

Gross: 40850 lb In Scale 1
Tare: 25420 lb P.T.
Net: 15440 lb

Truck: AH488M CUYDs: 20 License: AH488M
Truck Type: TANDEM

Carrier: EISCO

Manifest: EW2818815
Remaining: 0.00 TN

Profile: 2719-1276/FORT MONMOUTH PARCEL 57 PROJECT
Generator: FORT MONMOUTH PARCEL 57
Comments

Origin	Materials & Services	Quantity	Unit
Oceanport Boro	ID27 PCS	7.72	Tons

THE ABOVE IS CORRECT AND NON-HAZARDOUS TO THE BEST OF MY KNOWLEDGE

Driver: _____

Weighmaster: Joe S.

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
2719-1276	1	732-542-5152	203 1815

GENERATOR

5. Generator's Name and Mailing Address: UNITED STATES ARMY, FT. MONMOUTH, 1005 STANGER AVE, OCEANPORT NJ 07757
Generator's Phone: (732) 323-4109

Generator's Site Address (if different than mailing address): PARCEL 57, OCEANPORT, NJ

6. Transporter 1 Company Name: ESCO — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: BAYSHORE SOIL MANAGEMENT, 75 CROWS MILL ROAD, P.O. BOX 250, KEASBEY, NJ 08832 — U.S. EPA ID Number: NJ1225001522
Facility's Phone: (732) 738-6000

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON HAZ PC SOIL	X1	OT	45T. 15	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
ESCO — J-90 NJ PLATE A# 488M2
NON 2719-1276

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: William R Colvin for USARMY — Signature: William R Colvin for US Army — Month: 10 — Day: 04 — Year: 17

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name	Signature	Month	Day	Year
		10	04	17

Transporter 2 Printed/Typed Name	Signature	Month	Day	Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month — Day — Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name	Signature	Month	Day	Year

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TRANSPORTER #2