REMEDIAL INVESTIGATION REPORT

for

473 PRESIDENT STREET
BROOKLYN, NEW YORK

NYSDEC BCP NO.: C224220

Prepared For:

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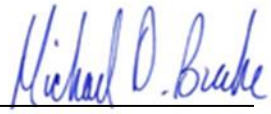

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Principal/Vice President

August 16, 2019
Langan Project No. 170361301

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AWQS	Ambient Water Quality Standards and Guidance Values
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BGS	Below Grade Surface
CAMP	Community Air Monitoring Program
Cells/mL	Cells per Milliliter
Cis-1,2-DCE	cis-1,2-dichloroethene
COC	Contaminant of Concern
CSM	Conceptual Site Model
CU	Commercial Use
DER	Division of Environmental Remediation
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
DUSR	Data Usability Summary Report
EDR	Environmental Data Resources
ELAP	Environmental Laboratory Approval Program
EPA	United Stated Environmental Protection Agency
ESA	Environmental Site Assessment
eV	Electron Volt
FEMA	Federal Emergency Management Agency
FWRIA	Fish and Wildlife Resources Impact Analysis
GNL	Geophysical Noise Level
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
IDW	Investigation Derived Waste
IRMWP	Interim Remedial Measures Work Plan
µg/L	Micrograms per Liter
L/min	Liters per minute
MDL	Method Detection Limit
$\mu g/m^3$	Micrograms per cubic meter
mg/kg	Milligram per kilogram
MGP	Manufactured Gas Plant
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MTBE	Methyl tert-butyl ether
NAVD88	North American Vertical Datum of 1988
NYCRR	New York Codes, Rules, and Regulations
NYSDOH	New York State Department of Health
NYSDEC	New York State Department of Environmental Conservation

Acronym	Definition
NTU	Nephelometric Turbidity Units
ORP	Oxidation-Reduction Potential
PAH	Polycyclic Aromatic Hydrocarbon
PCE	Tetrachloroethene
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts per million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RL	Reporting Limit
RRU	Restricted Residential Use
SCO	Soil Cleanup Objective
SGV	Standards and Guidance Values
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TMB	Trimethylbenzene
TOGS	Technical and Operational Guidance Series
UN/DOT	United Nations Department of Transportation
USGS	United States Geological Survey
UST	Underground Storage Tank
UU	Unrestricted Use
VC	Vinyl Chloride
VOC	Volatile Organic Compound

CERTIFICATION

I, Michael D. Burke, certify that I am currently a Qualified Environmental Professional as defined in 6 New York Codes, Rules and Regulations (NYCRR) Part 375 and that this Remedial Investigation Report (RIR) was prepared in accordance with applicable statutes and regulations , in substantial conformance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10), and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Michael D. Burke, PG, CHMM

1.0 INTRODUCTION

This Remedial Investigation Report (RIR) was prepared on behalf of MCP President Street LLC (the Volunteer) for the property located at 473 President Street in Brooklyn, New York (the site). A Site Location Map is provided as Figure 1. The Volunteer will remediate the site in conjunction with a new development project pursuant to a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC), dated August 20, 2015, for Brownfield Cleanup Program (BCP) Site No. C224220.

This RIR presents environmental data and findings from a remedial investigation (RI) that was implemented by Langan between March 6 and March 22, 2017, a supplemental investigation conducted between April 27 and May 6, 2017, and an indoor air investigation conducted on March 28, 2018., and subsequent indoor air documentation sampling events on August 17, September 7, and December 20, 2018. The indoor air documentation sampling events were conducted based on findings from the RI and indoor air investigation, which identified exposure concerns and resulted in the implementation of an Interim Remedial Measure Work Plan (IRMWP). Indoor documentation sampling events were performed on August 17, September 7, and December 20, 2018. The investigation was conducted in accordance with the NYSDEC-approved Remedial Investigation Work Plan (RIWP), dated November 23, 2015, which was prepared after the site's acceptance into the BCP. The supplemental investigation was performed in accordance with the proposed scope emailed to NYSDEC on April 25, 2017 and approved by NYSDEC in a letter dated April 27, 2017 (Appendix A). The indoor air investigation was performed in accordance with the proposed scope emailed to NYSDEC on February 14, 2018 and approved by NYSDEC in a letter dated February 20, 2018. The objective of the RI is to supplement the existing environmental data to determine, to the extent possible, the nature and extent of contamination in soil, soil vapor, and groundwater. Information presented in this RIR will be used to evaluate appropriate remedial action alternatives.

This RIR is organized as follows:

- Section 2.0 describes the site setting and the physical characteristics of the site.
- Section 3.0 describes the site background including results of previous investigations and identified areas of concern (AOCs).
- Section 4.0 presents the investigation .
- Section 5.0 describes the field observations and analytical results during the investigation.
- Section 6.0 describes the interim remedial measure work plan implementation and findings.
- Section 7.0 presents an assessment of the exposure risks of site contaminants to human, fish, and wildlife receptors.

- Section 8.0 presents the nature and extent of contamination in site media as determined through the field investigation and analysis of environmental samples.
- Section 9.0 summarizes the results of the investigation and presents conclusions based on field observations and analytical results.
- Section 10.0 presents the references used in preparation of this report.

2.0 SITE PHYSICAL CHARACTERISTICS

2.1 Site Description

The site is located at 473 President Street in the Gowanus neighborhood of Brooklyn, New York, and encompasses an area of about 20,000 square feet (0.46 acres) on the southern portion of New York City Tax Block 440, Lot 12. Block 440 is bound by Nevins Street to the west, Union Street to the north, 3rd Avenue to the east, and President Street to the south. The site is developed with a warehouse building occupying the entire footprint, and including a partial cellar at the eastern end of the site. The eastern portion of the warehouse building is used for storage by a bicycle tour company and the western portion of the site is vacant. The site building adjoins the building located on the northern half of Lot 12, which is occupied by the Royal Palms Shuffleboard Club.

The site has 200 feet of frontage along President Street, and is bound by Lot 1 to the west (electronic waste recycling warehouse); the northern portion of Lot 12 to the north (Royal Palms Shuffleboard Club); Lot 21 to the east (Pontone Bros. Corp.); and President Street to the south. The Gowanus Canal is located about 350 feet west of the site. A site layout plan is included as Figure 2.

The site is located in an M1-2 zoning district. M1 districts typically include light industrial uses, but offices, hotels, and most retail uses are also permitted. The proposed development will be consistent with current the current zoning.

2.1.1 Description of Surrounding Properties

The site is located in an urban setting that is characterized by residential, commercial and industrial buildings. The following is a summary of surrounding property usage:

Direction	Adjacent Properties			Surrounding Properties
	Block No.	Lot No.	Description	
East	440	21	One- to two-story warehouse building (South Brooklyn Casket Co)	Multiple-story manufacturing facilities, utility companies, and residential and commercial buildings. The Gowanus Canal is located about 375 feet to the west.
North	440	12	One-story warehouse building (Royal Palms Shuffleboard Club)	
West	440	1	Two-story warehouse building (Gowanus E-Waste Warehouse)	

Direction	Adjacent Properties			Surrounding Properties
	Block No.	Lot No.	Description	
South	447	7, 12, 13, 15, 16, 17, 18, 19	A one-story warehouse building (Crusader Candle Company; Lot 7), and six three-story residential buildings	

Land use within a half mile of the site is urbanized and includes industrial and mixed-use buildings, subway tunnels, park land, and school facilities. The nearest ecological receptor is the Gowanus Canal, a Federal Superfund site, located about 375 feet west of the site. Sensitive receptors, as defined in the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010), located within a half-mile of the site include those listed in the following table:

Number	Name (Approximate distance from Site)	Address
1	Rivendell School (approximately 0.07 miles southeast)	277 3rd Avenue Brooklyn, NY 11215
2	PS 372 The Children's School (approximately 0.16 miles southeast)	512 Carroll Street Brooklyn, NY 11215
3	Bumble Bee Daycare (approximately 0.20 miles southeast)	258 4th Avenue Brooklyn, New York 11218
4	Thomas Greene Playground (approximately 0.20 miles north)	225 Nevins Street Brooklyn, New York 11217
5	PS 32 Samuel Mills Sprole School (approximately 0.25 miles northwest)	317 Hoyt Street Brooklyn, NY 11231
6	P.S. 133 William A. Butler (approximately 0.35 miles northeast)	610 Baltic Street Brooklyn, New York 11217
7	Sunflower Child Care (approximately 0.36 miles southeast)	238 5th Avenue Brooklyn, New York 11215
8	Preschool of America, Inc (approximately 0.37 miles northwest)	378 Baltic Street Brooklyn, New York 11201
9	Eladia's Kids (approximately 0.40 miles east)	147 5th Avenue Brooklyn, NY 11217
10	Kumon Math and Reading Center of Carroll Gardens (approximately 0.40 miles northwest)	337 Smith Street Brooklyn, NY 11231
11	Raindrops (approximately 0.41 miles southeast)	314 5th Street Brooklyn, NY 11215
12	Language Laughter Studio (approximately 0.42 miles northeast)	137 Nevins Street Brooklyn, NY 11217

Number	Name (Approximate distance from Site)	Address
13	Hannah Senesh Community Day School (approximately 0.42 miles west)	342 Smith Street Brooklyn, NY 11231
14	PS 58 The Carroll School (approximately 0.43 miles northwest)	330 Smith Street Brooklyn, NY 11231
15	Cobble Hill School for American Studies (approximately 0.44 miles northwest)	347 Baltic Street Brooklyn, NY 11201
16	John Jay HS Annex – School Garden (approximately 0.44 miles northwest)	347 Baltic Street Brooklyn, New York 11201
17	Carroll Gardens – Hudson's House (approximately 0.44 miles west)	413 Smith Street Brooklyn, New York 11231
18	St. John's Kidz (approximately 0.45 miles east)	34 Saint Johns Place Brooklyn, NY 11217
19	Warren Street Center for Children and Families (approximately 0.46 miles northwest)	343 Warren Street Brooklyn, New York 11201
20	Helen Owen Carey Child Day Center (approximately 0.47 miles east)	71 Lincoln Place Brooklyn, NY 11217
21	Park Slope Christian Academy (approximately 0.48 miles northeast)	98 5th Avenue Brooklyn, New York 11217
22	PS/MS 282 (approximately 0.48 miles east)	180 6th Avenue Brooklyn, NY 11217
23	St. Thomas Aquinas School (0.48 miles southeast)	211 8th Street Brooklyn, NY 11215
24	The Math and Science Exploratory School (approximately 0.48 miles northeast)	345 Dean Street Brooklyn, NY 11217
25	Brooklyn High School of The Arts (approximately 0.48 miles northeast)	345 Dean Street Brooklyn, NY 11217
26	Public School 38 (approximately 0.48 miles northeast)	450 Pacific Street Brooklyn, NY 11217
27	Open House Nursery School (approximately 0.50 miles northwest)	Eileen Shannon, Director 318 Warren Street #A

A map showing the surrounding land uses and the locations of the nearest sensitive receptors is included as Figure 3.

2.1.2 Topography

According to the Brooklyn, NY Quadrant 7.5 Minute Topographic Map, published by the United States Geological Survey (USGS), the surface elevation of the site is about 15 feet above mean sea level (msl). According to a site survey completed by Langan on March 15, 2017 and May 6, 2017, the surface elevation ranges from about el 11[1] (approximate sidewalk elevation) in the southwest to about el 13 (approximate site building first floor slab elevation) in the northwest. The topography of the surrounding area is generally flat, but gradually slopes down from east to west towards the Gowanus Canal.

2.1.3 Surface Water and Drainage

The site is covered by a relatively impervious surface consisting of the site building and the concrete first-floor slab. As such, precipitation that falls on the site does not have the potential to infiltrate to the water table. Runoff drains to city sewers, then to the Red Hook wastewater treatment plant that serves the area.

According to the National Flood Insurance Rate map for the City of New York published by the Federal Emergency Management (FEMA) (Community Panel No. 360497, Panel 0211 G, dated December 5, 2013), the site is located in Zone X, which is designated for areas of 0.2% annual chance flood and areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile.

2.1.4 Wetlands

Potential wetlands on or near the site were evaluated by reviewing the National Wetlands Inventory and NYSDEC regulated wetlands. There are no mapped wetlands located on the site. The nearest wetland is the Gowanus Canal, located about 375 feet west of the site, and is identified as an estuarine and marine deepwater wetland.

2.2 Regional Geology and Hydrogeology

2.2.1 Regional Geology

The Gowanus neighborhood is a densely populated urban area improved with infrastructure including paved roads, walkways and buildings. The infrastructure is generally underlain with historic fill material used for construction and development since the mid 1800's. The area surrounding the Gowanus Canal, but not including the site, was originally part of the former Gowanus Creek and associated wetlands. In 1848, the State of New York authorized construction of the Gowanus Canal as well as the draining and filling of the wetlands of South

[1] Elevations herein are in feet and referenced to the North American Vertical Datum of 1988 (NAVD88).

Brooklyn (New York City Department of City Planning, 1985). By 1869, the Gowanus Canal was completed with the current street configuration (Fulton Municipal Works Former Manufactured Gas Plant Site Final RIR, GEI, 2012).

Soil and bedrock stratigraphy throughout Brooklyn typically consists of a layer of historic fill material that overlies glacial till, decomposed unconsolidated bedrock, and bedrock. The USGS "Bedrock and Engineering Geologic Maps of New York County and Parts of Kings and Queens Counties, New York, and Parts of Bergen and Hudson Counties, New Jersey" indicate the bedrock underlying the site is part of the Hartland Formation. The Hartland Formation is comprised of mica schist and quartz-feldspar granulite, with localized intrusions of granite and pegmatite.

2.2.2 Regional Hydrogeology

Groundwater flow is typically topographically influenced, as shallow groundwater tends to originate in areas of topographic highs and flows toward areas of topographic lows, such as rivers, stream valleys, ponds, and wetlands. A broader, interconnected hydrogeological network often governs groundwater flow at depth or in the bedrock aquifer. Groundwater depth and flow direction are also subject to hydrogeologic and anthropogenic variables such as precipitation, evaporation, extent of vegetation cover, and coverage by impervious surfaces. Other factors influencing groundwater include depth to bedrock, the presence of artificial fill, and variability in local geology and groundwater sources or sinks.

Site groundwater was encountered during the RI at elevations ranging from about el 3.1 to el 2.2, flowing towards the west-southwest. Depth to groundwater ranged from about 8.5 feet below grade surface (bgs) at sidewalk grade to about 10.7 feet bgs at the elevated site grade of the building. Groundwater in the New York City area is not used as a potable water source. Potable water is provided to the site by the City of New York and is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.

3.0 SITE BACKGROUND

This section describes historical site use and the proposed redevelopment, and provides discussion on the findings of previous environmental investigations. AOCs were developed based on a review of the previous reports and are summarized in Section 3.5.

3.1 Historical Site Use

Langan's review of historical documents revealed that the site and surrounding area have been developed for residential, commercial and industrial uses since at least 1886. Historical site uses include a sash and door factory (1886), a trim and planning mill (1904 to 1915), a soda bottling company (1938 to 1950), a die cutting facility (1959 to 2014), a metal manufacturing company (1969 to 1992), and a warehouse (1990s to present). Two gasoline underground storage tanks associated with the bottling plant were identified on Sanborn Maps (1938 and 1950). The site was listed in the NYSDEC Leaking Underground Storage Tanks database (Spill No. 9412605) because of an unregistered 3,500-gallon fuel oil tank, which failed a tank tightness test in 1994. A map showing the historical site and surrounding property usage is provided in Figure 4.

3.2 Proposed Redevelopment Plan

The proposed project will consist of an as-of-right development with a full cellar parking garage.

3.3 Previous Environmental Reports and Documents

Previous environmental reports were reviewed as part of this RIR. The environmental reports summarized below are included in Appendix A.

Phase I Environmental Site Assessment (ESA), dated July 24, 2014, performed by Carlin, Simpson & Associates (CSA)

Findings of the Phase I ESA as they relate to the site are as follows:

- The site was listed in the NYSDEC Leaking Underground Storage Tanks database (Spill No. 9412605) because of an unregistered 3,500-gallon fuel oil tank, which failed a tank tightness test in 1994. The previous owner stated that the tank was filled with sand and closed in-place but did not indicate any remedial actions taken, and no closure documentation was provided. The spill number remains open.

- The property has a history of industrial uses with limited information regarding waste management practices.

- Contaminated groundwater from off-site sources, including the Gowanus Canal and 318 Nevins Street (Verizon property), which was listed as a major oil storage facility with multiple reported spills, may have impacted the site.

Limited Subsurface Investigation, dated June 5, 2015 by Langan

The Limited Subsurface Investigation was conducted to investigate potential impacts from historical use of the site and the open NYSDEC Spill No. 9412605. The Limited Subsurface Investigation was implemented on May 28, 2015 and included a geophysical survey, completion of five soil borings, and collection and analysis of eight soil samples. The results are summarized below:

- Geophysical Survey: Anomalies consistent with USTs were identified near the northwestern and southwestern corners of the site. Anomalies identified near the northwestern corner of the site were consistent with the location of two gasoline USTs identified in the 1938 and 1950 Sanborn Maps.

- Subsurface Observations: Five soil borings were advanced in the vicinity of the geophysical anomalies. Samples collected from the borings were field screened with a photoionization detector (PID), and eight grab soil samples were collected for laboratory analysis. The following is a summary of field observations:

    - Historic fill was observed immediately below the concrete cap to depths ranging from about 6 to 8 feet bgs. The historic fill generally consisted of gray and dark brown fine- to coarse-grained sand with varying amounts of brick, gravel, glass, slag, and ash. The fill layer was underlain by fine- to medium-grained sand followed by clay. Groundwater-saturated soil was encountered at about 8.5 feet bgs in two soil borings.

    - Soil exhibiting mothball-like odors and PID readings up to 168.5 parts per million (ppm) was identified in three borings in the northwestern portion of the site at depths ranging from about 2 to 6 feet bgs.

- Analytical Results:

    - Four volatile organic compounds (VOCs) (acetone, 2-butanone, naphthalene, and total xylenes), 16 semivolatile organic compounds (SVOCs) (acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, benzo(ghi)perylene, dibenzo(a,h)anthracene, dibenzofuran, fluoranthene, flourene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene), one pesticide (4,4'-DDT) and five metals (arsenic, copper, lead, mercury, and zinc) were detected in soil at concentrations that exceed their respective Unrestricted Use (UU) Soil Cleanup Objective (SCO).

    - Ten SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, flouranthene,

indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) and two metals (arsenic and mercury) exceeded Commercial Use (CU) SCOs.

3.4 Summary of Areas of Concern

The following AOCs represent portions of the site that were developed in the RIWP based on site observations, the site history, and the findings of the previous environmental reports. The AOCs are shown on Figure 5.

1. AOC 1 – Historic Fill: AOC 1 represents a layer of historic fill of unknown origin identified between the site-wide concrete slab and about 6 to 8 feet bgs throughout the site. Analytical data for soil samples collected from this material during the May 2015 Limited Subsurface Investigation indicate the fill material contains SVOCs and metals in excess of CU SCOs.
2. AOC 2 – Petroleum Spill in the Southeastern Portion of the Site: AOC 2 represents the open petroleum spill in the southeastern portion of the site. The site was listed in the NYSDEC Leaking Underground Storage Tanks database (Spill No. 9412605) because of an unregistered 3,500-gallon fuel oil tank, which failed a tank tightness test in 1994. According to the previous owner, the tank was filled with sand and closed in-place; however, the petroleum release identified at the time was not remediated and the spill number remains open.
3. AOC 3 – Potential UST – Northwestern Portion of the Site: Sanborn Maps dated 1938 and 1950 identified two gasoline storage tanks of unknown capacity associated with the former Coca-Cola Bottling Co. near the northwestern corner of the site. During the May 2015 Limited Subsurface Investigation, a geophysical anomaly consistent with USTs was identified within the northwestern portion of the site. During the Limited Subsurface Investigation, soil from three borings advanced in the vicinity of the anomaly exhibited naphthalene-like odor and PID readings up to 168 ppm within the fill layer. Petroleum-like impacts were not observed in the borings.
4. AOC 4 – Potential UST – Southwestern Portion of the Site: During the May 2015 Limited Subsurface Investigation, anomalies consistent with USTs were identified in the southwestern portion of the site. No evidence of petroleum-like impacts was observed in two borings advanced in the vicinity of the anomaly during the Limited Subsurface Investigation.

A fifth AOC was identified during the RI in March 2017 and was investigated during the supplemental investigation conducted between April 27 and May 6, 2017:

5. AOC 5 – Chlorinated Volatile Organic Compound (CVOC) Impacts to Soil, Groundwater, and Soil Vapor: CVOCs were detected at concentrations above applicable standards in soil samples (central and northwestern portions of the site), groundwater samples

(northwestern portion of the site), and soil vapor samples (throughout the site) during the RI. Supplemental sampling was conducted to investigate this AOC.

4.0 FIELD INVESTIGATION

The RI included a geophysical survey, soil boring advancement, monitoring well installation, soil vapor probe installation, and collection of soil, groundwater, soil vapor, and ambient air samples. Based on preliminary soil and groundwater results, supplemental sampling was performed to further delineate the nature and extent of CVOCs in soil and groundwater. A summary of samples collected is provided in Table 1, and sample locations are shown on Figure 5.

The RI consisted of the following:

- Geophysical survey to identify subsurface anomalies consistent with utilities, structures, physical obstructions, or unidentified USTs, and to pre-clear soil boring, soil vapor, and monitoring well locations.
- Advancement of 18 soil borings (SB06, SB06D, SB07 through SB12, SB12D, SB13 through SB15, SB15D, SB16 through SB19, and SB20D) and collection of 48 soil samples, plus three duplicate samples.
- Installation of 12 permanent groundwater monitoring wells (MW06, MW6D, MW07, MW08, MW09, MW10, MW12, MW12D, MW15D, MW18, MW20S, and MW20D) and collection of 12 groundwater samples, plus two duplicate samples.
- Installation of five sub-slab soil vapor points (SV01 through SV05) and collection of five soil vapor samples, plus one duplicate sample, and collection of five indoor air samples (IA01 through IA05) and two ambient air samples (AA01 and AA02).

Langan conducted the RI in accordance with NYCRR Title 6 Part 375 (6 NYCRR Part 375), the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010), the NYSDEC Draft BCP Guide (May 2004), the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006), the NYSDEC-approved RIWP, dated November 23, 2015.

4.1 Geophysical Investigation

Prior to commencement of intrusive RI field activities (i.e., soil borings, well installation and soil vapor sampling), NOVA Geophysical & Environmental, Inc. (NOVA) of Douglaston, New York, conducted a geophysical survey under the supervision of a Langan field engineer on March 6, 2017. The survey included ground-penetrating radar (GPR) to identify potential USTs and locate buried utilities in the vicinity of each boring location. Borings were relocated as necessary to avoid subsurface utilities and anomalies. Copies of the geophysical survey report presenting findings is included in Appendix B.

4.2 Soil Investigation

4.2.1 Investigation Methodology

March 2017 RI

Fourteen soil borings, SB06 through SB19, were completed by AARCO Environmental Services Corp. (AARCO) between March 6 and 10, 2017. Boring locations were selected to provide sufficient site coverage and to evaluate the AOCs listed in Section 3.4. Twelve borings were advanced using a direct-push Geoprobe® 6610 DT, and two borings were advanced using a DeWalt jackhammer with a MacroCore attachment due to access constraints. Boring locations are presented on Figure 5.

Borings depths are summarized as follows:

- Boring SB10 was advanced to 10 feet bgs
- Borings SB08 and SB13 were advanced to 12 feet bgs
- Borings SB06, SB09, SB11, SB12, SB14, SB15, SB16, and SB17 were advanced to 16 feet bgs
- Boring SB07 was advanced to 28 feet bgs
- Borings SB18 and SB19 were advanced to 24 feet bgs

Continuous soil samples were collected from the surface to the final depth of each boring. Samples were collected from the Geoprobe® 6610 DT or the DeWalt Jackhammer into 4-foot-long acetate liners. The soil was screened for visual, olfactory, and instrumental evidence of environmental impacts, and was visually classified for soil type, grain size, texture, and moisture content. Instrument screening for the presence of VOCs was performed with a photoionization detector (PID) equipped with a 10.6-electron volt (eV) lamp. Boring logs documenting these observations are included in Appendix C.

Following sample collection, all borings were backfilled with sand and uncontaminated boring material or converted to groundwater monitoring wells. Excess soil was containerized in United Nations/Department of Transportation (UN/DOT)-approved 55-gallon steel drums with sealed lids in preparation for off-site disposal.

April 2017 Supplemental Investigation

Four additional borings (SB06D, SB12D, SB15D, and SB20D) were advanced by AARCO on April 28 and 29, 2017 using a Geoprobe 7822DT drill rig. The supplemental investigation was conducted to further investigate and delineate CVOC impacts identified during the RI and to obtain data necessary to evaluate in-situ remediation alternatives. Supplemental investigation boring depths are summarized below:

- Borings SB06D and SB12D were advanced to 30 feet bgs;

- Boring SB15D was advanced to 40 feet bgs; and
- SB20D was advanced to 55 feet bgs.

Continuous soil samples were collected from the surface to the final depth of each environmental boring. Samples were collected from the Geoprobe® 7822 DT into either 4-foot or 5-foot-long acetate liners. Samples were screened for visual, olfactory, and instrumental evidence of environmental impacts, and were visually classified for soil type, grain size, texture, and moisture content. Instrumental screening for the presence of VOCs was performed with a PID equipped with an 11.7 eV lamp. Oil-in-Soil dye kits were used to gauge the potential presence of dense non-aqueous phase liquid (DNAPL). Boring logs documenting these observations are included in Appendix C.

Following sample collection, all supplemental investigation borings were converted to groundwater monitoring wells. Excess soil was containerized in UN/DOT-approved 55-gallon steel drums with sealed lids in preparation for off-site disposal.

4.2.2 Sampling Methodology

March 2017 RI

Thirty-eight (38) soil samples, including two field duplicate samples, were collected for laboratory analysis. Two to three grab soil samples were collected from each boring location. One sample was collected from the upper two feet of historic fill material, a second sample was collected from the top two feet of the native layer, and the third sample was collected from the interval exhibiting the greatest degree of impacts based on field screening (i.e., odors and PID readings above background) or from the groundwater interface. Soil samples collected from each soil boring were analyzed for NYSDEC Part 375 VOCs by United States Environmental Protection Agency (EPA) Method 8260C, SVOCs by EPA method 8270D, pesticides via method 8081B, metals (including hexavalent chromium) by EPA methods 6010C/7473/7196A, and total cyanide by EPA method 9010C/9012B. A sample summary is provided as Table 1.

The samples were relinquished to a courier for delivery to York Analytical Laboratories, Inc. (York), NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratories in Stratford, Connecticut under standard chain-of-custody protocol.

April 2017 Supplemental Investigation

Thirteen soil samples, including one field duplicate sample, were collected for laboratory analysis. Unless impacts were observed, two samples were collected per boring, one grab sample from the boring termination depth, and one composite sample from the screened interval of the well for remedial design considerations. In boring SB20D, four grab samples were collected to characterize and delineate the vertical extent of impacted soil.

Grab soil samples collected from borings SB06D, SB12D, SB15D, SB20D were analyzed for NYSDEC Part 375 VOCs by EPA method 8260 analysis. Composite soil samples were analyzed for grain size, biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), ammonia, nitrate, nitrite, total phosphate, sulfate, alkalinity, total iron, and total manganese. A sample summary is provided as Table 1.

Samples submitted for VOC analysis were collected directly from the acetate liner via laboratory-supplied TerraCore® soil samplers. For all other analyses, the sample volume was homogenized and placed in appropriate laboratory-supplied. The sample containers were labeled, placed in a laboratory-supplied cooler and packed on ice (to maintain a temperature of 4±2°C). The samples were relinquished to a courier for delivery to Alpha Analytical Laboratories (Alpha), NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratories Westborough, Massachusetts under standard chain-of-custody protocol.

4.3 Groundwater Investigation

4.3.1 Monitoring Well Installation and Development Methodology

March 2017 RI

Seven monitoring wells were installed by AARCO between March 6 and 10, 2017. Seven soil borings (SB06, SB07, SB08, SB09, SB10, SB12, and SB18) were converted to permanent monitoring wells. Six monitoring wells (MW06, MW07, MW08, MW09, MW12, and MW18) were constructed by inserting 2-inch diameter pre-pack wells with an outer layer of stainless steel mesh screen and silica sand over 0.010-inch slotted screens (up to 10 feet in length). MW10, located in the cellar, was constructed by inserting 10 feet of 1-inch diameter 0.01-inch slotted schedule 40 PVC well screen. Monitoring wells MW06, MW08, MW09, MW12, and MW18 were screened to straddle the groundwater interface. MW07 was screened below the water table (about 10 feet bgs) at 19 to 24 feet bgs to evaluate the petroleum-like impacts observed in soil within the screened interval.

April 2017 Supplemental Investigation

Four soil borings (SB06D, SB12D, SB15D, SB20D) were converted into deep permanent groundwater monitoring wells by AARCO between April 28 and 29, 2017. One additional shallow well was constructed (MW20S) as part of a well couplet to evaluate the vertical distribution of VOC-impacted groundwater. Five permanent groundwater monitoring wells were constructed by inserting 2-inch diameter 0.020-inch slotted schedule 40 polyvinyl chloride (PVC) well screens, with attached risers, into the boreholes. The annulus of each well was filled with No. 2 sand to about two feet above the top of the screen. Hydrated bentonite well seals were installed above the filter sand. Visual, olfactory, and/or PID readings indicative of petroleum impacts were apparent in boring SB20D to about 30 feet bgs; therefore, MW20D was screened between 20 and 30 feet bgs. MW20S was screened to straddle the water table between 8 and 18 feet bgs.

Evidence of a chemical or petroleum release was not apparent in borings SB06D, SB12D, or SB15D; therefore, MW06D, MW12D, and MW15D were screened between 20 and 25 feet. The annulus of each well was filled with #2 filter sand to about two feet above the top of the screen. Hydrated bentonite well seals were installed above the filter sand.

Following installation, each well was developed using a surge block and a submersible whale pump. Development water was placed into labeled drums and stored on-site pending off-site disposal. Monitoring well locations are provided on Figure 5 and monitoring well construction logs are included in Appendix D.

A Langan field scientist completed synoptic groundwater gauging of newly-installed monitoring wells on March 22, 2017 and again on June 23, 2017. The top of casing in groundwater monitoring wells was surveyed by Langan on March 15, 2017 and May 6, 2017. Groundwater elevations are presented in Table 2. A groundwater contour map based on the June 23, 2017 groundwater gauging event is presented as Figure 6.

4.3.2 Groundwater Sampling

Monitoring wells were sampled one week after development. Wells were sampled in general accordance with the EPA's low-flow groundwater sampling procedure to allow for collection of a representative sample ("Low Stress [low flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", EQASOP-GW 001, January 19, 2010). Prior to sample collection, groundwater was purged from each well until either groundwater parameters (pH, conductivity, turbidity, dissolved oxygen [DO], temperature, and oxidation-reduction potential [ORP]) had stabilized and turbidity measurements were below 50 Nephelometric Turbidity Units (NTU) or one hour had lapsed. The monitoring wells were purged and groundwater samples were collected using a submersible pump, with the exception of monitoring wells MW09 and MW10. Monitoring well MW10 was collected using a peristaltic pump and MW09 was collected using a bailer. Groundwater sampling logs are included in Appendix E.

March 2017 RI

Eight groundwater samples, including one field duplicate sample, were collected into laboratory-supplied glassware and picked up and delivered via courier service to York for laboratory analysis. Groundwater samples were analyzed for TCL VOCs by EPA Method 8260C, TCL SVOCs by EPA method 8270D, pesticides by EPA method 8081Band Target Analyte List (TAL) metals (dissolved) by EPA methods 6010C/7470. A sample summary is provided as Table 1.

April 2017 Additional Investigation

Six groundwater samples, including one field duplicate sample, were collected into laboratory-supplied glassware and delivered via courier service to Alpha for laboratory analysis.

Groundwater samples were analyzed for TCL VOCs by EPA Method 8260C, nitrate, sulfate, ammonia, phosphate, and dehalococcoides (DHC). A sample summary is provided as Table 1.

4.4 Soil Vapor Investigation

NYSDEC DER-10 requires an assessment of soil vapor for contaminated sites to evaluate the health risk associated with potential exposure to VOCs through vapor intrusion into occupied spaces. Five sub-slab soil vapor sample points (SV01 through SV05) and one duplicate soil vapor sample point (DUP01) were installed during the RI. One ambient air sample (AA01) was also collected. Sampling locations are presented on Figure 5.

4.4.1 Sub-slab Soil Vapor Point Installation

Sub-slab soil vapor points were installed by AARCO under the supervision of a Langan field scientist between March 6 and March 10, 2017. AARCO used a Geoprobe® 6610 DT to install sub-slab soil vapor points ranging from about 5 feet bgs (SV02 through SV04) to 6 feet bgs (SV01). SV05 was installed to 5 feet bgs using a DeWalt Jackhammer.

The sub-slab soil vapor probes were installed in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). The sub-slab soil vapor point consisted of a stainless steel screen implant threaded into polyethylene tubing. The soil vapor implants were ¼-inch in diameter and about 6 inches in length. A sand filter pack was installed around the screen implant by pouring #2 Filpro sand into the annulus. The sand filter pack was placed to about 6 inches above the implant at soil vapor sample locations and to the bottom of the slab at the sub-slab soil vapor probe location. A hydrated bentonite slurry seal was installed above the sand pack. Sub-slab soil vapor point construction logs are provided in Appendix F.

4.4.2 Sub-Slab Soil Vapor and Air Sampling and Analysis

As a QA/QC measure, an inert tracer gas (helium) was introduced into an above-grade sampling chamber to ensure that the sub-slab soil vapor sampling points were properly sealed above the target sampling depth, thereby preventing subsurface infiltration of ambient air. Direct readings of helium of less than 5 percent of the shroud concentration prior to sampling were considered sufficient to verify a tight seal. All sampling points had sufficiently tight seals.

Each sub-slab soil vapor point was purged using a MultiRAE meter at a rate of 0.15 liters per minute (L/min) to evacuate a minimum of three sample tubing volumes prior to sample collection. The purged soil vapor was also monitored for VOCs and the value was recorded. After purging was complete, soil vapor samples were collected into laboratory-supplied, batch-certified 6-liter Summa® canisters that were calibrated for a sampling rate of about 0.2 L/min for 120 minutes of sampling. One ambient air sample was collected in conjunction with sub-slab soil vapor samples SV01, SV02, and SV04. The ambient air sample was collected outside, from about 3 feet above

sidewalk grade, and submitted to the laboratory for analysis for QA/QC purposes. Indoor air sampling was not included in the investigation scope outlined in the NYSDEC-approved RIWP. Sub-slab soil vapor and ambient air sampling logs are provided in Appendix F.

The canisters were labeled and delivered by courier to York under standard chain-of-custody protocol. Soil vapor samples were analyzed for VOCs by EPA Method TO-15.

4.5 Indoor Air Sampling

March 2018 Indoor Air Investigation

Indoor air sampling was conducted on March 28, 2018 in accordance with the NYSDEC- and NYSDOH-approved indoor air sampling scope. Five indoor air samples and one ambient air sample were collected at about 3 to 4 feet above ground (i.e., breathing height) to investigate soil vapor intrusion potential within the building and to evaluate potential matrix interferences, and external influences on soil vapor quality, respectively. Sampling locations are presented on Figure 5.

Indoor air and ambient air sampling was conducted in general accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). Prior to sample collection, a NYSDOH Indoor Air Quality Questionnaire and Building Survey was completed to document the potential presence of equipment or chemicals in the building that could interfere with the laboratory analytical results. The building was screened using a MiniRAE 3000 PID to identify potential sources of organic vapors that may interfere with sampling.

Indoor air and ambient air samples were collected into laboratory-supplied 2.7-liter Summa canisters with flow controllers calibrated for an 8-hour sampling period. The labeled samples were submitted to Alpha via courier service under standard chain-of-custody protocol. Air samples were analyzed for VOCs by EPA Method TO-15. Indoor air and outdoor ambient air sampling logs and results of the chemical product inventory are provided in Appendix F.

4.6 Quality Control Sampling

Field blanks, trip blanks, field duplicate samples, MS/MSD samples and an ambient air sample were collected and submitted for laboratory analysis. QA/QC samples are summarized in Table 1 and include the following matrix-specific QA/QC samples:

<u>Soil QA/QC samples</u>

- Three duplicate samples;
- Four MS/MSD sample;
- Two field blank samples; and

- Three trip blank samples.

Groundwater QA/QC samples

- Two duplicate samples;
- Two MS/MSD samples;
- Three field blank samples; and
- Two trip blank samples.

Sub-Slab Soil Vapor QA/QC Samples

- One duplicate sample; and
- Two ambient air samples.

Indoor Air QA/QC Samples

- One ambient air sample.

Indoor Air Documentation Samples QA/QC Samples

- Three ambient air samples.

Field blanks were collected to determine the effectiveness of the decontamination procedures for the groundwater sampling equipment and the cleanliness of unused neoprene gloves and acetate liners used to collect soil samples. Field blank samples consisted of deionized, distilled water provided by the laboratory that has passed through the sampling apparatus. Field blank samples were analyzed for the same list of analytes as the corresponding sampling event and sample matrix.

MS/MSD samples were collected to assess the effect of the sample matrix on the recovery of target compounds or target analytes.

The field duplicates were collected to assess the precision of the analytical methods relative to the sample matrix. Duplicates were collected from the same material as the primary sample by splitting the volume of homogenized sample collected in the field into two sample containers.

The ambient air samples were collected to assess ambient air conditions and determine whether conditions existed at the site during sub-slab soil vapor and indoor air sampling that could have potentially interfered with sampling results. The ambient air samples were analyzed for the same parameter list as the sub-slab soil vapor and indoor air samples.

The trip blank samples were collected to assess the potential for contamination of the sample containers and samples during the trip from the laboratory, to the field, and back to the laboratory for analysis. Trip blanks contained about 40 milliliters of acidic water (doped with hydrochloric acid) that were sealed by the laboratory when the empty sample containers were shipped to the

field, and unsealed and analyzed by the laboratory when the sample shipment was received from the field. The trip blank samples were analyzed for VOCs.

4.7 Data Validation

Data from the RI was validated by a Langan data validator in accordance with EPA and NYSDEC validation protocols. Copies of the data usability summary reports (DUSRs) and the data validator's credentials are provided in Appendix G.

4.7.1 Data Usability Summary Report Preparation

A DUSR was prepared for each sampling matrix. The DUSR presents the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. For the soil and groundwater samples, the following items were assessed:

- Holding times
- Sample preservation
- Sample extraction and digestion
- Laboratory blanks
- Laboratory control samples
- System monitoring compounds
- MS/MSD recoveries
- Field duplicate, trip blanks, and field blanks sample results

For the air samples, the following items were assessed:

- Holding times
- Canister certification
- Laboratory blanks
- Laboratory control samples
- System monitoring compounds
- Target compound identification and qualification
- Field duplicate sample results

Based on the results of data validation, the following qualifiers were assigned to the data in accordance with EPA's guidelines and best professional judgment:

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

After data validation activities were complete, validated data was used to prepare the tables and figures included in this report.

4.8 Field Equipment Decontamination

Decontamination of down-hole drilling equipment occurred between each boring location, and consisted of cleaning the rods. The decontamination wastewater was contained within a wash pan, and transferred to 55-gallon drums for disposal.

Handheld sampling equipment including the groundwater interface probe was decontaminated by hand using an Alconox-based solution, and triple rinsed with distilled water. All liquids were temporarily contained in 5-gallon buckets. Decontamination wastewater was drummed for disposal.

4.9 Investigation-Derived Waste Management

Investigation-derived wastes (IDW) generated during the RI consisted of excess soil from soil borings, purging and development water from groundwater monitoring wells, and water used for equipment decontamination. IDW was transferred to 55-gallon drums, which were staged in a secured area on-site. Two drums of liquid waste and one drum of solid waste were generated during the March 2017 portion of the investigation and were transported for off-site disposal under standard manifest protocol by AARCO on April 13, 2017 to Dale Transfer Corp in West Babylon, NY. Five drums of liquid waste were generated during the supplemental investigation. The waste was characterized as spent solvent hazardous waste from a non-specific source (F002) and was transported for off-site disposal under hazardous waste manifest protocol (EPA Generator ID No. NYR000232116) by Clean Harbors Environmental Services, Inc. on June 23, 2017 to Clean Harbors El Dorado LLC in El Dorado, AR. Four drums of non-hazardous solid waste were generated during the supplemental investigation and were transported for off-site disposal under standard manifest protocol by Clean Harbors on June 23, 2017 to Spring Grove Resource Recovery, Inc. in Cincinnati, OH.

5.0 FIELD OBSERVATIONS AND ANALYTICAL RESULTS

This section summarizes the field observations and laboratory analytical results from the RI. Soil analytical results are compared to the NYSDEC Part 375 UU SCOs and CU SCOs; groundwater analytical results are compared to the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (SGVs) for Class GA water; and sub-slab soil vapor sample results are compared to the ambient air sample results and NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York Decision Matrices. The nature and extent of contamination is discussed in Section 7.0.

A description of the soil, groundwater, and sub-slab soil vapor samples collected during the RI is provided in Table 1. Copies of the laboratory analytical data reports for data generated during the RI are provided in Appendix H. Summaries of the soil, groundwater, sub-slab soil vapor, and QA/QC sample analytical results for samples collected during the RI are provided in the following tables:

- Table 3: Soil Sample Analytical Detection Summary
- Table 4: Soil Design Criteria Sample Results Summary
- Table 5: Groundwater Sample Analytical Results Summary
- Table 6: Groundwater Design Criteria Sample Results Summary
- Table 7: Soil Vapor and Air Sample Analytical Results Summary
- Table 8: Air Sample Analytical Results Summary
- Table 9: Indoor Air Documentation Sample Results Summary
- Table 10: QA/QC Sample Analytical Results Summary

The following sections describe the field observations and analytical data associated with the RI.

5.1 Geophysical Investigation Findings

The geophysical survey identified two anomalies that were determined to be consistent with USTs: one anomaly in the area of suspected gasoline USTs in the northwestern portion of the site and one anomaly in the area of suspected fuel oil USTs in the southwestern portion of the site. The reported closed-in-place UST in the southeastern portion of the site was not detected during the survey, but access in that area of the site was limited by tenant storage. Several electrical, gas, sewer and water lines were found on the eastern part of the site. A copy of the March 14, 2017 Geophysical Engineering Survey Report is included in Appendix B.

5.2 Geology and Hydrogeology

Geologic and hydrogeologic observations made during the RI are provided below. A groundwater contour map is provided as Figure 6, and subsurface profiles are shown on Figure 7. Soil boring logs are provided in Appendix C.

5.2.1 Historic Fill

A historic fill layer was encountered beneath the 6- to 36-inch-thick concrete slab to depths ranging from about 8 feet bgs in the northeastern portion of the site at borings SB12, SB14, and SB16 to about 10 to 14 feet bgs throughout the rest of the site. The fill generally consists of brown, medium to fine sand with varying amounts of gravel, brick, concrete, asphalt, coal fragments, coal ash, slag, and wood. An area of predominantly coal fragments was observed below the cellar slab to a depth of about 7 feet in boring SB10, located in the partial cellar in the southeastern portion of the site. Hardened coal tar was observed within the fill layer in boring SB11, located in the southeastern portion of the site.

5.2.2 Native Soil Layers

The fill layer was underlain mainly by brown fine sand with varying amounts of silt and clay. In borings, SB09, SB11, and SB14 the fine sand was underlain by a 2-foot-thick brown clayey silt layer.

5.2.3 Bedrock

The USGS "Bedrock and Engineering Geologic Maps of New York County and Parts Kings and Queens Counties, New York, and Parts of Bergen and Hudson Counties, New Jersey" indicates that the bedrock underlying the site is part of the Hartland Formation and is between el -100 and -200 feet. Bedrock was not encountered during the RI.

5.2.4 Hydrogeology

Synoptic groundwater level measurements were collected on May 22 and June 23, 2017. Groundwater was encountered at elevations ranging from about el 2.16 to 3.12 feet, which roughly correspond to depths of about 9 to 10.5 feet bgs. The regional groundwater table is relatively flat with a slight gradient to the west towards the Gowanus Canal. A groundwater contour map is shown as Figure 6.

5.3 Soil Findings

5.3.1 Field Observations

Petroleum-like impacts, evidenced by odors, staining and PID readings above background levels, were apparent in 4 of 18 borings. The depth intervals at which petroleum-like odors were

apparent, and the highest recorded PID readings for these intervals, are provided in the following table:

Soil Boring ID	Observed Fill Interval (feet bgs)	Petroleum-like Impact Depth Interval (feet bgs)	Max PID Reading	Soil Boring Location
SB07	0 – 13	11 – 24	4195 ppm	AOC 3 – Northwestern USTs
SB18	0 – 8	11 – 20	1493 ppm	AOC 3 – Northwestern USTs
SB19	0 – 14.5	13.5 – 20	1276 ppm	AOC 3 – Northwestern USTs
SB20D	0 – 13.5	12 – 19.5	1121 ppm	AOC 3 – Northwestern USTs

Coal tar-like odors were apparent during the 2015 Supplemental Investigation within the fill layer in the northwestern portion of the site, and during the RI within the fill layer in the southeastern portion of the site (SB11). DNAPL was not identified during the RI or previous investigations.

5.3.2 Analytical Results

Thirty-eight soil samples, including two field duplicate samples, were collected and analyzed for VOCs, SVOCs, metals, pesticides, and total cyanide. Soil samples were not analyzed for PCBs during the RI; however, they will be analyzed as part of waste characterization sampling prior to site remediation. Eight additional soil samples, including one duplicate sample, were collected and analyzed for VOCs; and five additional soil samples were collected and analyzed for grain size, BOD, COD, TOC, ammonia, nitrate, nitrite, total phosphate, total iron, total manganese, sulfate, and alkalinity to evaluate remedial alternatives.

A summary of laboratory detections for soil samples collected during the RI with comparisons to UU and CU SCOs is provided in Table 3. A summary of laboratory results for the treatability samples is provided in Table 4. Full laboratory reports for the RI are included in Appendix H. Soil sample results that exceed SCOs for samples collected during the RI are shown on Figure 8. The following contaminants were detected at concentrations exceeding NYSDEC Part 375 CU and/or UU SCOs:

VOCs

Eight petroleum-related VOCs and two CVOCs were detected at concentrations above UU SCOs in soil samples collected at depths ranging from 1 to 24 feet bgs. VOC concentrations exceeding SCOs were identified in borings SB07, SB09, SB18, SB19, and SB20D. The list below provides a summary of each VOC that exceeded the UU SCO. The concentration ranges provided represent concentrations detected above the UU SCO (the UU SCO for each compound is shown in parentheses):

Petroleum-related VOCs

- 1,2,4-Trimethylbenzene (1,2,4-TMB): 52 milligrams per kilogram (mg/kg) in SB20D_17-19 to 100 mg/kg in SB07_23-24 (UU SCO of 3.6 mg/kg);

- 1,3,5-Trimethylbenzene (1,3,5-TMB): 18 mg/kg in SB20D_17-19 to 29 mg/kg in the duplicate of sample SB07_23-24 (UU SCO of 8.4 mg/kg);
- 2-Butanone: 0.19 mg/kg in SB20D_0-2 (UU SCO of 0.12 mg/kg);
- Benzene: 0.55 mg/kg in SB07_13-14 to 2.1 mg/kg in SB20D_17-19 (UU SCO of 0.06 mg/kg);
- Ethyl Benzene: 2.2 mg/kg in SB07_13-14 to 32 mg/kg in the duplicate of sample SB07_23-24 (UU SCO of 1 mg/kg);
- n-Propylbenzene: 6.9 mg/kg in SB20D_17-19 to 22 mg/kg in SB07_13-14 (UU SCO of 3.9 mg/kg);
- Toluene: 5.3 mg/kg in SB07_23-24 to 5.5 mg/kg in the duplicate of sample SB07_23-24 (UU SCO of 0.7 mg/kg);
- Total Xylenes: 40 mg/kg in SB20D_17-19 to 250 mg/kg in the duplicate of sample SB07_23-24 (UU SCO of 0.26 mg/kg).

CVOCs

- cis-1,2-Dichlorothene (cis-1,2-DCE): 0.57 mg/kg in the duplicate of sample SB07_23-24 to 3.7 mg/kg in SB07_23-24 (UU SCO of 0.25 mg/kg);
- Trichloroethylene (TCE): 2.3 mg/kg in the duplicate of sample SB19_20-21 to 5.1 mg/kg in SB09_1-2 (UU SCO of 0.47 mg/kg).

VOCs did not exceed CU SCOs in any sample.

SVOCs

Seven SVOCs were detected at concentrations above the UU and/or CU SCOs in soil samples collected from surface grade to 8 feet bgs. SVOC concentrations exceeding the UU SCOs were detected soil borings SB08, SB11, SB12, SB14, and SB17. In addition, SVOCs were detected during Langan's limited subsurface investigation in borings SB02 and SB04. The list below provides a summary of each SVOC that exceeded the UU SCO and/or CU SCO. The concentration ranges represent concentrations detected above the UU SCO and/or CU SCO (the UU and CU SCOs for each compound are shown in parentheses):

- Benzo(a)anthracene: 2.46 mg/kg in SB12_1-2 to 8.42 mg/kg in SB17_7-8 (UU of 1 mg/kg; CU SCO of 5.6 mg/kg);
- Benzo(a)pyrene: 2.21 mg/kg in SB12_1-2 to 12.5 mg/kg in SB11_2-4 (UU and CU SCO of 1 mg/kg);
- Benzo(b)fluoranthene: 2.39 mg/kg in SB12_1-2 to 9.66 mg/kg in SB11_2-4 (UU SCO of 1 mg/kg; CU SCO of 5.6 mg/kg)

- Benzo(k)fluoranthene: 1.97 mg/kg in SB12_1-2 to 11.3 mg/kg in SB11_2-4 (UU SCO of 0.8 mg/kg; CU SCO of 56 mg/kg)
- Chrysene: 2.76 mg/kg in SB12_1-2 to 8.82 mg/kg in SB17_7-8 (UU SCO of 1 mg/kg; CU SCO of 56 mg/kg)
- Dibenzo(a,h)anthracene: 0.596 mg/kg in SB12_1-2 to 2.12 mg/kg in SB17_7-8 (UU SCO of 0.33 mg/kg; CU SCO of 0.56 mg/kg)
- Indeno(1,2,3-cd)pyrene: 1.25 mg/kg in SB12_1-2 to 8.59 mg/kg in SB11_2-4 (UU SCO of 0.5 mg/kg; CU SCO of 5.6 mg/kg)

Other SVOCs were detected in soil samples, but at concentrations below UU SCOs.

Metals

Metals were detected at concentrations above UU and/or CU SCOs to depths of up to 11 feet bgs in 12 of 14 soil borings with samples analyzed for metals. The list below provides a summary of each metal that was detected at a concentration above the UU SCO and/or CU SCO. The concentration ranges provided represent concentrations detected above the UU SCO (the UU and CU SCOs for each compound are shown in parentheses).

- Arsenic:14.1 mg/kg in SB14_1-2 to 203 mg/kg in SB16_9-11 (UU SCO of 13 mg/kg; CU SCO of 16 mg/kg)
- Barium: 397 mg/kg in SB14_1-2 to 1,170 mg/kg in SB16_9-11 (UU SCO of 350; CU of 400 mg/kg)
- Cadmium: 6.48 in SB16_9-11 (UU SCO of 2.5 mg/kg; CU SCO of 4.3 mg/kg)
- Trivalent chromium: 69.14 mg/kg in SB13_1-2 (UU SCO of 30 mg/kg; CU SCO of 1500 mg/kg)
- Hexavalent chromium: 1.07 mg/kg in SB06_2-3 to 3.86 mg/kg in SB13_1-2 (UU SCO of 1 mg/kg; CU SCO of 400 mg/kg)
- Copper: 50.7 mg/kg in SB08_1-2 to 242 mg/kg in SB16_9-11 (UU SCO of 50 mg/kg; CU SCO of 270 mg/kg)
- Lead: 64.8 mg/kg in SB17_15-16 to 1080 mg/kg in SB16_9-11(UU SCO of 63 mg/kg; CU SCO of 1,000 mg/kg)
- Mercury: 0.194 mg/kg in SB06_2-3 to 2.96 mg/kg in SB17_1-2 (UU SCO of 0.18 mg/kg; CU SCO of 2.8 mg/kg)
- Nickel: 40.6 mg/kg in SB15_7-8 (UU SCO of 30 mg/kg; CU SCO of 310 mg/kg);
- Selenium: 5.09 mg/kg in SB15_7-8 to 63.1 mg/kg in SB16_9-11 (UU SCO of 3.9 mg/kg; CU SCO of 1,500 mg/kg)

- Zinc: 125 mg/kg in SB08_1-2 to 577 mg/kg in SB16_9-11 (UU SCO of 109 mg/kg; RRU and CU SCO of 10,000 mg/kg)

Pesticides

Pesticides were not detected at concentrations above the CU SCOs. Two pesticides were detected at concentrations above UU SCOs in boring SB13. The concentrations provided represent concentrations detected above the UU SCO (the UU SCOs for each compound are shown in parentheses).

- 4,4'-DDT: 0.00491 mg/kg in SB13_1-2 (UU SCO of 0.0033 mg/kg)
- alpha-Chlordane: 0.28 mg/kg in SB13_1-2 (UU SCO of 0.094 mg/kg)

Total Cyanide

Cyanide was not detected in any soil samples.

5.4 Groundwater Findings

5.4.1 Field Observations

Monitoring wells were gauged for free product with an oil-water interface probe. Free product was not detected in monitoring wells. Monitoring wells MW07, MW18, MW20S, and MW20D exhibited petroleum-like odors and PID headspace readings between 31.4 and 630 ppm (highest reading in MW20S) during sampling.

5.4.2 Analytical Results

Eight groundwater samples, including one duplicate sample, were collected during the RI and analyzed for VOCs, SVOCs, pesticides, and dissolved metals. Six additional groundwater samples, including one duplicate sample, were collected from monitoring wells MW06D, MW12D, MW15D, MW20S, and MW20D and analyzed for VOCs and groundwater treatability design criteria (ammonia, nitrate, phosphate, sulfate, and Dehalococcoides).

Full laboratory reports for the RI are included in Appendix H. A summary of the groundwater sample laboratory detections compared to the TOGS Class GA SGVs is presented in Table 5. Groundwater design criteria results are summarized in Table 6. Groundwater sample locations and results that exceed the TOGS Class GA SGVs are presented in Figures 9A and 9B. The following is a summary of the groundwater sample results that exceed the SGVs organized by analytical parameter.

VOCs

Groundwater samples collected from all wells except MW09, MW10, and MW12D, had detections of petroleum-related VOCs and/or CVOCs at concentrations above TOGS SGVs for

Class GA drinking water. The following concentration ranges represent concentrations detected above the SGVs (the SGV for each compound is shown in parentheses):

Petroleum-Related VOCs

- 1,2,4-TMB: 6.2 µg/L in MW15D_050617 to 1,600 µg/L in MW18_032217 and MW07_032217 (SGV of 5 µg/L);
- 1,2,4,5-Tetramethylbenzene: 57 µg/L in MW06_031617 to 73 µg/L in MW20S_050617 (SGV of 5 µg/L);
- 1,3,5-TMB: 250 µg/L MW20S_050617 to 470 µg/L in MW07_032217 (SGV of 5 µg/L);
- Acetone: 71 µg/L in MW20S_050617 to 120 µg/L in MW18_032217 and MW20D_050617 (SGV of 50 µg/L);
- Benzene: 70 µg/L in MW06_031617 to 3500 µg/L MW18_031217 (SGV of 1 µg/L);
- Ethyl benzene: µg/L 110 µg/L in MW20S_050617 to 2000 µg/L in MW07_032217 (SGV of 5 µg/L);
- Isopropylbenzene: 34 µg/L in MW20S_050617 to 160 µg/L in MW18_032217 (SGV of 5 µg/L);
- Naphthalene: 120 µg/L in MW20S_050617 to 360 µg/L in MW20D_050617 (SGV of 10 µg/L);
- n-Butylbenzene: 8.3 µg/L in MW06_031617 to 62 µg/L in MW18_032217 (SGV of 5 µg/L);
- n-Propylbenzene: 32 µg/L in MW20S_050617 to 220 µg/L in MW18_032217 (SGV of 5 µg/L);
- *o*-Xylene: 31 µg/L in MW20S_050617 to 1300 µg/L in MW07_032217 (SGV of 5 µg/L);
- *p*- & *m*-Xylenes: 5.8 µg/L in MW06_031617 to 5600 µg/L in MW07_032217 (SGV of 5 µg/L);
- *p*-Isopropyltoluene: 10 µg/L in MW20S_050617 to 24 µg/L in MW18_032217 (SGV of 5 µg/L);
- sec-Butylbenzene: 9.6 µg/L in MW20S_050617 to 23 µg/L in MW18_032217 (SGV of 5 µg/L);
- Toluene: 9.8 µg/L in MW20S_050617 to 740 µg/L in MW07_032217 (AWQS of 5 µg/L);

CVOCs

- 1,2,3-Trichloropropane: 23 µg/L in MW20S_050617 to 34 µg/Lin MW20D_050617 (SGV of 0.04 µg/L);

- cis-1,2-DCE: 20 µg/L in MW15D_050617 to 4900 µg/L in MW07_032217 (SGV of 5 µg/L);
- Vinyl chloride (VC): 2.8 µg/L in MW15D_050617 to 190 µg/L in MW07_032217 (SGV of 2 µg/L);
- TCE: 5.4 µg/L in GWDUP01_031617 to 1300 µg/L in MW18_032217 to (SGV of 5 µg/L);

SVOCs

Groundwater samples collected from monitoring wells MW06, MW07, MW08, and MW18 had detections of one or more SVOC at concentrations above TOGS SGVs for Class GA drinking water. The following concentration ranges represent concentrations detected above the SGVs (the SGV for each compound is shown in parentheses):

- Benzo(a)anthracene: 0.123 µg/L in the duplicate of sample MW08_031617 (SGV of 0.002 µg/L)
- Benzo(a)pyrene: 0.138 µg/L in the duplicate of sample MW08_031617 (SGV of non-detect)
- Benzo(b)fluoranthene: 0.108 µg/L in the duplicate of sample MW08_031617 (SGV of 0.002 µg/L)
- Benzo(k)fluoranthene: 0.138 µg/L in the duplicate of sample MW08_031617 (SGV of 0.002 µg/L)
- Chrysene: 0.131 µg/L in the duplicate of sample MW08_031617 (SGV of 0.002 µg/L)
- Indeno(1,2,3-cd)pyrene: 0.0462 µg/L in the duplicate of sample MW08_031617 (SGV of 0.002 µg/L)
- Naphthalene: 19.4 µg/L in MW06_031617 to 427 µg/L in MW18_032217 to (SGV of 10 µg/L)

Dissolved Metals

Groundwater samples collected from monitoring wells MW06, MW07, MW08, MW09, MW10, MW12, and MW18 were analyzed for dissolved metals. At least one metal was detected above the Class GA SGVs in all wells except MW09. The following concentration ranges were detected above SGVs (the SGV for each analyte is shown in parentheses):

- Antimony: 3.09 µg/L in MW07_032217 (SGV of 3 µg/L);
- Arsenic: 37.2 µg/L in MW07_032217 to 38.2 µg/L in MW07_032217 (SGV of 25 µg/L);
- Magnesium: 37600 µg/L in MW12_031617 to 54100 µg/L in MW18_032217 to (SGV of 35000 µg/L);
- Manganese: 413 µg/L in MW07_032217 to 882 µg/L in MW18_032217 (SGV of 300 µg/L);

- Selenium: 16.2 µg/L in the duplicate of sample MW08_031617 to 20 µg/L in MW12_031617 (SGV of 10 µg/L)
- Sodium: 37,700 µg/L in MW12_031617 to 197,000 µg/L in MW10_032217 (SGV of 20,000 µg/L)

Pesticides

Pesticides were not detected at concentrations above TOGS SGVs Class GA in any of the groundwater samples.

5.5 Soil Vapor Findings

Five sub-slab soil vapor samples, one duplicate sub-slab soil vapor sample, and one ambient air sample were collected during the RI and analyzed for VOCs. Sub-slab soil vapor sample results were compared to background concentrations detected in the ambient air sample and to the Decision Matrices included in the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York Soil Vapor.

Full laboratory reports for the RI are included in Appendix H. A summary of the sub-slab soil vapor sample laboratory detections compared to the background ambient air sample concentrations is presented in Table 7. Sub-slab soil vapor and air sample locations and results that exceed their respective background ambient air sample concentration are presented in Figure 10.

The total VOC concentration in the ambient air sample (AA01_070616) was 19.75 micrograms per cubic meter (µg/m^3). The total VOC concentration in the sub-slab soil vapor samples ranged from 738 µg/m^3 in SV01 to 39,807 µg/m^3 in SV03.

Nineteen VOCs were detected in sub-slab soil vapor samples at concentrations greater than ambient air include:

- 1,2,4-TMB
- 1,3,5-TMB
- 1,4-Dichlorobenzene
- 2-Butanone
- Acetone
- Benzene
- Carbon disulfide
- Chloroform
- cis-1,2-DCE
- Cyclohexane
- Ethyl benzene
- n-Heptane
- n-Hexane
- o-Xylene
- p- & m- Xylenes
- p-Ethyltoluene
- Tetrachloroethylene (PCE)
- TCE
- Toluene

Of the 19 compounds detected at concentrations greater than ambient air, NYSDOH Decision Matrices are provided for three, including cis-1,2-DCE, PCE, and TCE.

- cis-1,2-DCE was detected at concentrations ranging from 38 µg/m^3 at SV03 to 95 µg/m^3 at SV04. The NYSDOH Decision Matrix A recommends mitigation for sub-slab cis-1,2-DCE concentrations greater than 60 µg/m^3.

- PCE was detected at concentrations ranging from 38 µg/m³ at SV01 to 440 µg/m³ at SV04. The NYSDOH Decision Matrix B recommends actions ranging from "no further action" to mitigation for sub-slab PCE concentrations between 100 and 1,000 µg/m³.
- TCE was detected at concentrations ranging from 450 µg/m³ at SV01 to 39,000 µg/m³ at SV03. The NYSDOH Decision Matrix A recommends mitigation for sub-slab TCE concentrations greater than 60 µg/m³.

5.6 Indoor Air Findings

Five indoor air samples and one ambient air sample were collected and analyzed for VOCs. Indoor air concentrations were compared to NYSDOH Air Guidance Values (AGV) for indoor air and to background concentrations detected in the outdoor ambient air sample.

Full laboratory reports for the RI are included in Appendix H. A summary of the indoor air sample laboratory detections compared to NYSDOH AGVs and background outdoor ambient air sample concentrations is presented in Table 8. Indoor air sample locations and results that exceed the comparison criteria are presented in Figure 10.

The total VOC concentration in the ambient air sample (AA02_032818) was 17.312 µg/m³. The total VOC concentration in the indoor air samples ranged from 76.95 µg/m³ in IA05 to 272.499 µg/m³ in IA03.

Twenty-four VOCs were detected in the indoor air samples at concentrations greater than outdoor ambient air:

- 1,2,4-TMB
- 2,2,4-Trimethylpentane
- 2-Butanone
- Acetone
- Benzene
- Carbon tetrachloride
- Chloroform
- Chloromethane
- cis-1,2-DCE
- Cyclohexane
- Dichlorodifluoromethane
- Ethanol
- Ethyl Acetate
- Ethylbenzene
- n-Heptane
- Isopropanol
- n-Hexane
- o-Xylene
- p- & m-Xylene
- Styrene
- PCE
- Toluene
- TCE
- Trichlorofluoromethane

One compound, TCE, was detected in all indoor air samples at concentrations exceeding the NYSDOH AGV (2 µg/m³) ranging from 2.9 µg/m³ in IA05 to 23.9 µg/m³ in IA03.

5.7 Quality Control Results

Duplicate, field blank, trip blank, and MS/MSD samples were collected during the RI and are listed in Table 1. The duplicate, field blank, and MS/MSD samples for soil and groundwater were collected at a frequency of 1 per 20 primary samples. Quality control sample results were

evaluated during data validation. The analytical results of field blanks and trip blank samples are summarized in Table 9.

5.8 Data Usability

Category B laboratory reports for the soil, groundwater, sub-slab soil vapor, indoor air and ambient air samples were provided by York and Alpha and were forwarded to Langan's data validator for all samples collected during the RI. Copies of the DUSRs are provided in Appendix G. The results of the data validation review are summarized below.

The data were determined to be mostly acceptable.

- Completeness for the groundwater laboratory report, defined as the percentage of analytical results that are judged to be valid, is 100%.
- Completeness for the soil laboratory report, defined as the percentage of analytical results that are judged to be valid, is 99%. The following major deficiency was noted: Sample SB10_1-2 displayed internal standard area counts less than the rejection threshold for chlorobenzene-d5 at 19% and 1,2-dichlorobenzene-d4 at 11%. The associated non-detect sample results were qualified as rejected and positive detections are qualified as estimated.
- Completeness for the sub-slab soil vapor laboratory report, defined as the percentage of analytical results that are judged to be valid, is 94%. The following major deficiency was noted: Sample SV02_030717 displayed an internal standard area count less than the lower control limit for bromochloromethane at 28%. The associated positive detections for compounds quantitated by bromochloromethane were qualified as "J" and non-detect results were rejected.
- Completeness for the indoor air laboratory report, define as the percentage of analytical results that are judged to be valid, is 100%

5.9 Evaluation of Potential Areas of Concern

This section discusses the results of the RI with respect to the five AOCs described in Section 3.4. A comparison to the UU SCOs and the CU SCOs was prepared to evaluate whether an unrestricted land use cleanup is practical. AOC locations are shown on Figure 5.

5.9.1 AOC-1: Historic Fill

AOC-1 represents a layer of historic fill material identified in all borings, ranging in depth from below the building slab to about 8 to 14 feet bgs. Contaminants typically associated with historic fill in soil and groundwater include SVOCs, pesticides, and metals.

A summary of the findings associated with AOC-1 is presented below:

AOC-1 Soil

Fill material generally consists of brown fine sand with varying amounts of medium sand, brick, coal, coal ash, concrete, and wood. Hardened tar-like material with a moth ball-like odor was encountered within historic fill material within the northwest and southeast portions of the site. Nineteen (19) samples were collected from the historic fill layer. Sample results from historic fill are summarized as follows:

- VOCs were not detected at concentrations exceeding CU SCOs. TCE was detected at concentrations above the UU SCO in samples SB09_1-2 and SB20D_0-2. The VOC 2-butanone was detected in sample SB20D_0-2 above the UU SCO. The TCE detection is likely related to the historical uses of the site, and not the condition of the historic fill.
- SVOCs, particularly the PAHs, were detected at concentrations exceeding the UU SCOs (benzo(k)fluoranthene and chrysene) and CU SCOs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) in five samples (SB08_1-2, SB11_2-4, SB12_1-2, SB14_1-2, and SB17_7-8). The highest PAH concentrations coincided with areas where hardened tar-like material was encountered.
- Metals were detected in historic fill at concentrations exceeding the UU SCOs (cadmium, copper, hexavalent chromium, nickel, selenium, trivalent chromium, and zinc) and CU SCOs (arsenic, barium, lead, and mercury) in 19 samples (SB06_2-3, SB07_4-5, SB08_1-2, SB08_7-8, SB10_6-7, SB10_9-10, SB11_2-4, SB12_1-2, SB13_1-2, SB13_9-10, SB14_1-2, SB15_1-2, SB15_7-8, SB16_1-2, SB16_9-11, SB17_1-2, SB17_7-8, SB17_15-16, SB19_10-11) collected from the site. Of the samples with metal concentrations exceeding UU SCOs, samples SB10_10-11, SB17_15-16, and SB19_10-11 were within the native soil layer.
- Two pesticides, 4,4'-DDT and alpha-chlordane, were detected at concentrations exceeding the UU SCOs in one sample, SB13_1-2.

AOC-1 Groundwater

Six SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene chrysene, and indeno(1,2,3-cd)pyrene, which were detected in soil samples at concentrations above UU SCOs, were detected at concentrations above TOGS Class GA SGVs in the sample collected from monitoring will MW08. Naphthalene, which was detected in historic fill samples in the northwestern and southwestern portions of the site, was detected in monitoring wells MW06, MW07, MW18, MW20S, and MW20D. The source of SVOCs is either historic fill material or tar-like material that was detected during the RI. Petroleum-related VOCs and CVOCs were detected at concentrations above TOGS Class GA SGVs in multiple groundwater samples, but are not related to the historic fill on the site.

Dissolved arsenic and selenium were detected at concentrations exceeding the TOGS Class GA SGV in groundwater samples. These metals were also detected in historic fill material. In addition, the metals antimony, magnesium, manganese, and sodium were detected in groundwater at concentrations above TOGS Class GA SGVs. The probable source of these metals is the Gowanus Canal, a brackish water body located about 350 feet to the west of the site.

AOC-1 Conclusions

- Historic fill material was identified from the surface to depths of up to 14 feet bgs and is ubiquitous across the site. Hardened, tar-like material was encountered within historic fill material at borings SB02 and SB11.
- Metals and SVOCs, typically polycyclic aromatic hydrocarbons (PAH), were detected at concentrations above CU SCOs throughout the historic fill layer and were generally within the concentration range typically found in historic fill material in New York City.
- PAH concentrations atypical of historic fill material were detected in samples from borings SB01 and SB02, advanced within the northwest portion of the site during the May 2015 investigation, and SB11 advanced within the southeast portion of the site during the RI, are associated with tar-like material observed in those borings.
- Several metals, including arsenic, barium, cadmium, copper, hexavalent chromium, lead, mercury nickel, selenium, trivalent chromium, and zinc, are constituents of historic fill material and were detected at concentrations greater than applicable standards. Dissolved arsenic and selenium were also detected in groundwater and historic fill material is a possible source.

5.9.2 AOC-2: Petroleum Spill in the Southeastern Portion of the Site

AOC-2 represents the open petroleum spill in the southeastern portion of the site. The site was listed in the NYSDEC Leaking Underground Storage Tanks database (Spill No. 9412605) because of an unregistered 3,500-gallon fuel oil tank, which failed a tank tightness test in 1994.

Soil borings SB10 and SB11, monitoring well MW10, and sub-slab soil vapor point SV05 were located in AOC-2. A summary of findings associated with AOC-2 is presented below:

AOC-2 Soil, Groundwater, and Sub-Slab Soil Vapor

The geophysical survey did not identify evidence of a UST in the southeastern portion of the site. Boring SB11 was located west of the suspected closed-in-place UST, and boring SB10 was located east of the suspected closed-in-place UST and within the partial cellar. The fill material in boring SB10 primarily consisted of coal, and hardened tars were identified within the fill layer in boring SB11. No evidence of petroleum-like impacts, such as staining or petroleum-like odor, were apparent in either soil boring. PID readings above background, up to 35 ppm, were

identified in boring SB10 at 4 to 7 feet bgs. A mothball-like odor was identified in boring SB11 from 7 to 9 feet bgs.

No VOCs were detected in soil samples collected from SB10 and SB11 at concentrations above UU SCOs. Multiple SVOCs were detected in sample SB11_2-4 at concentrations above UU and/or CU SCOs, but the detected SVOCs were PAHs attributed to the quality of historic fill.

No VOCs or SVOCs were detected in monitoring well MW10 at concentrations above TOGS Class GA SGVs.

Multiple petroleum-related VOCs, including cyclohexane, ethyl benzene, n-heptane, xylenes, and toluene, were detected in sub-slab soil vapor sample SV05 at concentrations above the ambient air sample. In addition, 1,4-dichlorobenzene, which is associated with a mothball-like odor, was detected in SV05 at a concentration above the ambient air sample.

AOC-2 Conclusions

No evidence of a petroleum spill was apparent in AOC-2.

5.9.3 AOC-3: Potential UST – Northwestern Portion of the Site

AOC-3 represents the suspected USTs in the northwestern portion of the site. Sanborn Maps dated 1938 and 1950 identified two gasoline storage tanks of unknown capacity associated with the former Coca-Cola Bottling Co. near the northwestern corner of the site.

AOC-3 investigation locations include:

- May 2015 soil borings SB01, SB02, and SB03, and RI soil borings SB06, SB06D, SB07, SB18, SB19, and SB20D.
- Monitoring wells MW06, MW06D, MW07, MW18, MW20S, and MW20D.
- Sub-slab soil vapor point SV01

AOC-3 UST

The geophysical survey identified an anomaly consistent with one or more USTs in the northwestern portion of the site. The anomaly was about 16 feet long by 10 feet wide.

AOC-3 Soil

Petroleum-like impacts, including staining and/or odor, and PID readings up to 4,195 ppm, were apparent in soil borings SB07, SB18, SB19, and SB20D between about 10 and 24 feet bgs. Observations of staining were limited to about 10 to 15 feet bgs. A naphthalene-like odor and PID readings up to 168 ppm were apparent in borings SB01, SB02, and SB03, but these findings coincided with tar-like material within the historic fill layer (0 to 8 feet bgs).

Petroleum-related VOCs, including 1,2,4-TMB, 1,3,5-TMB, benzene, toluene, ethyl benzene, xylenes (BTEX), and n-propylbenzene, were detected at concentrations above UU SCOs in samples collected from boring SB07 between 13 and 24 feet bgs, and boring SB20D at 17 to 19 feet bgs. The CVOC cis-1,2-DCE was detected in samples SB07_23-24, SB18_23-24 at concentrations above the UU SCO, and the CVOC TCE was detected in sample SB19_20-21 at a concentration above the UU SCO.

Sixteen SVOCs were detected at concentrations above the UU and/or CU SCOs in sample SB02_5-6, where tar-like impacts were identified within historic fill.

AOC-3 Groundwater

Petroleum-related VOCs were detected in monitoring wells MW06, MW07, MW15, MW18, MW20S, and MW20D at concentrations above their respective TOGS Class GA SGVs. Total petroleum-related VOC concentrations are summarized in the below table.

Well ID	Screened Interval (feet bgs)	Total Petroleum-Related VOCs (µg/l)
MW06	8-18	480.2
MW07	19-24	13,764
MW18	8-18	14,042
MW20S	8-18	1,678.2
MW20D	20-30	5,509

The petroleum-related VOC concentrations were highest in wells MW07 and MW18, which were located northeast of the suspected UST area. Petroleum-like impacts were not apparent in SB06D/MW-06D, SB-13, and SB-17; these boring locations define the extent of petroleum-impacted material.

CVOC concentrations in site groundwater were highest in AOC-3; specifically in monitoring wells MW07 and MW20D, which were screened below the groundwater table at 19 to 24 feet bgs and 20 to 30 feet bgs, respectively.

Naphthalene was detected in monitoring wells MW06, MW07, MW18, MW20S, and MW20D at concentrations above TOGS Class GA SGVs. The source of naphthalene in groundwater is historic fill material.

AOC-3 Sub-slab Soil Vapor

PCE, TCE and petroleum-related VOCs were detected in the sample collected from sub-slab soil vapor point SV01 at concentrations above ambient air sample concentrations.

AOC-3 Conclusions

Based on the results of the investigation within AOC-3, there was likely a release from the suspected UST(s) that impacted soil, groundwater, and sub-slab soil vapor in the northwestern portion of the site. The greatest degree of impacts was observed to the east of the UST area. The limits of AOC-3 are defined by SB-06D/MW-06D, SB-13, SB-12/MW-12, SB16, and SB-17.

5.9.4 AOC-4: Potential UST – Southwestern Portion of the Site

During the May 2015 Limited Subsurface Investigation, an anomaly consistent with USTs was identified in the southwestern portion of the site. AOC-4 investigation locations include May 2015 soil borings SB04 and SB05, RI soil boring SB08, monitoring well MW08, and sub-slab soil vapor point SV02.

AOC-4 Soil, Groundwater, and Sub- Slab Soil Vapor

A geophysical survey was conducted during the RI and identified the anomaly in the southwestern portion of the site. Borings SB04 and SB05 were advanced north and south of the anomaly, respectively, and boring SB08 was advanced west (downgradient) of the anomaly. No petroleum-like impacts were noted in any of the AOC-4 borings. Historic fill material consisting of fine sand with varying amounts of brick, coal, and coal ash was observed to about 6 to 8 feet bgs in all three borings.

SVOCs and metals were detected in soil samples at concentrations above the UU SCOs within the historic fill layer in all three borings. The concentrations were generally consistent with historic fill quality throughout the site.

No free product, sheen or odors were apparent in monitoring well MW08. TCE was detected in the groundwater sample collected from MW08 at a concentration above the TOGS Class GA SGV. Multiple SVOCs were detected in MW08 above the TOGS Class GA SGVs. Historic fill material is a possible source of the SVOC detections in groundwater; however, SVOCs in MW08 may have resulted from entrained sediment in the sample.

PCE, TCE and petroleum-related VOCs were detected in the sample collected from sub-slab soil vapor point SV02 at concentrations above ambient air sample concentrations.

AOC-4 Conclusions

Based on the results of the investigation within AOC-4, one or more USTs may be present in the southwestern portion of the site. No evidence of a petroleum release was identified in AOC-4.

5.9.5 AOC-5: Chlorinated Volatile Organic Compound (CVOC) Impacts to Soil, Groundwater, and Sub-Slab Soil Vapor

AOC-5 was added to the list of AOCs based on the results of the RI sampling conducted in March 2017. One or more CVOCs (1,2,3-trichloropropane, cis-1,2-DCE, TCE, PCE, and VC) were

detected in groundwater samples from monitoring wells MW07, MW08, MW12, and MW18 at concentrations above the TOGS Class GA SGVs during the March 2017 sampling event. In addition, CVOCs were detected in all five sub-slab soil vapor samples at concentrations exceeding the ambient air sample concentrations, and multiple CVOCs were detected in sub-slab soil vapor at concentrations at which mitigation is recommended based on the NYSDOH Decision Matrices.

The supplemental investigation included the following investigation locations:

- Soil borings SB06D, SB12D, SB15D, and SB20D
- Monitoring wells MW06D, MW12D, MW15D, MW20S, and MW20D

AOC-5 Soil

CVOCs were detected in shallow soil samples (0-2 feet bgs) and deep soil samples (20 to 24 feet bgs) at concentrations above the UU SCOs, as follows:

- TCE was detected at concentrations above the UU SCO in samples SB09_1-2, SB20D_0-2, and SB19_20-21
- cis-1,2-DCE was detected at concentrations above the UU SCO in samples SB07, 23-24 and SB18_23-24

During the supplemental investigation, oil-in-soil dye kits were used to gauge the potential presence of DNAPL; no indications of DNAPL were identified.

AOC-5 Groundwater

CVOCs were detected at concentrations above TOGS Class GA SGVs in samples collected from monitoring wells MW06D, MW07, MW08, MW12D, MW15D, MW18, MW20S, and MW20D. Total CVOC concentrations are summarized as follows:

Well ID	Screened Interval (feet bgs)	Total CVOCs (µg/l)
MW06D	20-25	7.3
MW07	19-24	6,390
MW08	8-18	8.52
MW12D	20-25	39.8
MW15D	20-25	39.75
MW18	8-18	33
MW20S	8-18	101.98
MW20D	20-30	867.9

CVOC concentrations in groundwater were higher in wells screened below the water table, and were highest in MW07 and MW20D, located in the northwestern and central portions of the site, respectively. TCE concentrations in groundwater at the downgradient extents of the site (MW08 and MW06D) were detected at concentrations marginally exceeding the Class GA SGV of 5 µg/L, indicating that TCE impacts have not migrated off-site. The groundwater design criteria sample results did not indicate dechlorinating bacteria activity above the target threshold of 10^4 cells per milliliter (cells/mL); however, the presence of PCE/TCE breakdown products cis-1,2-DCE and VC suggests that some breakdown has occurred over time.

AOC-5 Sub-Slab Soil Vapor

CVOCs were detected in all five sub-slab soil vapor samples at concentrations above the ambient air sample concentrations. TCE and cis-1,2-DCE were detected in soil vapor at concentrations at which the NYSDOH Decision Matrix A recommends mitigation regardless of indoor air concentrations.

Sample Vapor Point ID	Sample Depth (feet bgs)	Total CVOCs (µg/m^3)
SV01	6	488
SV02	5	524
SV03	5	39,158
SV04	5	11,535
SV05	5	60

AOC-5 Indoor Air

CVOCs were detected in all eleven indoor air samples collected during the RI and IRM at concentrations above the outdoor ambient air sample concentrations. TCE was detected in all 11 indoor air samples at concentrations above its NYSDOH AGV (2 µg/m^3), ranging from 2.9 µg/m^3 to 31.4 µg/m^3. TCE concentrations were evaluated using the NYSDOH Decision Matrix A. Based on this evaluation, mitigation is recommended.

AOC-5 Conclusions

CVOCs impacts were detected in soil, groundwater, sub-slab soil vapor and indoor air. Based on the detections of CVOCs in shallow soil, the source of the CVOCs in groundwater is likely the historical uses of the site. Groundwater concentrations suggest a historical release near the northwestern and central portions of the site. CVOC-impacted groundwater is contained within the limits of the site. CVOCs are present in sub-slab soil vapor and indoor air at concentrations in which the NYSDOH Guidance recommends mitigation.

6.0 INTERIM REMEDIAL MEASURE WORK PLAN IMPLEMENTATION AND FINDINGS

Based on the findings of the RI, an IRM was implemented and included the installation of indoor air treatment units and post-installation documentation samples.

The IRM consisted of the following:

- Installation of eight indoor air treatment units in the previously-occupied portion of the warehouse
- Completion of three documentation sampling events, which included collection of two indoor air samples (IA06 and IA07) and one ambient air sample (AA02) per event (a total of six indoor air samples and three ambient air samples were collected over three sampling events)

Langan conducted the IRMWP in accordance with the NYCRR Title 6 Part 375 (6 NYCRR Part 375), the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010), the NYSDEC Draft BCP Guide (May 2004), the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006), and the NYSDEC-approved IRMWP, dated July 19, 2018.

6.1 IRMWP Implementation

The IRMWP was implemented to address the elevated TCE concentrations in indoor air. Indoor air treatment units (AllerAir AirMedic Pro 5 MG Vocarb) were installed in the eastern portion of the building, which was occupied by a bicycle tour company, and a total of three indoor air documentation sampling events were conducted. Sampling locations are presented on Figure 5.

Five indoor air treatment units were installed on August 3, 2018. Based on the results of the first two post-installation indoor air sampling events, three additional units were installed on November 19, 2018.

Indoor air sampling events were conducted on August 17, September 7, and December 20, 2018. A total of six indoor air documentation samples and three ambient air samples were collected and analyzed for VOCs over the three documentation sampling events (two indoor air samples and one ambient air sample per event).

Indoor air and ambient air sampling was conducted in general accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). Prior to sample collection, a NYSDOH Indoor Air Quality Questionnaire and Building Survey was completed to document the potential presence of equipment or chemicals in the building that could interfere with the laboratory analytical results. During each sampling event, two indoor air

samples and one ambient air sample were collected at about 3 to 4 feet above ground (i.e., breathing height) and to confirm the efficacy of the treatment system. The building was screened using a ppbRAE 3000 to identify potential sources of organic vapors that may interfere with sampling.

Indoor air and ambient air samples were collected into laboratory-supplied 6-liter Summa canisters with flow controllers calibrated for an 8-hour sampling period. The labeled samples were submitted to Alpha via courier service under standard chain-of-custody protocol. Air samples were analyzed for VOCs by EPA Method TO-15. Indoor air and outdoor ambient air sampling logs and results of the chemical product inventory are provided in Appendix F.

6.2 Quality Control Sampling

One ambient air sample was collected during each documentation sampling event and was submitted for laboratory analysis for QA/QC purposes. QA/QC samples are summarized in Table 1.

6.3 IRMWP Indoor Air Documentation Sample Results

Indoor air concentrations were compared to NYSDOH Air Guidance Values (AGV) for indoor air and to background concentrations detected in the outdoor ambient air samples. Full laboratory reports for the IRM sampling events are included in Appendix H. A summary of the indoor air sample laboratory detections compared to NYSDOH AGVs and background outdoor ambient air sample concentrations is presented in Table 9. Indoor air sample locations and results that exceed the comparison criteria are shown on Figure 11.

The total VOC concentration in the indoor air documentation samples ranged from 150.2 µg/m³ in IA07_081718 to 716.029 µg/m³ in IA07_122018. The total VOC concentration in the ambient air samples collected across three documentation sampling events ranged from 34.674 µg/m³ to 71.976 µg/m³.

Twenty-six VOCs were detected in the indoor air samples at concentrations greater than outdoor ambient air:

- 1,2,4-TMB
- 1,2,5-TMB (Mesitylene)
- 2,2,4-Trimethylpentane
- 2-Butanone
- Acetone
- Benzene
- Carbon disulfide
- Chloromethane
- cis-1,2-DCE
- Cyclohexane
- Dichlorodifluoromethane
- Ethanol
- Ethyl Acetate
- Ethylbenzene
- Isopropanol
- o-Xylene
- p- & m-Xylene
- Styrene
- PCE
- Toluene
- TCE

- Carbon tetrachloride
- Chloroform
- n-Heptane
- n-Hexane
- Trichlorofluoromethane

One compound, TCE, was detected in all indoor air samples at concentrations exceeding the NYSDOH AGV, (2 µg/m³) ranging from 9.03 µg/m³ in IA07_081718 to 31.4 µg/m³ in IA06_081718. Based on the findings, the indoor air treatment units did not reduce the indoor air concentrations to below the NYSDOH AGVs. The owner informed the tenants that the building can only be used for storage and cannot be continuously occupied. The forthcoming RAWP will address potential exposure pathways.

6.4 Data Usability

Category B laboratory reports for the indoor air and ambient air samples were provided by Alpha and were forwarded to Langan's data validator for all samples collected during the RI. Copies of the DUSRs are provided in Appendix G. No major deficiencies where identified. Completeness for the indoor air documentation events, defined as the percentage of analytical results that are judged to be valid, is 100%

7.0 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

Human health exposure risk was evaluated for both current and future site and off-site conditions, in accordance with the May 2010 NYSDEC Final DER-10 Technical Guidance for Site Investigation and Remediation. The assessment includes an evaluation of potential sources and migration pathways of site contamination, potential receptors, exposure media, and receptor intake routes and exposure pathways.

In addition to the human health exposure assessment, NYSDEC DER-10 requires an on-site and off-site Fish and Wildlife Resources Impact Analysis (FWRIA) if certain criteria are met. A completed form of DER-10 Appendix 3C is enclosed in this addendum as Appendix I. Considering the Gowanus Canal is a Federal Superfund Site, the FWIRA was not considered necessary and was not completed. The Gowanus Canal remedial investigation and remediation is currently being undertaken by the EPA in accordance with the Superfund Program (Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended).

7.1 Current Conditions

The site is a 20,000-square-foot rectangular-shaped lot located at 473 President Street in the Gowanus neighborhood of Brooklyn, New York on the southern portion of Block 440, Lot 12. The site is developed with a warehouse building occupying the entire footprint, and including a partial cellar at the eastern end of the site. The eastern portion of the warehouse building is used for storage by a bicycle tour company and the western portion of the site is vacant. The site cover consists of a 6- to 36-inch-thick concrete slab. The site has 200 feet of frontage along President Street, and is bound by Lot 1 to the west (electronic waste recycling warehouse); the northern portion of Lot 12 to the north (Royal Palms Shuffleboard Club); Lot 21 to the east (Pontone Bros. Corp.); and President Street to the south. The Gowanus Canal is located about 350 feet west of the site.

7.2 Proposed Conditions

The purpose of the project is to develop an underutilized, contaminated parcel while implementing remedial measures that are protective of human health and the environment. The proposed redevelopment project is still in early planning stages and is subject to change. An as-of-right development consisting of a commercial space with a cellar parking garage is contemplated. The cellar of the proposed building would occupy the entire site.

7.3 Summary of Environmental Conditions

Soil contaminants of concern (COC) include VOCs, SVOCs, pesticides, and metals. Analysis of soil samples revealed VOCs, SVOCs, pesticides and metals at concentrations that exceeded UU SCOs, and SVOCs and metals at concentrations that also exceed the CU SCOs.

Historic fill material is present across the site at depths ranging from the surface to about 8 to 14 feet bgs. Historic fill impacts include SVOCs, metals, and pesticides at concentrations above UU SCOs, and SVOCs and metals at concentrations above CU SCOs. Tar-like material was identified within historic fill material and coincided with the areas where SVOC concentrations were greatest. Petroleum-related impacts and CVOCs were also detected, primarily in the central and northwestern portions of the site.

Groundwater sample results exhibited concentrations of petroleum-related VOCs and CVOCs exceeding the TOGS Class GA SGVs.

CVOCs are present in sub-slab soil vapor and indoor air at concentrations that exceed the NYSDOH-recommended action levels for mitigation.

7.4 Conceptual Site Model

A conceptual site model (CSM) has been developed based on the findings of the RI. The purpose of the conceptual site model is to develop a simplified framework for understanding the distribution of impacted materials, potential migration pathways, and potentially complete exposure pathways, as discussed below.

7.4.1 Potential Sources of Contamination

Potential sources of contamination have been identified and include historic fill, potential USTs in the northwestern and southwestern portions of the site, a closed-in-place UST and open NYSDEC spill in the southeastern portion of the site, and petroleum-related VOC and CVOC-impacted soil, sub-slab soil vapor, and groundwater associated with historical site use. The ubiquitous historic fill has been established as a source of SVOCs, metals, and to a lesser extent pesticides in near-surface soil. Historic petroleum storage has been established as a source of petroleum-related VOCs in soil, groundwater, and sub-slab soil vapor. The presence of CVOCs in shallow soil, groundwater, and sub-slab soil vapor suggests the presence of several on-site point sources, which aligns with potential contained releases of CVOCs in connection with historic site use as a machine shop, bottling plant, die cutting, and/or metal works. A distinct CVOC source location was not identified during the RI, and historical records do not indicate a large release event of CVOCs; however, the historical site use may have contributed to CVOC concentrations in groundwater and soil vapor. Furthermore, the presence of PCE/TCE breakdown products, including cis-1,2-DCE and VC, suggest historical releases have undergone some degree of natural attenuation. The RAWP will be designed to further investigate potential source areas through waste characterization sampling.

7.4.2 Exposure Media

The impacted media include soil, groundwater, and sub-slab soil vapor. Analytical data indicates that the historic fill material contains SVOCs, metals, and pesticides. Groundwater impacts

include VOCs, SVOCs, and metals. Sub-slab soil vapor is impacted by VOCs. The proposed development's cellar level is anticipated to occupy the entire site footprint and extend to the groundwater table, which would prevent the potential for impacted vapors to accumulate. The potential exists for accumulation of impacted vapors under adjoining buildings and intrusion through cellar sidewalls.

7.4.3 Receptor Populations

The eastern portion of the warehouse building is used for storage by a bicycle tour company and the western portion of the site is vacant. . Access is limited to employees of the bicycle tour company and consultants investigating environmental conditions on the site. During site development, human receptors will be limited to construction and remediation workers, authorized guests visiting the site, and the public adjacent to the site. Under future conditions, receptors will include the new building tenants, workers, and visitors to the commercial properties.

7.5 Potential Exposure Pathways – On-Site

7.5.1 Current Conditions

The site is covered by a one-story warehouse building with a 6- to 36-inch-thick concrete floor slab; therefore, exposure to contaminated soil is only possible during subsurface investigation at the site. The potential exposure pathway for dermal absorption, inhalation, and ingestion during subsurface investigation is controlled through the implementation of the HASP.

Because groundwater in this area of New York City is not used as a potable water source, there is no complete exposure pathway under current site conditions. There is a potential exposure pathway through dermal absorption, inhalation, and ingestion during groundwater sampling associated with site investigation, but it is controlled through the implementation of the HASP.

There is potential for sub-slab soil vapor to accumulate below the building slab and within the enclosed warehouse building; however, the building is not used as a residence or for full-time workers. There is a potential exposure pathway to sub-slab soil vapor through inhalation during soil, sub-slab soil vapor and groundwater sampling associated with site investigation. This pathway is controlled through the implementation of the HASP.

TCE was detected in indoor air samples at concentrations above the NYSDOH AGV. In accordance with the approved IRMWP, indoor air treatment units were installed to mitigate soil vapor intrusion in the occupied portion of the warehouse. Based on post-installation indoor air documentation sample results that indicated CVOCs at concentrations greater than the TCE AGV, the treatment units were ineffective at reducing TCE concentrations in indoor air. NYSDEC and NYSDOH determined the building cannot be continuously occupied. The tenant was notified that using the space for bicycle storage is acceptable; however, continued use to repair bicycles is

not permitted. The presence of TCE in post-installation documentation sample results indicates a potential exposure pathway exists via the inhalation of contaminated indoor air; however, this exposure pathway is controlled through restricting human occupancy of the warehouse limiting use for storage purposes only.

7.5.2 Construction/Remediation Condition

Construction and remediation may result in potential exposures to site contaminants in the absence of a HASP and a Community Air Monitoring Plan (CAMP). Construction and remedial activities include demolition, the excavation and off-site disposal of impacted soil and construction of foundation components. In the absence of a HASP and CAMP, this scenario presents the potential for exposure of soil COCs to construction and remediation workers via dermal absorption, ingestion, and inhalation of vapors and particulate matter. This exposure pathway will be controlled through the implementation of the HASP, CAMP, and vapor and dust suppression techniques.

Groundwater may be encountered during excavation by workers, and there is potential for exposure to groundwater COCs, in the absence of a HASP, to construction workers via dermal absorption or ingestion. This exposure pathway will be marginalized through the implementation of the HASP, CAMP, and vapor and dust suppression techniques.

During site development, construction and remediation workers and the surrounding community could be exposed to sub-slab soil vapor COCs and contaminated soil via inhalation. Exposure to sub-slab soil vapor and dust will be limited through the implementation of a HASP, CAMP, and dust and vapor suppression techniques.

7.5.3 Proposed Future Conditions

The proposed development is anticipated to include commercial uses. Upon completion of the proposed new development, the entire site will be capped with a concrete building. This barrier will prevent direct human exposure to impacted soil and groundwater.

In the absence of engineering controls (e.g., vapor barrier and/or sub-membrane depressurization), the presence of VOCs in the groundwater and sub-slab soil vapor creates the potential for VOCs to accumulate in the proposed building, completing an inhalation exposure pathway for future users; however, this exposure pathway will be marginalized through the installation of a vapor barrier membrane.

There is no risk of ingesting groundwater COCs because the site and surrounding areas will continue to obtain their drinking water supply from surface water reservoirs located upstate and not from groundwater. In addition, the site will be capped with concrete.

7.6 Potential Exposure Pathways – Off-Site

In the absence of CAMP and a HASP, soil has the potential to be transported off-site by wind in the form of dust or on the tires of vehicles or equipment leaving the site during development and remediation activities and create an exposure risk to the public adjacent to the site. Groundwater is anticipated to flow to the west-southwest. The source of petroleum-related VOC and CVOC impacts to groundwater will be removed and/or treated during site remediation, and after source removal/treatment, potential residual groundwater contamination would be expected to naturally attenuate.

The potential off-site migration of site contaminants is not expected to result in a complete exposure pathway for current, construction and remediation, or future conditions for the following reasons:

- The site is located in an urban area and predominantly covered with continuous relatively impervious surface covering (i.e. building foundations and concrete and asphalt paving)
- During site redevelopment remediation and construction, the following protective measures will be implemented:
    - Air monitoring will be conducted for particulates (i.e., dust) and VOCs during all intrusive activities as part of a CAMP. Dust and/or vapor suppression techniques will be employed to limit potential for off-site migration of soil and vapors.
    - Vehicle tires and undercarriages will be washed as necessary prior to leaving the site to prevent tracking material off-site.
    - A soil erosion/sediment control plan will be implemented during construction to control off-site migration of soil.
- The planned redevelopment will include a vapor barrier to be installed beneath the slab. The site will also be covered by a continuous impervious surface.

Because contaminants of concern were detected in downgradient onsite wells, it is possible that a complete exposure pathway exists for the migration of site contaminants in groundwater and sub-slab soil vapor to migrate to off-site human receptors for current, construction phase, or future conditions. However, a short-term in-situ remedial technology, such as activated persulfate (chemical oxidation) or PlumeStop® (adsorption), will be implemented to address the groundwater impacts. In addition, groundwater in New York City is not used as a potable water source.

7.7 Evaluation of Human Health Exposure

Based upon the CSM and the review of environmental data, complete on-site exposure pathways appear to be present, in the absence of institutional and engineering controls, in current,

construction and remediation, and future conditions. The complete exposure pathways indicate there is a risk of exposure to humans from site contaminants via exposure to soil, groundwater, and sub-slab soil vapor if institutional and engineering controls are not implemented.

Complete exposure pathways have the following five elements: 1) a contaminant source; 2) a contaminant release and transport mechanism; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population. A discussion of the five elements comprising a complete pathway as they pertain to the site is provided below.

7.7.1 Current Conditions

Contaminant sources include the historic fill with varying levels of SVOCs, metals, and pesticides; petroleum-impacted soil, groundwater and sub-slab soil vapor; and CVOC-impacted soil, groundwater, and sub-slab soil vapor.

Contaminant release and transport mechanisms include contaminated soil transported as dust, contaminated groundwater flow and volatilization of contaminants from the soil and groundwater matrices to the soil vapor phase, and transport of existing sub-slab soil vapor contaminants. Under current conditions, the likelihood of exposure to humans is limited, as site use is limited to storage space, the site is completely capped by a building with concrete foundation, potable water is obtained from an off-site source, and access is restricted to authorized workers and guests. Mitigation measures were implemented in accordance with the approved IRMWP. Based on post-installation indoor air documentation sample results, the treatment units were ineffective at reducing the TCE concentrations in indoor air. NYSDEC and NYSDOH determined the building cannot be continuously occupied. The tenant was notified that using the space for bicycle storage is acceptable; however, continued use to repair bicycles is not permitted. Under current conditions, the use restriction on the site limits the likely exposure and risk to human health.

7.7.2 Construction/Remediation Activities

During development and remediation, points of exposure include disturbed and exposed soil during excavation, dust and organic vapors generated during excavation, and contaminated groundwater that will be encountered during excavation and/or dewatering operations. Routes of exposure include ingestion and dermal absorption of contaminated soil and groundwater, inhalation of organic vapors arising from contaminated soil and groundwater, and inhalation of dust arising from contaminated soil. The receptor population includes construction and remediation workers and, to a lesser extent, the public adjacent to the site.

The potential for completed exposure pathways is present since all five elements exist; however, the risk can be avoided or minimized by applying appropriate health and safety measures during construction and remediation, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, cleaning truck undercarriages before they leave the site to

prevent off-site soil tracking, maintaining site security, and wearing the appropriate personal protective equipment (PPE).

In accordance with the Remedial Action Work Plan (RAWP), which will include a HASP, a Soil/Materials Management Plan (SMMP), and a CAMP, measures such as conducting an air-monitoring program, donning PPE, covering soil stockpiles, altering work sequencing, maintaining a secure construction entrance, proper housekeeping, and applying vapor and dust suppression measures to prevent off-site migration of contaminants during construction will be implemented. Such measures will prevent completion of these potential migration pathways.

7.7.3 Proposed Future Conditions

For the proposed future conditions, residual contaminants may remain on-site, depending on the remedy, and would, to a lesser extent, include those listed under current conditions. Contaminant release and transport mechanisms include volatilization of contaminants from the groundwater matrix to the soil vapor phase or intrusion of soil vapor from off-site sources. If institutional and/or engineering controls are not implemented, points of exposure include potential cracks in the foundation or slab of the proposed development, and exposure during any future soil-disturbing activities. Routes of exposure may include inhalation of vapors entering the building. The receptor population includes the building occupants and employees, visitors, and maintenance workers. The possible routes of exposure can be avoided or mitigated by proper installation of soil vapor mitigation measures, construction and maintenance of a site capping system (i.e., concrete or at least two feet of clean soil) and implementation of a Site Management Plan if residual contamination is left in place.

7.7.4 Human Health Exposure Assessment Conclusions

1. Under current conditions, there is a marginal risk for exposure as the warehouse is not continuously occupied and only used for storage space. The primary exposure pathways are for dermal contact, ingestion and inhalation of soil, sub-slab soil vapor, or groundwater by employees of the on-site businesses and site investigation workers. The exposure risks can be avoided or minimized by following the appropriate health and safety and vapor and dust suppression measures outlined in the site-specific HASP during investigation activities.
2. In the absence of institutional and engineering controls, there is a moderate risk of exposure during the construction and remediation activities. The primary exposure pathways are:
    a. Dermal contact, ingestion and inhalation of contaminated soil, groundwater or sub-slab soil vapor by construction workers.
    b. Dermal contact, ingestion and inhalation of soil (dust) and inhalation of sub-slab soil vapor by the community in the vicinity of the site.

These can be avoided or minimized by performing community air monitoring and by following the appropriate health and safety, vapor and dust suppression and site security measures.

3. The existence of a complete exposure pathway for site contaminants to human receptors during proposed future conditions is unlikely, as a large quantity of soil will be excavated and transported to an off-site disposal facility and whatever residual soil remains will be capped with an impermeable cover or two feet of clean soil. Regional groundwater is not used as a potable water source in New York City and the site cover will limit access to the subsurface so exposure to regional groundwater contaminants is unlikely. The potential pathway for soil vapor intrusion into the building would be addressed through the use of soil vapor mitigation measures, thereby minimizing the risk of exposure to soil vapor.
4. It is possible that a complete exposure pathway exists for the migration of site contaminants to off-site human receptors for current, construction phase, or future conditions. Monitoring and control measures would be used during investigation and construction to prevent completion of this pathway. Under future conditions, the site will be remediated and engineering controls can be implemented to prevent completion of this pathway; however, due to the presence of residual off-site contamination, the potential for impacted off-site soil vapor will remain after the site is redeveloped.

8.0 NATURE AND EXTENT OF CONTAMINATION

The site-wide historic fill layer extends from surface grade to depths ranging from about 8 to 14 feet bgs and contains varying concentrations of VOCs, SVOCs, metals, and pesticides. Naphthalene-like odors and hardened tar-like material were randomly observed within the historic fill layer throughout the site and SVOCs were detected at concentrations above typical historic fill concentrations. Petroleum- and CVOC-impacted soil was encountered at varying depths extending to a maximum depth of about 24 feet bgs. Petroleum-related VOCs and CVOCs were identified in both groundwater and sub-slab soil vapor across the site. The discussion is divided by the following contaminant classifications:

1. Historic fill material
2. Tar-like material
3. Petroleum-impacted material
4. CVOC-impacted material

8.1 Soil Contamination

8.1.1 Historic Fill Material

Contaminants related to historic fill material include SVOCs, pesticides, and metals. Historic fill exists across the site from surface grade to depths ranging from about 8 to 14 feet bgs. Sixteen soil samples collected from throughout the historic fill layer exhibited concentrations of SVOCs (including, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene), metals (including arsenic, barium, hexavalent and trivalent chromium, copper, lead, mercury, nickel, selenium, and zinc), and/or pesticides (4,4'-DDT and alpha-chlordane) exceeding UU and, in some cases, CU SCOs.

8.1.2 Tar-like Material

Observations of hardened tar and tar -like odors were apparent within the historic fill layer at about 4 to 8 feet bgs in borings SB01 through SB03, located within the northwestern portion of the site, and boring SB11, located within the southeastern portion of the site. Sixteen SVOCs (acenaphthene, fluoranthene, naphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, anthracene, benzo(ghi)perylene, fluorene, phenanthrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, pyrene, and dibenzofuran) were detected in sample SB02_5-6 at concentrations above UU SCOs and, in some cases, CU SCOs. Total SVOC concentrations in samples from borings SB01, SB02, SB03, and SB11 were one to two orders of magnitude higher than concentrations in other historic fill samples.

8.1.3 Petroleum-Impacted Material

Petroleum impacts to soil, including PID readings above background, odors, and staining, were apparent during the RI in borings SB07, SB18, SB19 and SB20D at depths ranging from 11 to 24 feet bgs. The maximum PID reading, 4,195 ppm, was recorded in SB07 from 22 to 23 feet bgs. Analytical results for soil samples collected from SB07 and SB20D exhibited concentrations of petroleum-related VOCs, including 1,2,4-TMB, 1,3,5-TMB, MTBE, benzene, ethylbenzene, n-propylbenzene, toluene, and total xylenes, exceeding UU SCOs both at and below the groundwater interface.

8.1.4 CVOC-Impacted Material

Concentrations of CVOCs in excess of UU SCOs were identified in surficial soil samples and samples collected from below the groundwater table from RI borings SB07, SB09, SB18, SB19, and SB20D. The shallow soil (0-2 feet bgs) samples exhibiting concentrations of TCE exceeding the UU SCO are in the central portion of the site (SB09 and SB20D); and the deep soil samples exhibiting concentrations of TCE and cis-1,2-DCE above UU SCOs are located in the northwestern portion of the site (SB07 and SB19).

8.2 Groundwater Contamination

Evaluation of the groundwater analytical results identified petroleum-related VOC and CVOC contaminants, and arsenic, at concentrations exceeding Class GA AWQS. The discussion is divided by the following contaminant classifications:

1. Petroleum-Contaminated Groundwater
2. CVOC-Contaminated Groundwater
3. Arsenic-Contaminated Groundwater
4. Historic Fill-Impacted Groundwater

8.2.1 Petroleum-Contaminated Groundwater

Petroleum impacts, including PID readings above background and odors, were apparent during the RI in monitoring wells MW07, MW18, MW20S, and MW20D. The maximum headspace PID reading, 630 ppm, was recorded in MW20S. Analytical results for samples collected from wells MW06, MW07, MW15D, MW18, MW20S, and MW20D exhibited concentrations of petroleum-related VOCs, including 1,2,4-TMB, 1,2,4,5-tetramethylbenzene, 1,3,5-TMB, benzene, ethyl benzene, isopropylbenzene, n-butylbenzene, n-propylbenzene, p-isopropyltoluene, sec-butylbenzene, toluene, and xylenes, and one SVOC, naphthalene, exceeding Class GA SGVs.

8.2.2 CVOC-Contaminated Groundwater

Analytical results revealed CVOC impacts to groundwater. Concentrations of CVOCs, including TCE, cis-1,2-DCE, and VC exceeding Class GA SGVs, were found in samples collected from MW06D, MW07, MW08, MW12D, MW15D, MW18, MW20S, and MW20D. Sample MW07_032217 exhibited the maximum TCE concentration of 1,300 µg/L, followed by MW20D_050617 with a concentration of 830 µg/L.

8.2.3 Historic Fill-Impacted Groundwater

Historic fill was identified in all borings, ranging in depth from below the building slab to about 8 to 14 feet bgs. Dissolved arsenic and selenium were detected in groundwater samples at concentrations above the TOGS Class GA SGVs and were also detected in historic fill at concentrations above the UU SCOs. Arsenic concentrations in historic fill also exceeded CU SCOs. Additional metals with concentrations above the TOGS Class GA SGVs included antimony, magnesium, manganese, and sodium, and were attributed to regional groundwater conditions.

Multiple PAHs detected at concentrations above CU SCOs in historic fill (benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, and chrysene), were detected above the TOGS Class GA SGV in the sample collected from monitoring well MW08. Additionally, naphthalene was detected at concentrations above UU SCOs in historic fill samples, and was detected in multiple groundwater samples at concentrations above the TOGS Class GA SGV.

8.3 Sub-Slab Soil Vapor and Indoor Air Contamination

Total CVOC concentrations in sub-slab soil vapor samples ranged from 60 µg/m^3 in sample SV-5 to 39,158 µg/m^3 in sample SV-3. One CVOC, TCE, was detected in all indoor air samples at concentrations above its NYSDOH AGV. There are site-wide CVOC and petroleum-related VOC impacts to soil vapor and indoor air and, based on these the proposed development will require soil vapor intrusion mitigation.

9.0 CONCLUSIONS

The conclusions presented are based on the results of the RI performed between March 6 and March 22, 2017, the supplemental investigation performed between April 27 and May 6, 2017, the indoor air investigation performed on March 28, 2018, and three subsequent indoor air documentation sampling events performed between August 17 and December 20, 2018. The RI was performed in accordance with an NYSDEC-approved RIWP and the supplemental investigation scope approved by the NYSDEC in a letter dated April 27, 2017. The indoor air investigation was performed in accordance with the proposed scope emailed to NYSDEC on February 14, 2018 and approved by NYSDEC in a letter dated February 20, 2018. The indoor documentation sampling events were performed in accordance with the NYSDEC-approved Interim Remedial Measures Work Plan (IRMWP) dated July 19, 2018. The RI and subsequent investigation findings summarized herein are based on qualitative data (field observations and instrumental readings) and laboratory analytical soil, groundwater, and soil vapor sample results. Findings and conclusions are as follows:

1. Stratigraphy: A historic fill layer was encountered from below the building foundation to depths ranging from about 8 feet bgs in SB08 to 14 feet bgs. The fill material generally consists of brown fine sand with varying amounts of medium sand, brick, coal, coal ash, concrete, and wood. The fill layer was underlain mainly by brown fine sand with varying amounts of silt and clay. In borings SB09, SB11, and SB14, a 2-foot-thick discontinuous brown clayey silt layer was observed within the native sand layer. Bedrock was not encountered in any of the soil borings.

2. Hydrogeology: Groundwater was encountered at about 9 to 10.5 feet bgs across the site. The groundwater contours demonstrate a flow to the west-southwest. The regional groundwater table is relatively flat with a slight gradient to the west towards the Gowanus Canal.

3. Historic Fill: Fill material was identified below the surface cover to depths ranging from about 8 to 14 feet bgs. SVOCs, metals, and pesticides attributed to historic fill were detected at concentrations above UU and/or CU SCOs within this layer. The RI has characterized the historic fill layer and has also defined the native soil horizon beneath the fill. The detected contaminant concentrations are considered typical of historic fill found in New York City. Elevated SVOC concentrations were identified within the historic fill, but are associated with areas within the fill in the northwestern and southeastern portions of the site that contained hardened tar-like material and exhibited coal tar-like odors. VOCs were also identified within the historic fill, but are associated with potential historical CVOC and petroleum releases and are not related to historic fill quality.

4. Historic Fill-Impacted Groundwater: Metals and SVOCs that were detected historic fill at concentrations above their respective UU and/or CU SCOs were detected in groundwater

samples at concentrations above their respective TOGS Class GA SGVs. Dissolved arsenic and selenium, and multiple PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, and naphthalene) were detected in one or more groundwater samples at concentrations above the TOGS Class GA SGV

5. Underground Storage Tanks: The geophysical survey identified anomalies indicative of USTs in the northeastern and southwestern portions of the site. The closed-in-place UST associated with open NYSDEC Spill No. 9412605 was not located during the RI.

6. Petroleum-Impacted Soil, Groundwater and Soil Vapor: Petroleum impacts, evidenced by odors, staining, and/or PID readings above background levels, were apparent in soil to depths up to 24 feet bgs in the north-central/northwestern portion of the site. Based on the analytical results, petroleum-related constituents were detected at concentrations above UU SCOs in soil samples collected from depths between about 13 and 24 feet bgs. Dissolved petroleum-related VOCs were detected at concentrations exceeding Class GA SGVs in groundwater in the central and northwestern portions of the site, with the highest concentrations near the northwestern UST area. Petroleum impacts to soil vapor were identified above the ambient air sample concentrations in soil vapor samples across the site. The presence of petroleum-impacted VOCs in soil, groundwater, and soil vapor is attributed to historical releases associated with the suspected USTs in the northwestern portion of the site.

7. CVOC-Impacted Soil, Groundwater, Sub-Slab Soil Vapor, and Indoor Air: Analytical data revealed concentrations of CVOCs exceeding UU SCOs in shallow soil samples (0 to 2 feet bgs) and in deep samples collected from below the groundwater table (20 to 24 feet bgs). CVOCs were detected in groundwater samples collected from throughout the site at concentrations above the Class GA SGVs. CVOC concentrations in groundwater were highest in the north-central portion of the site, and were higher in samples collected form monitoring wells screened below 19 feet bgs. The groundwater design criteria sample results did not identify dechlorinating bacteria activity above the target threshold of 10^4 cells/mL; however, the presence of PCE/TCE breakdown products cis-1,2-DCE and VC suggests that some breakdown has occurred over time. CVOC impacts to sub-slab soil vapor and indoor air were identified above outdoor ambient air sample concentrations in soil vapor and indoor air samples across the site. TCE was detected in all indoor air samples above the NYSDOH AGV. TCE and cis-1,2-DCE were detected in soil vapor at concentrations at which the NYSDOH Decision Matrix A recommends mitigation regardless of indoor air concentrations. The presence of CVOCs in soil, groundwater and soil vapor is attributed to historical releases associated with the former uses of the site for metals manufacturing, bottling, and/or die cutting.

8. Sufficient analytical data were gathered during the RI, together with previous studies, to establish soil cleanup levels and to develop a remedy for the site. The final remedy will

be detailed in the forthcoming RAWP to be prepared in accordance with NYS BCP guidelines. The remedy will need to address petroleum- and CVOC-impacted soil, groundwater and soil vapor; historic fill-impacted groundwater; historic fill impacted with metals, SVOCs and pesticides; measures for the removal and closure of known and unknown USTs; closure of NYSDEC spill number 9412605; and all potential exposure pathways. The excavation for the proposed development is expected to remove the majority of the source material on the site. Analytical results of the treatability samples will help inform selection of an in-situ remedy to treat residual groundwater contamination.

9.0 REFERENCES

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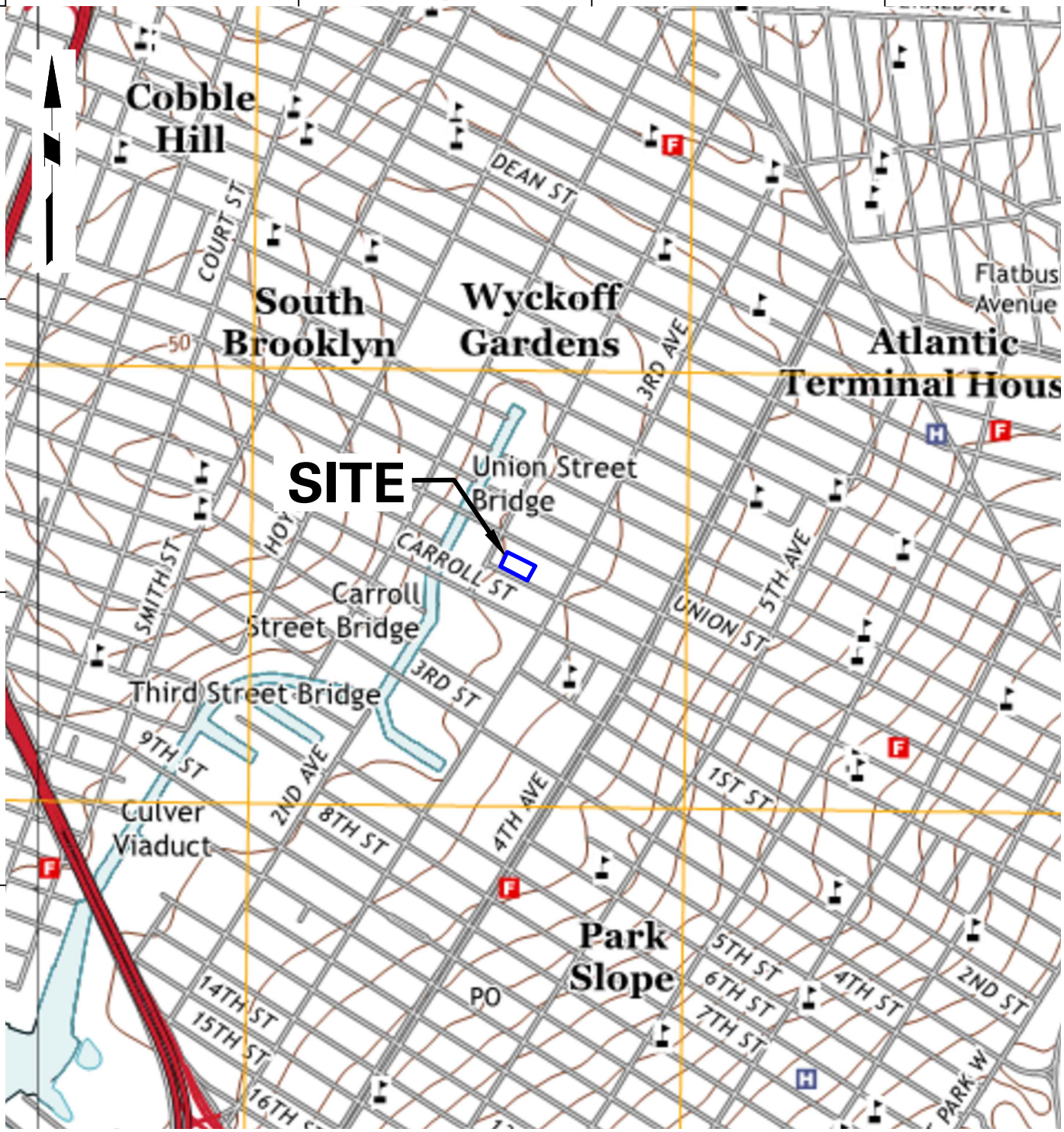
FIGURES



MAP REFERENCE: USGS 7.5-MINUTE JERSEY CITY, N.J., AND BROOKLYN, N.Y. TOPOGRAPHIC QUADRANGLES

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BLOCK No. 440, LOT No. 12
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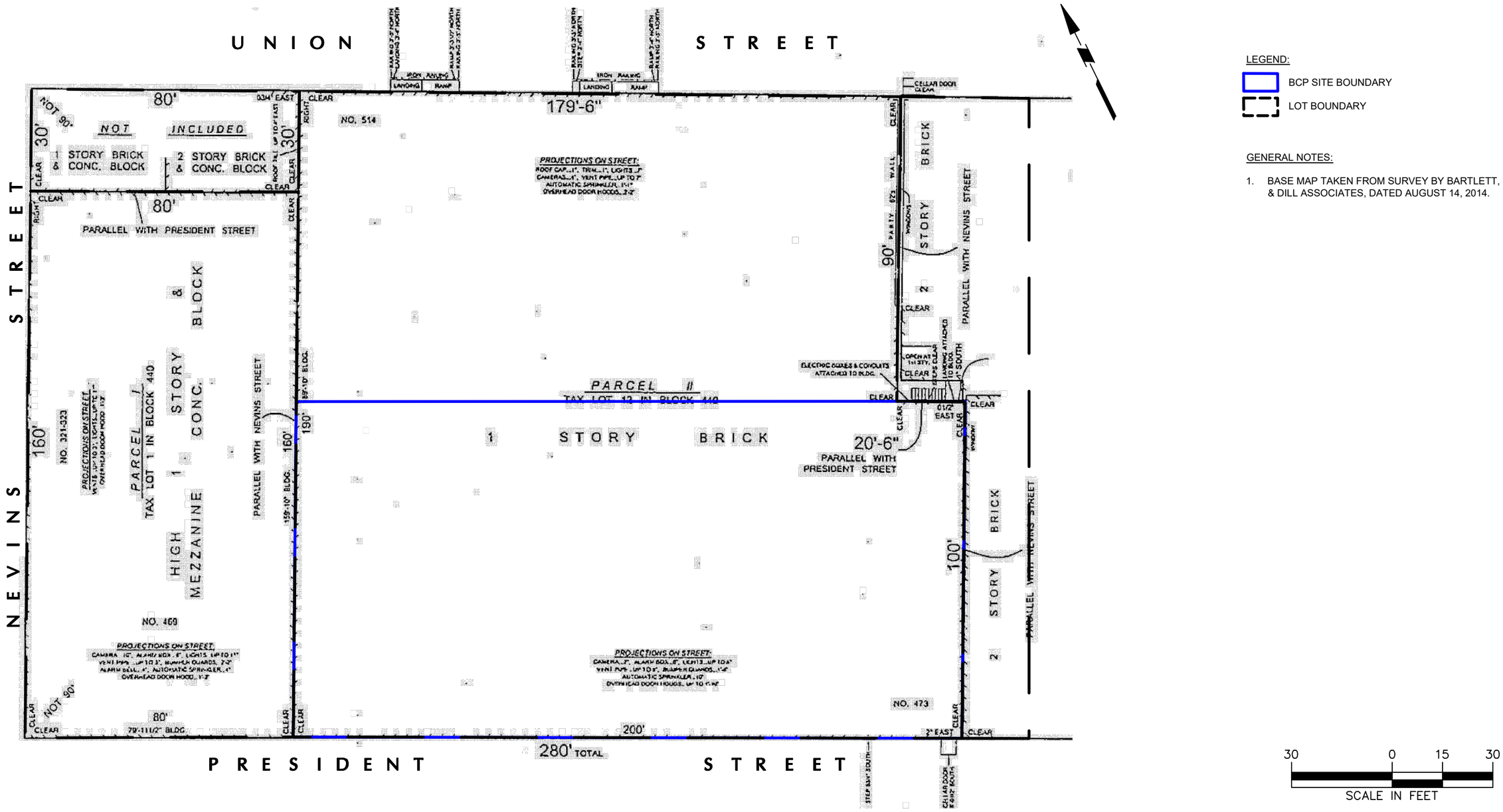
KINGS NEW YORK

Figure Title

SITE LOCATION MAP

Project No. 170361301	Figure No. 1
Date 03/18/2019	
Scale NTS	
Drawn By KT / Checked By PM	
Submission Date	Sheet 1 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 1 - Site Location Map.dwg Date: 5/16/2019 Time: 09:53 User: mtan Style Table: Langan.stb Layout: ANSIA-BP



LEGEND:

- BCP SITE BOUNDARY
- LOT BOUNDARY

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.

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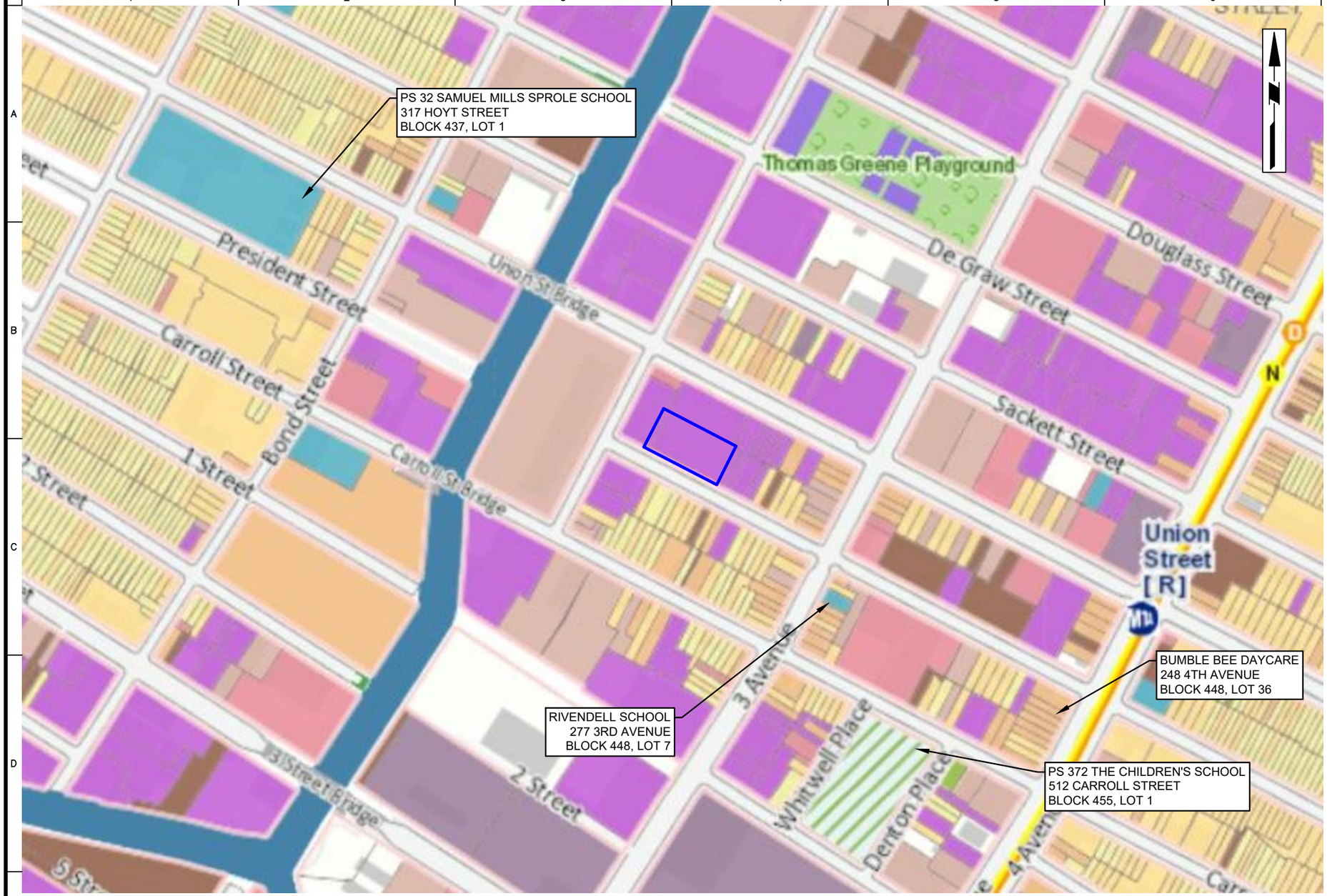
Figure Title

SITE LAYOUT PLAN

Project No. 170361301	Figure No. 2
Date 8/11/2017	
Scale 1"=30'	
Drawn By PM / Checked By NR	
Submission Date –	Sheet 2 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 2 - Site Layout Plan.dwg Date: 5/16/2019 Time: 09:58 User: mtan Style Table: Langan.stb Layout: Surrounding Uses



LEGEND:

BCP SITE BOUNDARY

KEY:

- 1 & 2 FAMILY RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- MIXED USE
- OPEN SPACE & OUTDOOR RECREATION
- COMMERICAL
- INSTITUTIONS
- INDUSTRIAL
- PARKING
- TRANSPORATION/UTILITIES
- VACANT LOTS

GENERAL NOTES:

1. BASE MAP TAKEN FROM HTTP://WWW.OASISNYC.NET/MAP.ASPX

250 0 100 250

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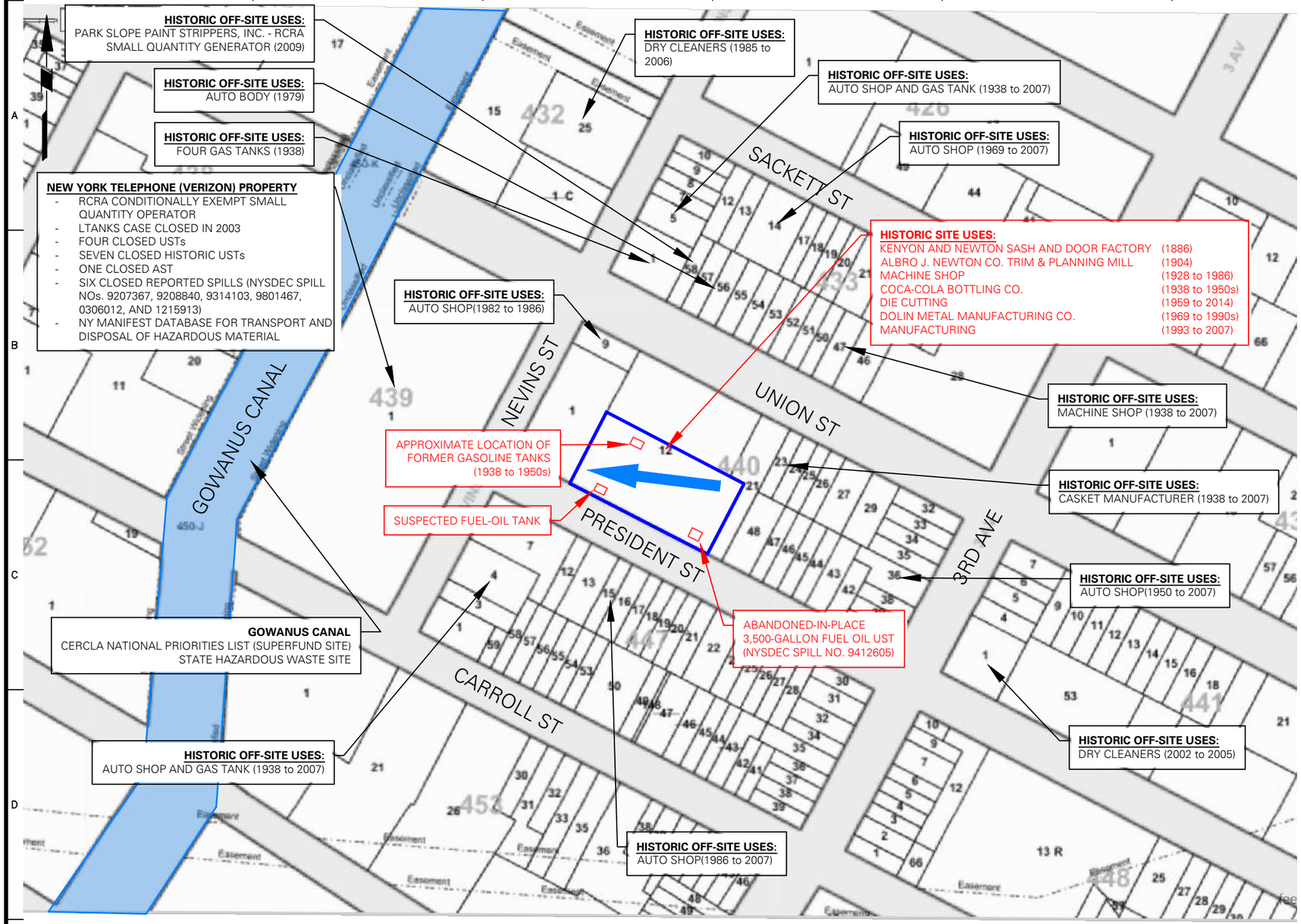
Figure Title

SURROUNDING LAND USE AND SENSITIVE RECEPTORS

Project No. 170361301	Figure No. 3
Date 8/11/2017	
Scale 1"=250'	
Drawn By VDP / Checked By PM	
Submission Date	Sheet 3 of 12



LEGEND:

- APPROXIMATE BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- SUSPECTED TANK LOCATIONS (AS NOTED)
- HISTORICAL SITE USES: — ON-SITE USES
- HISTORICAL OFF-SITE USES: — OFF-SITE USES
- PRESUMED GROUNDWATER FLOW DIRECTION

GENERAL NOTES:

1. BASE MAP TAKEN FROM THE NEW YORK CITY DEPARTMENT OF FINANCE DIGITAL TAX MAP ON AUGUST 11, 2017.
2. HISTORICAL SITE AND SURROUNDING PROPERTY USAGE OBTAINED FROM HISTORICAL SANBORN MAPS AVAILABLE FROM 1886 TO 2007 AND FROM A ENVIRONMENTAL DATA RESOURCES, INC. (EDR) ENVIRONMENTAL RECORDS REPORT, DATED MAY 5, 2014.
3. CERCLA = COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT
4. RCRA = RESOURCE CONSERVATION AND RECOVERY ACT
5. LTANKS = LEAKING STORAGE TANKS
6. AST = ABOVEGROUND STORAGE TANK
7. UST = UNDERGROUND STORAGE TANK

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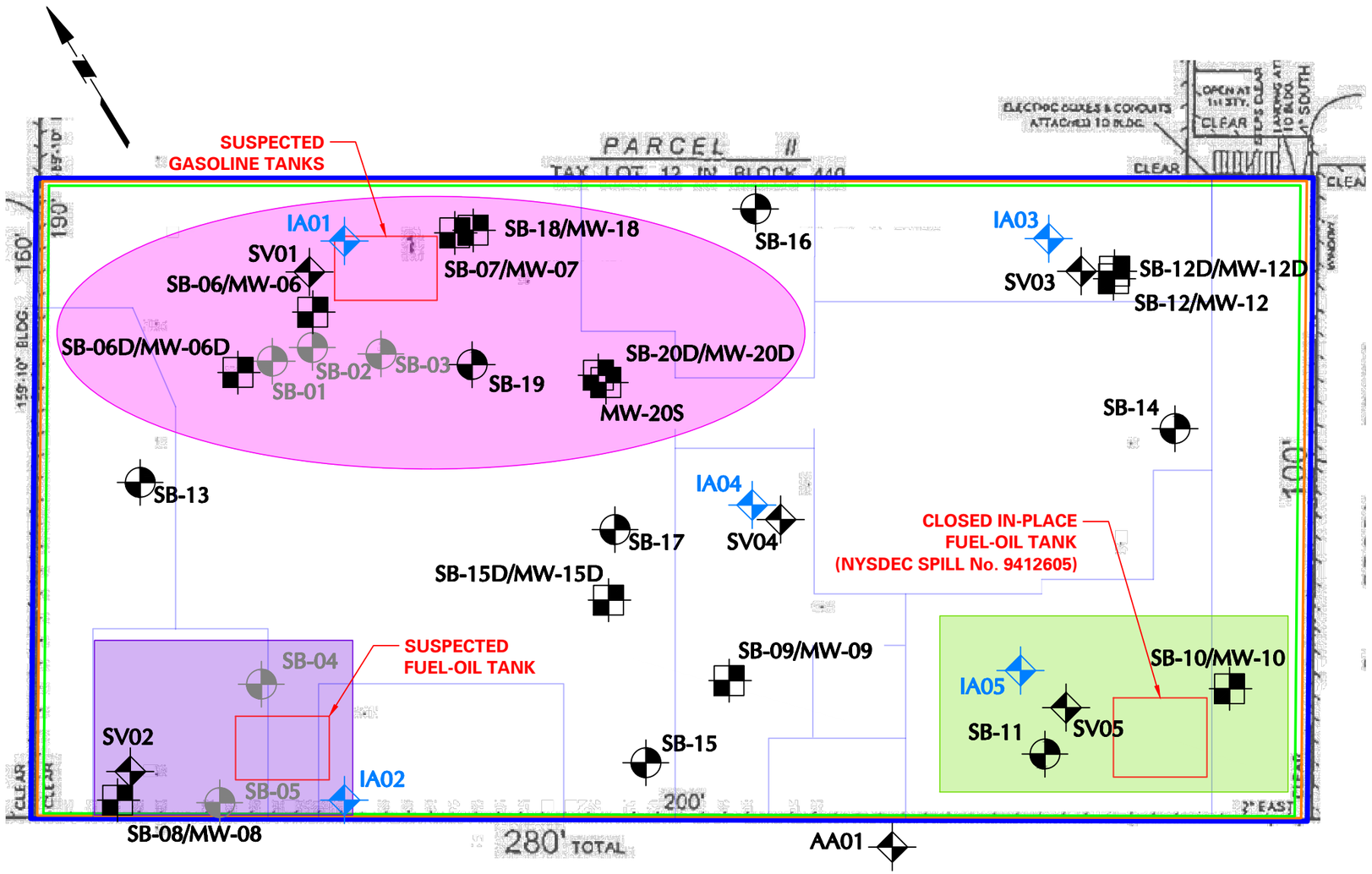
Figure Title
HISTORICAL SITE AND SURROUNDING PROPERTY USAGE

Project No. 170361301	Figure No. 4
Date 8/11/2017	
Scale 1" = 150'	
Drawn By VDP / Checked By PM	
Submission Date	Sheet 4 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 4 - Historical Site and Surrounding Property Usage.dwg Date: 5/16/2019 Time: 10:02 User: mtan Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- APPROXIMATE BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- APPROXIMATE LOCATION OF INTERIOR WALL
- SUSPECTED TANK LOCATIONS
- AREA OF CONCERN 1: HISTORIC FILL
- AREA OF CONCERN 2: PETROLEUM SPILL IN THE SOUTHEASTERN PORTION OF THE SITE
- AREA CONCERN 3: POTENTIAL UST - NORTHWESTERN PORTION OF THE SITE
- AREA OF CONCERN 4: POTENTIAL UST - SOUTHWESTERN PORTION OF THE SITE
- AREA CONCERN 5: CHLORINATED VOLATILE ORGANIC COMPOUNDS (CVOC) IMPACTS TO SOIL, GROUNDWATER AND SOIL VAPOR
- SB-01 — LANGAN 2015 LIMITED SUBSURFACE INVESTIGATION SOIL BORING LOCATION
- SB-11 — LANGAN 2017 REMEDIAL INVESTIGATION SOIL BORING LOCATION
- SB-06/MW-06 — LANGAN 2017 REMEDIAL INVESTIGATION SOIL BORING/MONITORING WELL LOCATION
- SV01 — LANGAN 2017 REMEDIAL INVESTIGATION SUB-SLAB SOIL VAPOR SAMPLE LOCATION
- IA03 — LANGAN 2017 REMEDIAL INVESTIGATION INDOOR AIR SAMPLE LOCATION

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.
2. MONITORING WELLS WERE SURVEYED ON MARCH 15, 2017 AND MAY 6, 2017.
3. SOIL BORING AND SOIL VAPOR POINT LOCATIONS WERE MEASURED OFF OF SURVEYED MONITORING WELL LOCATIONS AND ARE APPROXIMATE.

20 0 5 10 20
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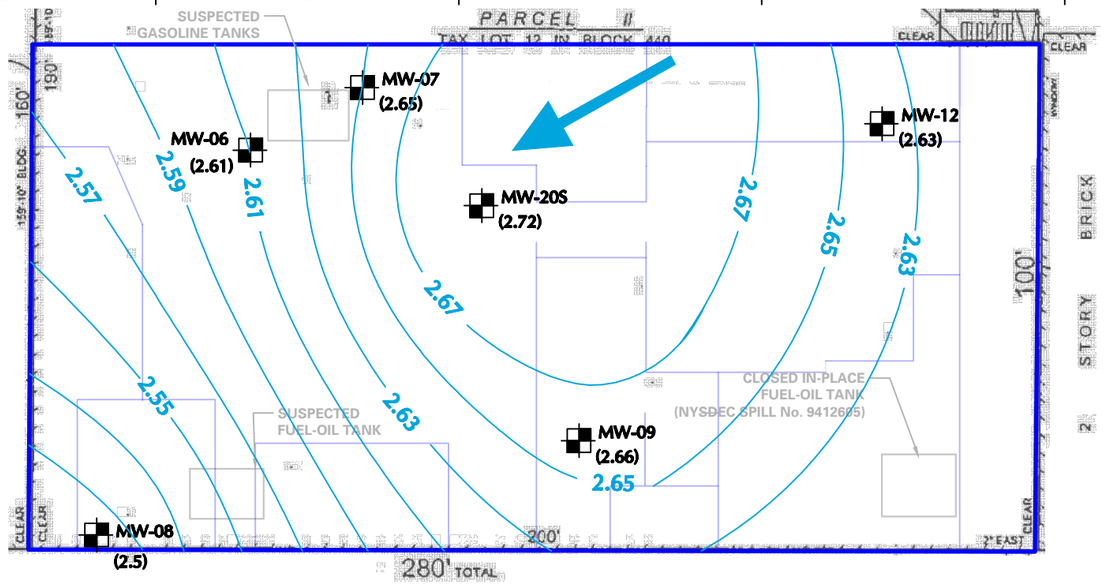
Figure Title
AREAS OF CONCERN AND SAMPLE LOCATION PLAN

Project No. 170361301	Figure No. 5
Date 8/11/2017	
Scale 1" = 20'	
Drawn By VDP / Checked By PM	
Submission Date	Sheet 5 of 12

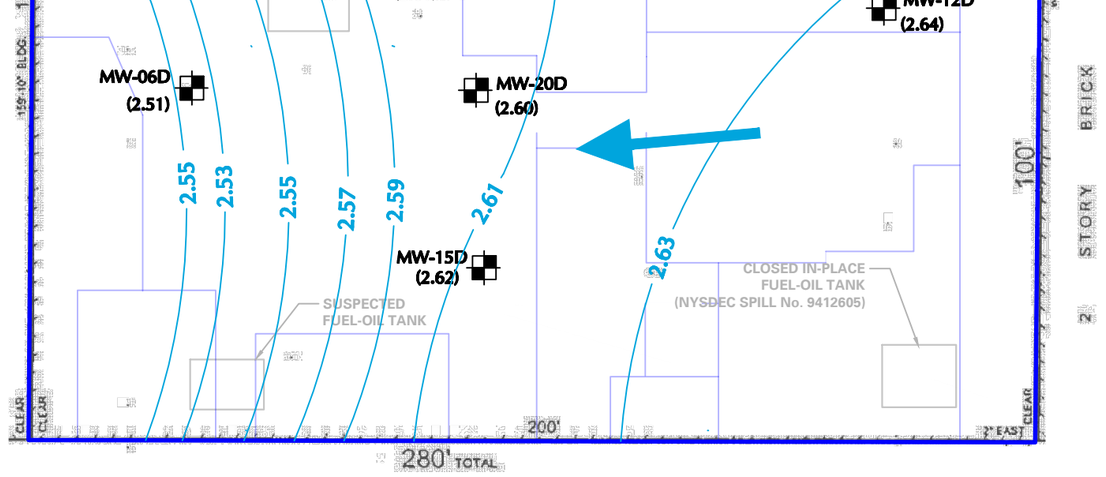
Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 5 - AOC and Sample Location Plan.dwg Date: 5/16/2019 Time: 10:04 User: mtan Style Table: Langan.stb Layout: ANSIB-BL

SHALLOW WELLS



PRESIDENT STREET

DEEP WELLS



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LEGEND:

- APPROXIMATE BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- APPROXIMATE LOCATION OF INTERIOR WALL
- SUSPECTED TANK LOCATIONS (AS NOTED)
- MW-12D (2.64) — LANGAN 2017 REMEDIAL INVESTIGATION SOIL BORING/MONITORING WELL LOCATION
- 2.53 — GROUNDWATER CONTOUR ELEVATION
- PRESUMED GROUNDWATER FLOW DIRECTION

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.
2. GROUNDWATR DATA COLLECTED BYLANGAN DURING A GAUGING EVENT ON JUNE 23, 2017.
3. GROUNDWATER ELEVATONS ARE IN FEET AND REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. THE GROUNDWATER CONTOURS DEVELOPED USING SURFER 11 BY GOLDEN SOFTWARE.
5. GROUNDWATER ELEVATION FROM MW-10 WAS NOT INCLUDED IN THE CONTOURS.

30 0 15 30
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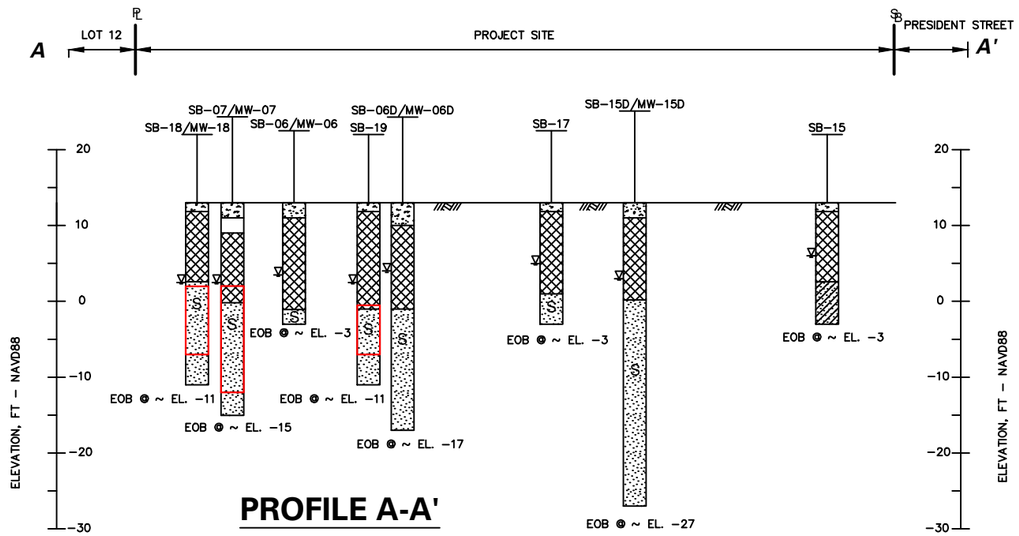
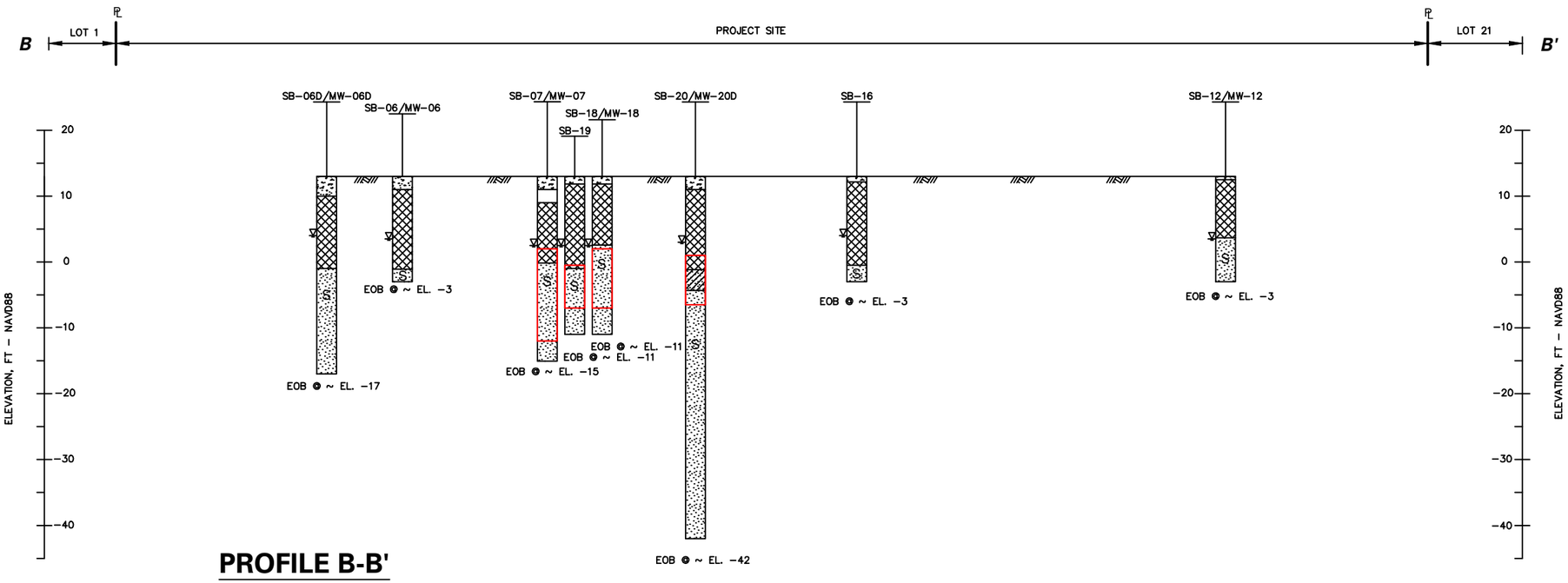
Figure Title
GROUNDWATER CONTOUR MAP

Project No. 170361301	Figure No. 6
Date 8/11/2017	
Scale 1'=30'	
Drawn By VDP / Checked By PM	
Submission Date	Sheet 6 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 6 - Groundwater Contour Map.dwg Date: 5/16/2019 Time: 10:06 User: mtan Style Table: Langan.stb Layout: ANSIB-BL



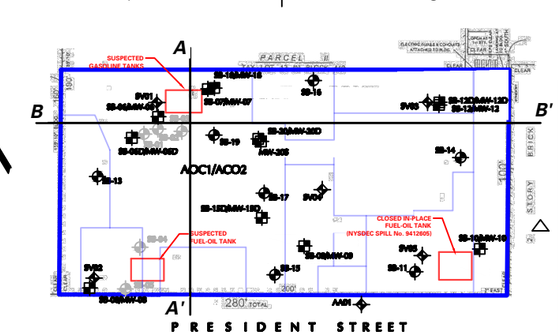
PROFILE A-A'



PROFILE B-B'

MATERIAL SYMBOLS

- CONCRETE
- FILL
- SAND
- SAND WITH SOME SILT
- SILT
- PETROLEUM-LIKE IMPACT OBSERVATION INTERVAL



GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.
2. MONITORING WELLS WERE SURVEYED ON MARCH 15, 2017 AND MAY 6, 2017.
3. SOIL BORING LOCATIONS WERE MEASURED OFF OF SURVEYED MONITORING WELL LOCATIONS AND ARE APPROXIMATE.
4. DISTANCES BETWEEN SB-07/MW-07, SB-19, AND SB-18/MW-18 ARE EXAGGERATED FOR CLARITY.
5. COMPLETED BORING LOGS ARE INCLUDED IN APPENDIX C.
6. NAVD88 = NORTH AMERICAN VERTICAL DATUM OF 1988

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Figure Title
SUBSURFACE PROFILES

Project No. 170361301	Figure No. 7
Date 8/11/2017	
Scale 1" = 20'	
Drawn By VDP / Checked By PM	
Submission Date	Sheet 7 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 7 - Subsurface Profiles.dwg Date: 5/16/2019 Time: 10:10 User: mtan Style Table: Langan.stb Layout: ANSIB-BL

Sample ID	SB02_1.5-2.5	SB02_5-6
Sampling Date	5/28/2015	5/28/2015
Sample Depth (feet bgs)	1.5-2.5	5-6
Sample Layer	Fill	Fill
PID Reading (ppm)	48.1	166.3
VOCs (mg/kg)		
2-Butanone	ND	**0.67**
Acetone	ND	**0.51**
Naphthalene	ND	**50**
Xylenes, Total	ND	**0.26**
SVOC (mg/kg)		
Acenaphthene	NE	**110**
Anthracene	NE	**220**
Benzo(a)anthracene	**1.8**	**310**
Benzo(a)pyrene	**1.3**	**260**
Benzo(b)fluoranthene	**1.6**	**330**
Benzo(ghi)perylene	NE	**140**
Benzo(k)fluoranthene	NE	**120**
Chrysene	**1.9**	**300**
Dibenzo(a,h)anthracene	NE	**34**
Dibenzofuran	NE	**96**
Fluoranthene	NE	**750**
Fluorene	NE	**130**
Indeno(1,2,3-cd)Pyrene	**0.74**	**160**
Naphthalene	NE	**160**
Phenanthrene	NE	**880**
Pyrene	NE	**650**
Pesticides (mg/kg)		
Total Pesticides	ND	ND
PCBs (mg/kg)		
Total PCBs	ND	ND
Metals (mg/kg)		
Copper, Total	NE	**120**
Lead, Total	**100**	**140**
Mercury, Total	**0.55**	**2.7**
Zinc, Total	NE	**200**

Sample ID	SB03_4-5.5
Sampling Date	5/28/2015
Sample Depth (feet bgs)	4-5.5
Sample Layer	Fill
PID Reading (ppm)	8.8
VOCs (mg/kg)	
Total VOCs	NE
SVOCs (mg/kg)	
Total SVOCs	NE
Pesticides (mg/kg)	
Total Pesticides	ND
PCBs (mg/kg)	
Total PCBs	ND
Metals (mg/kg)	
Copper, Total	**95**
Lead, Total	**380**
Mercury, Total	**0.43**
Zinc, Total	**110**

Sample ID	SB07_4-5	SB07_13-14	SB07_23-24	DUP01_030717
Sampling Date	3/7/2017	3/7/2017	3/7/2017	3/7/2017
Sample Depth (feet bgs)	4-5	13-14	23-24	23-24
Sample Layer	Fill	Native	Native	Native
PID Reading (ppm)	0.0	1,550	4,195	4,195
VOCs (mg/kg)				
1,2,4-Trimethylbenzene	ND	ND	**100**	**68**
1,3,5-Trimethylbenzene	ND	ND	**28**	**29**
Benzene	ND	**0.55**	ND	ND
cis-1,2-Dichloroethylene	ND	ND	**3.7**	**0.57**
Ethyl Benzene	ND	**2.2**	**31**	**32**
n-Propylbenzene	ND	**22**	**17**	**17**
Toluene	ND	ND	**5.3**	**5.5**
Xylenes	ND	ND	**170**	**250**
SVOC (mg/kg)				
Total SVOCs	ND	NE	NE	NE
Pesticides (mg/kg)				
Total Pesticides	ND	ND	ND	ND
Metals (mg/kg)				
Chromium, Hexavalent	**1.79**	ND	ND	ND
Lead	**632**	NE	NE	NE
Mercury	**0.338**	ND	ND	ND
Selenium	**5.32**	NE	ND	ND
Zinc	**133**	NE	NE	NE

Sample ID	SB19_10-11	SB19_17-18	SB19_20-21	DUP02_031017
Sampling Date	3/10/2017	3/10/2017	3/10/2017	3/10/2017
Sample Depth (feet bgs)	10-11	17-18	20-21	20-21
Sample Layer	Fill	Native	Native	Native
PID Reading (ppm)	7	1,500	10	10
VOCs (mg/kg)				
Trichloroethylene	ND	ND	**2.4**	**2.3**
SVOC (mg/kg)				
Total SVOCs	NE	ND	NE	ND
Pesticides (mg/kg)				
Total Pesticides	ND	NT	ND	ND
Metals (mg/kg)				
Lead	**81.4**	NT	NE	NE
Mercury	**0.328**	NT	ND	ND

Sample ID	SB12D_23-25
Sampling Date	4/29/2017
Sample Depth (feet bgs)	23-25
Sample Layer	Native
PID Reading (ppm)	0.0
VOCs (mg/kg)	
Total VOCs	ND

Sample ID	SB12_1-2	SB12_9-10
Sampling Date	3/8/2017	3/8/2017
Sample Depth (feet bgs)	1-2	9-10
Sample Layer	Fill	Native
PID Reading (ppm)	0.1	0.1
VOCs (mg/kg)		
Total VOCs	NE	NE
SVOC (mg/kg)		
Benzo(a)anthracene	**2.46**	ND
Benzo(a)pyrene	**2.21**	ND
Benzo(b)fluoranthene	**2.39**	ND
Benzo(k)fluoranthene	**1.97**	ND
Chrysene	**2.76**	ND
Dibenzo(a,h)anthracene	**0.596**	ND
Indeno(1,2,3-cd)pyrene	**1.25**	ND
Pesticides (mg/kg)		
Total PCBs	ND	ND
Metals (mg/kg)		
Lead	**99.6**	NE
Mercury	**0.466**	ND

Sample ID	SB14_1-2	SB14_10-11
Sampling Date	3/8/2017	3/8/2017
Sample Depth (feet bgs)	1-2	10-11
Sample Layer	Fill	Native
PID Reading (ppm)	0.2	0.1
VOCs (mg/kg)		
Total VOCs	NE	ND
SVOC (mg/kg)		
Benzo(a)anthracene	**6.09**	ND
Benzo(a)pyrene	**5.53**	ND
Benzo(b)fluoranthene	**4.98**	ND
Benzo(k)fluoranthene	**4.98**	ND
Chrysene	**6.54**	ND
Dibenzo(a,h)anthracene	**2.02**	ND
Indeno(1,2,3-cd)pyrene	**3.74**	ND
Pesticides (mg/kg)		
Total Pesticides	ND	ND
Metals (mg/kg)		
Arsenic	**14.1**	NE
Barium	**397**	NE
Copper	**53.4**	NE
Lead	**623**	NE
Mercury	**0.74**	ND
Zinc	**148**	NE

Sample ID	SB16_1-2	SB16_9-11	SB16_14-15
Sampling Date	3/9/2017	3/9/2017	3/9/2017
Sample Depth (feet bgs)	1-2	9-11	14-15
Sample Layer	Fill	Fill	Native
PID Reading (ppm)	0.0	0.0	0.0
VOCs (mg/kg)			
Total VOCs	NE	ND	NE
SVOC (mg/kg)			
Total VOCs	NE	ND	NE
Pesticides (mg/kg)			
Total Pesticides	ND	ND	ND
Metals (mg/kg)			
Arsenic	NE	**203**	NE
Barium	NE	**1,170**	NE
Cadmium	ND	**6.48**	ND
Copper	NE	**242**	NE
Lead	**96.6**	**1,080**	NE
Selenium	NE	**63.1**	NE
Zinc	**167**	**577**	NE

Sample ID	SB17_1-2	SB17_7-8	SB17_15-16
Sampling Date	3/8/2017	3/8/2017	3/8/2017
Sample Depth (feet bgs)	1-2	7-8	15-16
Sample Layer	Fill	Fill	Native
PID Reading (ppm)	0.1	0.2	0.0
VOCs (mg/kg)			
Total VOCs	NE	NE	NE
SVOC (mg/kg)			
Benzo(a)anthracene	ND	**8.42**	ND
Benzo(a)pyrene	ND	**7.76**	ND
Benzo(b)fluoranthene	ND	**7.25**	ND
Benzo(k)fluoranthene	ND	**7.77**	ND
Chrysene	ND	**8.82**	ND
Dibenzo(a,h)anthracene	ND	**2.12**	ND
Indeno(1,2,3-cd)pyrene	ND	**5.88**	ND
Pesticides (mg/kg)			
Total Pesticides	ND	ND	ND
Metals (mg/kg)			
Copper	**54.6**	NE	NE
Lead	**194**	**213**	**64.8**
Mercury	**2.96**	**0.964**	**1.09**
Zinc	NE	**148**	NE

Sample ID	SB18_10-11	SB18_23-24
Sampling Date	3/10/2017	3/10/2017
Sample Depth (feet bgs)	10-11	23-24
Sample Layer	Fill	Native
PID Reading (ppm)	0.0	9.8
VOCs (mg/kg)		
cis-1,2-Dichloroethylene	ND	**0.64**
SVOC (mg/kg)		
Total SVOCs	NE	ND
Pesticides (mg/kg)		
Total Pesticides	ND	ND
Metals (mg/kg)		
Total Metals	NE	NE

Sample ID	SB01_4-5.5	SB01_8-9
Sampling Date	5/28/2015	5/28/2015
Sample Depth (feet bgs)	4-5.5	8-9
Sample Layer	Fill	Fill
PID Reading (ppm)	168.2	21.2
VOCs (mg/kg)		
Total VOCs	NE	NE
SVOC (mg/kg)		
Benzo(a)anthracene	**34**	NE
Benzo(a)pyrene	**29**	NE
Benzo(b)fluoranthene	**35**	NE
Benzo(k)fluoranthene	**14**	NE
Chrysene	**33**	NE
Dibenzo(a,h)anthracene	**3.6**	NE
Dibenzofuran	**8.6**	NE
Indeno(1,2,3-cd)Pyrene	**17**	NE
Pesticides (mg/kg)		
Total Pesticides	NE	NE
PCBs (mg/kg)		
Total PCBs	NE	NE
Metals (mg/kg)		
Copper, Total	**52**	NE
Lead, Total	**100**	NE
Mercury, Total	**18**	NE

Sample ID	SB06_2-3	SB06_9-10	SB06_14-15
Sampling Date	3/6/2017	3/6/2017	3/6/2017
Sample Depth (feet bgs)	2-3	9-10	14-15
Sample Layer	Fill	Fill	Native
PID Reading (ppm)	0.0	0.0	0.0
VOCs (mg/kg)			
Total VOCs	NE	ND	NE
SVOC (mg/kg)			
Total SVOCs	NE	ND	ND
Pesticides (mg/kg)			
Total Pesticides	ND	ND	ND
Metals (mg/kg)			
Chromium, Hexavalent	**1.070**	ND	ND
Mercury	**0.194**	NE	NE

Sample ID	SB06D_23-25	SODUP01_042817
Sampling Date	4/28/2017	4/28/2017
Sample Depth (feet bgs)	23-25	23-25
Sample Layer	Native	Native
PID Reading (ppm)	0.0	0.0
VOCs (mg/kg)		
Total VOCs	NE	NE

Sample ID	SB13_1-2	SB13_9-10
Sampling Date	3/6/2017	3/6/2017
Sample Depth (feet bgs)	1-2	9-10
Sample Layer	Fill	Native
PID Reading (ppm)	0.025	0.0
VOCs (mg/kg)		
Total VOCs	NE	NE
SVOC (mg/kg)		
Total SVOCs	NE	ND
Pesticides (mg/kg)		
4,4'-DDT	**0.00491**	ND
alpha-Chlordane	**0.28**	ND
Metals (mg/kg)		
Barium	**885**	NE
Chromium, Trivalent	**69.14**	NE
Chromium, Hexavalent	**3.86**	ND
Lead	**808**	**126**
Mercury	**0.555**	**0.215**
Zinc	**177**	NE

Sample ID	SB20D_0-2	SB20D_17-19	SB20D_23-25	SB20D_30-32
Sampling Date	4/27/2017	4/27/2017	4/27/2017	4/27/2017
Sample Depth (feet bgs)	0-2	17-19	23-25	30-32
Sample Layer	Fill	Native	Native	Native
PID Reading (ppm)	0.0	1,121	17.2	0
VOCs (mg/kg)				
1,2,4-Trimethylbenzene	NE	**52**	NE	NE
1,3,5-Trimethylbenzene	NE	**18**	NE	NE
2-Butanone	**0.19**	ND	ND	ND
Benzene	ND	**2.1**	ND	ND
Ethyl Benzene	NE	**18**	ND	NE
n-Propylbenzene	ND	**6.9**	NE	ND
Trichloroethylene	**4.1**	ND	ND	NE
Xylenes	NE	**40**	ND	NE

Sample ID	SB15D_23-25
Sampling Date	4/28/2017
Sample Depth (feet bgs)	23-25
Sample Layer	Native
PID Reading (ppm)	0.0
VOCs (mg/kg)	
Total VOCs	NE

Sample ID	SB04_2-3	SB04_4-5.5
Sampling Date	5/28/2015	5/28/2015
Sample Depth (feet bgs)	2-3	4-5.5
Sample Layer	Fill	Fill
PID Reading (ppm)	5.7	14.0
VOCs (mg/kg)		
Total VOCs	NE	NE
SVOCs (mg/kg)		
Benzo(a)anthracene	**16**	NE
Benzo(a)pyrene	**16**	NE
Benzo(b)fluoranthene	**17**	NE
Benzo(k)fluoranthene	**7.6**	NE
Chrysene	**15**	NE
Dibenzo(a,h)anthracene	**2.6**	ND
Indeno(1,2,3-cd)Pyrene	**9.4**	NE
Pesticides (mg/kg)		
Total Pesticides	ND	ND
PCBs (mg/kg)		
Total PCBs	ND	NE
Metals (mg/kg)		
Copper, Total	**81**	NE
Lead, Total	**460**	**92**
Mercury, Total	**13**	**10**
Zinc, Total	**170**	NE

Sample ID	SB08_1-2	SB08_7-8	SB08_8-9
Sampling Date	3/6/2017	3/6/2017	3/6/2017
Sample Depth (feet bgs)	1-2	7-8	8-9
Sample Layer	Fill	Fill	Native
PID Reading (ppm)	0.0	0.025	0.025
VOCs (mg/kg)			
Total VOCs	NE	NE	ND
SVOC (mg/kg)			
Benzo(a)anthracene	**5.9**	ND	ND
Benzo(a)pyrene	**7.05**	ND	ND
Benzo(b)fluoranthene	**4.89**	ND	ND
Benzo(k)fluoranthene	**5.71**	ND	ND
Chrysene	**6.28**	ND	ND
Dibenzo(a,h)anthracene	**1.96**	ND	ND
Indeno(1,2,3-cd)pyrene	**4.44**	ND	ND
Pesticides (mg/kg)			
Total Pesticides	ND	ND	ND
Metals (mg/kg)			
Copper	**50.7**	NE	NE
Lead	**274**	**89.1**	NE
Mercury	**1.91**	**0.414**	ND
Zinc	**125**	NE	NE

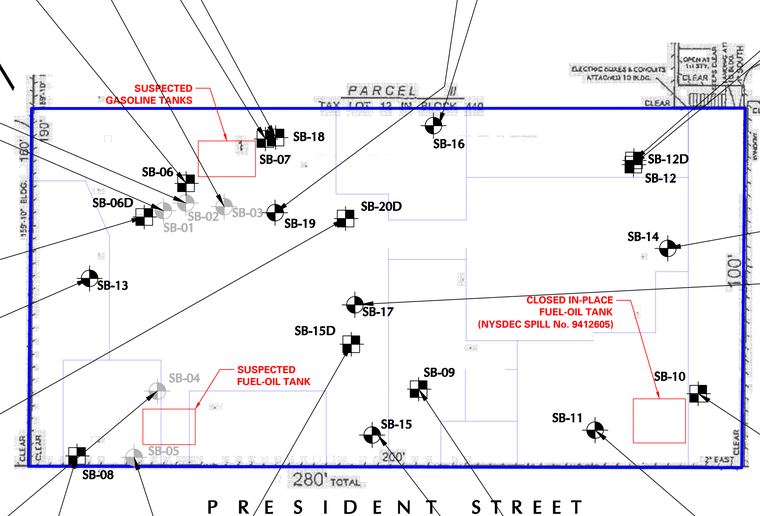
Sample ID	SB05_0.5-2
Sampling Date	5/28/2015
Sample Depth (feet bgs)	0.5-2
Sample Layer	Fill
PID Reading (ppm)	3.5
VOCs (mg/kg)	
Naphthalene	**51**
SVOCs (mg/kg)	
Benzo(a)anthracene	**1.6**
Benzo(a)pyrene	**1.6**
Benzo(b)fluoranthene	**2.1**
Chrysene	**1.6**
Indeno(1,2,3-cd)Pyrene	**0.94**
Pesticides (mg/kg)	
4,4'-DDT	**0.01**
PCBs (mg/kg)	
Total PCBs	ND
Metals (mg/kg)	
Arsenic, Total	**19**
Copper, Total	**83**
Lead, Total	**710**
Mercury, Total	**1.4**
Zinc, Total	**160**

Sample ID	SB15_1-2	SB15_7-8	SB15_10-11
Sampling Date	3/8/2017	3/8/2017	3/8/2017
Sample Depth (feet bgs)	1-2	7-8	10-11
Sample Layer	Fill	Fill	Native
PID Reading (ppm)	0.0	0.0	0.0
VOCs (mg/kg)			
Total VOCs	NE	ND	NE
SVOC (mg/kg)			
Total SVOCs	NE	NE	ND
Pesticides (mg/kg)			
Total Pesticides	ND	ND	ND
Metals (mg/kg)			
Lead	**341**	**982**	NE
Nickel	ND	**40.6**	NE
Selenium	ND	**5.09**	NE
Zinc	ND	**125**	NE
Mercury	**0.387**	**0.981**	NE

Sample ID	SB09_1-2	SB09_10-11
Sampling Date	3/8/2017	3/8/2017
Sample Depth (feet bgs)	1-2	10-11
Sample Layer	Fill	Native
PID Reading (ppm)	0.0	0.0
VOCs (mg/kg)		
Trichloroethylene	**5.1**	ND
SVOC (mg/kg)		
Total SVOCs	ND	ND
Pesticides (mg/kg)		
Total Pesticides	ND	ND
Metals (mg/kg)		
Total Metals	NE	NE

Sample ID	SB10_1-2	SB10_6-7	SB10_9-10
Sampling Date	3/9/2017	3/9/2017	3/9/2017
Sample Depth (feet bgs)	1-2	6-7	9-10
Sample Layer	Fill	Fill	Native
PID Reading (ppm)	0.0	25.2	0.0
VOCs (mg/kg)			
Total VOCs	NE	NE	ND
SVOC (mg/kg)			
Total SVOCs	NE	NE	ND
Pesticides (mg/kg)			
Total Pesticides	ND	ND	ND
Metals (mg/kg)			
Arsenic	NE	**14.8**	**16.2**

Sample ID	SB11_2-4	SB11_15-16
Sampling Date	3/10/2017	3/10/2017
Sample Depth (feet bgs)	2-4	15-16
Sample Layer	Fill	Native
PID Reading (ppm)	0.0	0.0
VOCs (mg/kg)		
Total VOCs	NE	NE
SVOC (mg/kg)		
Benzo(a)pyrene	**12.5**	ND
Benzo(b)fluoranthene	**9.66**	ND
Benzo(k)fluoranthene	**11.3**	ND
Dibenzo(a,h)anthracene	**0.959**	ND
Indeno(1,2,3-cd)pyrene	**8.59**	ND
Pesticides (mg/kg)		
Total Pesticides	ND	ND
Metals (mg/kg)		
Lead	**132**	NE
Mercury	**1.19**	NE



LEGEND:

- APPROXIMATE BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- APPROXIMATE LOCATION OF INTERIOR WALL
- SUSPECTED TANK LOCATIONS
- SB-01 LANGAN 2015 LIMITED SUBSURFACE INVESTIGATION SOIL BORING LOCATION
- SB-11 LANGAN 2017 REMEDIAL INVESTIGATION SOIL BORING LOCATION
- SB-06 LANGAN 2017 REMEDIAL INVESTIGATION SOIL BORING/MONITORING WELL LOCATION

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.
2. SOIL BORING LOCATIONS WERE MEASURED OFF SURVEYED MONITORING WELL LOCATIONS AND ARE APPROXIMATE
3. SOIL ANALYTICAL RESULTS ARE COMPARED TO TITLE 6 OF THE NEW YORK CODES, RULES, AND REGULATIONS (6 NYCRR) PART 375 UNRESTRICTED USE AND RESTRICTED COMMERCIAL USE SOIL CLEANUP OBJECTIVES (SCOs).
4. ONLY CONCENTRATIONS FOR COMPOUNDS EXCEEDING THE SCOs STATED IN NOTE 3 ARE SHOWN.
5. CONCENTRATIONS DETECTED ABOVE 6 NYCRR PART 375 UNRESTRICTED USE (UU) SOIL CLEANUP OBJECTIVES (SCOs) ARE BOLDED.
6. CONCENTRATIONS DETECTED ABOVE 6 NYCRR PART 375 RESTRICTED COMMERCIAL USE (CU) SCOs ARE HIGHLIGHTED AND BOLDED.
7. PART 375 UU AND CU SCOs ARE PRESENTED IN THE TABLE BELOW.
8. VOC = VOLATILE ORGANIC COMPOUND
9. SVOC = SEMIVOLATILE ORGANIC COMPOUND
10. mg/kg - MILLIGRAM PER KILOGRAM
11. ND = NOT DETECTED
12. NE = NO DETECTED CONCENTRATIONS ABOVE PART 375 UU OR CU SOIL CLEANUP OBJECTIVES.

	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Commercial Use SCOs
VOCs (mg/kg)		
1,2,4-Trimethylbenzene	3.6	190
1,3,5-Trimethylbenzene	8.4	190
2-Butanone	0.12	500
Benzene	0.06	44
cis-1,2-Dichloroethylene	0.25	500
Ethyl Benzene	1	390
n-Propylbenzene	3.9	500
Toluene	0.7	500
Trichloroethylene	0.47	200
Xylenes, Total	0.26	500
SVOCs (mg/kg)		
Acenaphthene	20	500
Anthracene	100	500
Benzo(a)anthracene	1	5.6
Benzo(a)pyrene	1	1
Benzo(b)fluoranthene	1	5.6
Benzo(g,h,i)perylene	100	500
Benzo(k)fluoranthene	0.8	56
Chrysene	1	56
Dibenzo(a,h)anthracene	0.33	0.56
Dibenzofuran	7	350
Fluoranthene	100	500
Fluorene	30	500
Indeno(1,2,3-cd)pyrene	0.5	5.6
Naphthalene	12	500
Phenanthrene	100	500
Pyrene	100	500
Pesticides (mg/kg)		
4,4'-DDT	0.0033	47
alpha-Chlordane	0.094	24
Metals (mg/kg)		
Arsenic	13	16
Barium	350	400
Chromium, Hexavalent	1	400
Copper	50	270
Lead	63	1000
Mercury	0.18	2.8
Nickel	30	310
Selenium	3.9	1500
Zinc	109	10000

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Langan CT, Inc.
Langan International LLC
Collectively known as Langan

Project

473 PRESIDENT STREET

BLOCK No. 440, PARTIAL LOT No. 12
BROOKLYN
KINGS NEW YORK

Figure Title

SOIL SAMPLE ANALYTICAL RESULTS MAP

Project No. 170361301	Figure No. 8
Date 8/11/2017	
Scale 1"=20'	
Drawn By VZ / Checked By PM	
Submission Date	Sheet 8 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 8 - Soil Sample Analytical Results Map.dwg Date: 5/16/2019 Time: 10:12 User: mtan Style Table: Langan.stb Layout: Figure XX

Sample ID	MW07_032217
Laboratory ID	17C0850-02
Sampling Date	3/22/2017
Screened Interval (feet bgs)	19-24
VOCs (µg/L)	
1,2,4-Trimethylbenzene	**1600**
1,3,5-Trimethylbenzene	**470**
Benzene	**890**
cis-1,2-Dichloroethylene	**4900**
Ethyl Benzene	**2000**
Isopropylbenzene	**130**
n-Propylbenzene	**180**
o-Xylene	**1300**
p- & m- Xylenes	**5600**
Toluene	**740**
Trichloroethylene	**1300**
Vinyl Chloride	**190**
Xylenes, Total	**6900**

Sample ID	MW18_032217
Laboratory ID	17C0878-01
Sampling Date	3/22/2017
Screened Interval (feet bgs)	8-18
VOCs (µg/L)	
1,2,4-Trimethylbenzene	**1600**
1,3,5-Trimethylbenzene	**460**
Acetone	**120**
Benzene	**3500**
cis-1,2-Dichloroethylene	**26**
Ethyl Benzene	**1400**
Isopropylbenzene	**160**
n-Butylbenzene	**62**
n-Propylbenzene	**220**
o-Xylene	**450**
p- & m- Xylenes	**4500**
p-Isopropyltoluene	**24**
sec-Butylbenzene	**23**
Toluene	**340**
Vinyl Chloride	**7**
Xylenes, Total	**4900**

Sample ID	MW12D_050617	GWDUP01_050617
Laboratory ID	L1714721-02	L1714721-08
Sampling Date	5/6/2017	5/6/2017
Screened Interval (feet bgs)	20-25	20-25
VOCs (µg/L)		
Total VOCs	NE	NE

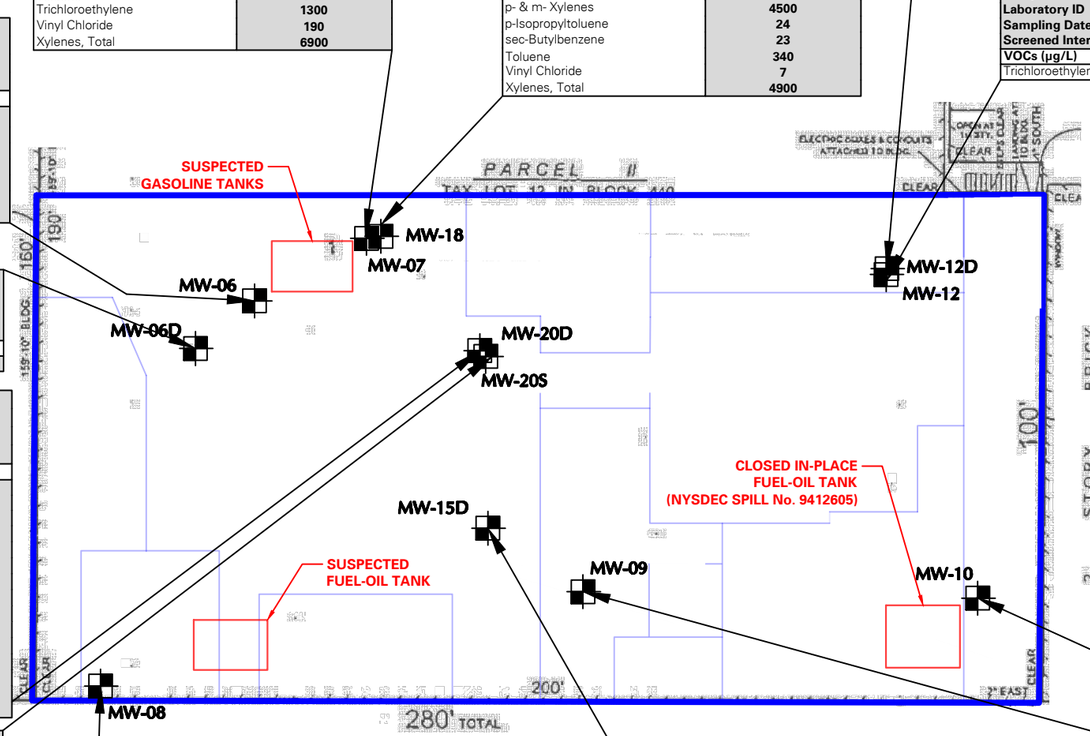
Sample ID	MW12_031617
Laboratory ID	17C0618-03
Sampling Date	3/16/2017
Screened Interval (feet bgs)	8-18
VOCs (µg/L)	
Trichloroethylene	**39**

Sample ID	MW06_031617
Laboratory ID	17C0618-02
Sampling Date	3/16/2017
Screened Interval (feet bgs)	8-18
VOC (µg/L)	
1,2,4,5-Tetramethylbenzene	**57**
Benzene	**70**
Isopropylbenzene	**45**
n-Butylbenzene	**8.3**
n-Propylbenzene	**72**
p- & m- Xylenes	**5.8**
sec-Butylbenzene	**13**

Sample ID	MW06D_050617
Laboratory ID	L1714721-01
Sampling Date	5/6/2017
Screened Interval (feet bgs)	20-25
VOCs (µg/L)	
Trichloroethylene	**7.3**

Sample ID	MW20D_050617
Laboratory ID	L1714721-04
Sampling Date	5/6/2017
Screened Interval (feet bgs)	20-30
VOCs (µg/L)	
1,2,3-Trichloropropane	**34**
1,2,4-Trimethylbenzene	**1200**
1,2,4,5-Tetramethylbenzene	**66**
1,3,5-Trimethylbenzene	**360**
Acetone	**120**
Benzene	**280**
Ethyl Benzene	**820**
Isopropylbenzene	**82**
Naphthalene	**360**
n-Propylbenzene	**130**
o-Xylene	**68**
p- & m- Xylenes	**2100**
Toluene	**43**
Trichloroethylene	**830**
Xylenes, Total	**2200**

Sample ID	MW20S_050617
Laboratory ID	L1714721-03
Sampling Date	5/6/2017
Screened Interval (feet bgs)	8-18
VOCs (µg/L)	
1,2,3-Trichloropropane	**23**
1,2,4-Trimethylbenzene	**430**
1,2,4,5-Tetramethylbenzene	**73**
1,3,5-Trimethylbenzene	**250**
Acetone	**71**
Benzene	**140**
Ethyl Benzene	**110**
Isopropylbenzene	**34**
Naphthalene	**120**
n-Butylbenzene	**8.8**
n-Propylbenzene	**32**
o-Xylene	**31**
p- & m- Xylenes	**420**
p-Isopropyltoluene	**10**
sec-Butylbenzene	**9.6**
Toluene	**9.8**
Trichloroethylene	**78**
Xylenes, Total	**450**



Sample ID	MW08_031617	GWDUP01_031617
Laboratory ID	17C0618-01	17C0618-04
Sampling Date	3/16/2017	3/16/2017
Screened Interval (feet bgs)	6-16	6-16
VOCs (µg/L)		
Trichloroethylene	**5.7**	**5.4**

Sample ID	MW15D_050617
Laboratory ID	L1714721-05
Sampling Date	5/6/2017
Screened Interval (feet bgs)	20-25
VOCs (µg/L)	
1,2,4-Trimethylbenzene	**6.2**
cis-1,2-Dichloroethylene	**20**
Trichloroethylene	**16**
Vinyl Chloride	**2.8**

Sample ID	MW10_032217
Laboratory ID	17C0850-03
Sampling Date	3/22/2017
Screened Interval (feet bgs)	0-8
VOCs (µg/L)	
Total VOCs	NE

Sample ID	MW09_032217
Laboratory ID	17C0850-04
Sampling Date	3/22/2017
Screened Interval (feet bgs)	6-16
VOCs (µg/L)	
Total VOCs	NE

LEGEND:

- APPROXIMATE BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- APPROXIMATE LOCATION OF INTERIOR WALL
- SUSPECTED TANK LOCATIONS
- MW-06 — LANGAN 2017 REMEDIAL INVESTIGATION MONITORING WELL LOCATION

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.
2. GROUNDWATER ANALYTICAL RESULTS ARE COMPARED TO NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES (SGVs) FOR CLASS GA DRINKING WATER - PROVIDED IN THE TABLE BELOW.
3. ONLY CONCENTRATIONS FOR COMPOUNDS EXCEEDING CLASS GA SGVs ARE SHOWN IN THE TABLES.
4. CONCENTRATIONS DETECTED ABOVE TOGS CLASS GA SGVs ARE HIGHLIGHTED AND IN BOLD.
5. VOC = VOLATILE ORGANIC COMPOUND
6. µg/L = MICROGRAM PER LITER
7. ND = NO DETECTED CONCENTRATIONS
8. NE = NOT DETECTED ABOVE NYSDEC SGVs

NYSDEC TOGS Standards and Guidance Values- Class GA	
VOCs (µg/L)	
1,2,3-Trichloropropane	0.04
1,2,4-Trimethylbenzene	5
1,2,4,5-Tetramethylbenzene	5
1,3,5-Trimethylbenzene	5
Acetone	50
Benzene	1
cis-1,2-Dichloroethylene	5
Ethyl Benzene	5
Isopropylbenzene	5
Naphthalene	10
n-Butylbenzene	5
n-Propylbenzene	5
o-Xylene	5
p- & m- Xylenes	5
p-Isopropyltoluene	5
Toluene	5
Trichloroethylene	5
Vinyl Chloride	2
Xylenes, Total	5

30 0 15 30
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Figure Title
GROUNDWATER SAMPLE ANALYTICAL RESULTS MAP - VOCs

Project No.	Figure No.
170361301	9A
Date: 8/11/2017	
Scale: 1'=30'	
Drawn By: VZ / Checked By: PM	
Submission Date	Sheet 9 of 12

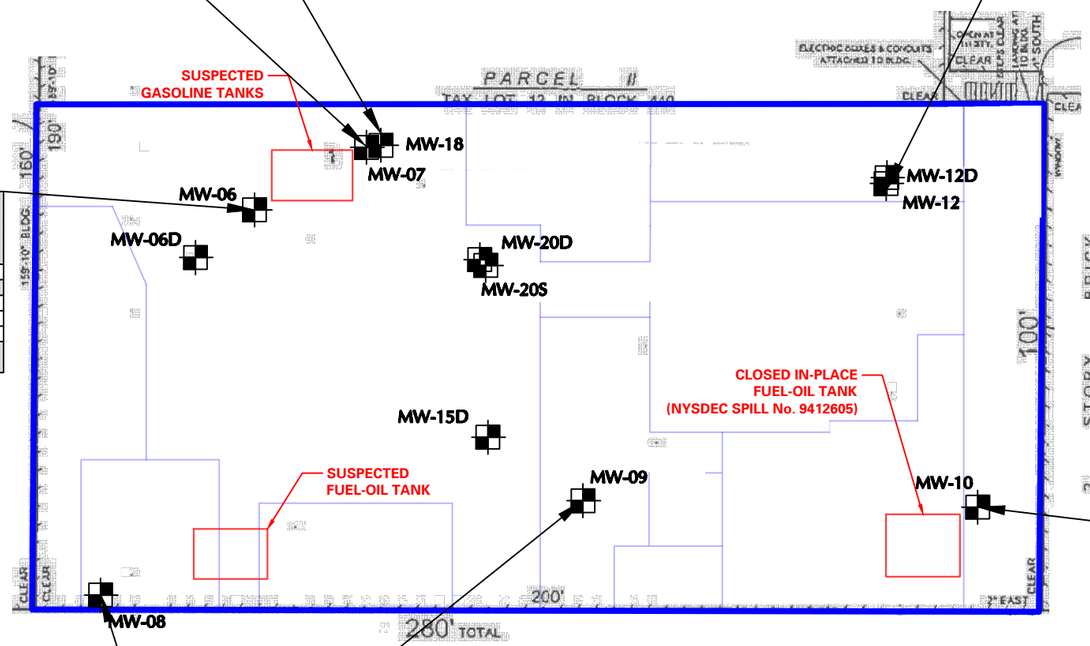
Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 9A - Groundwater Sample Analytical Results Map - VOCs - Copy.dwg Date: 5/16/2019 Time: 10:15 User: mtan Style Table: Langan.stb Layout: ANSIB-BL

Sample ID	MW07_032217
Laboratory ID	17C0850-02
Sampling Date	3/22/2017
Screened Interval (feet bgs)	19-24
SVOCs (µg/L)	
Naphthalene	**214**
Pesticides (µg/L)	
Total Pesticides	ND
Dissolved Metals (µg/L)	
Antimony	**3.09**
Arsenic	**37.2**
Manganese	**413**
Sodium	**66700**

Sample ID	MW18_032217
Laboratory ID	17C0878-01
Sampling Date	3/22/2017
Screened Interval (feet bgs)	8-18
SVOCs (µg/L)	
Naphthalene	**427**
Pesticides (µg/L)	
Total Pesticides	ND
Dissolved Metals (µg/L)	
Arsenic	**38.2**
Magnesium	**54100**
Manganese	**882**
Sodium	**149000**

Sample ID	MW12_031617
Laboratory ID	17C0618-03
Sampling Date	3/16/2017
Screened Interval (feet bgs)	8-18
SVOCs (µg/L)	
Total SVOCs	NE
Pesticides (µg/L)	
Total Pesticides	ND
Dissolved Metals (µg/L)	
Magnesium	**37600**
Manganese	**743**
Selenium	**20**
Sodium	**37700**

Sample ID	MW06_031617
Laboratory ID	17C0618-02
Sampling Date	3/16/2017
Screened Interval (feet bgs)	8-18
SVOCs (µg/L)	
Naphthalene	**19.4**
Pesticides (µg/L)	
Total Pesticides	ND
Dissolved Metals (µg/L)	
Manganese	**436**
Sodium	**70300**



Sample ID	MW10_032217
Laboratory ID	17C0850-03
Sampling Date	3/22/2017
Screened Interval (feet bgs)	0-8
SVOCs (µg/L)	
Total SVOCs	NE
Pesticides (µg/L)	
Total Pesticides	ND
Dissolved Metals (µg/L)	
Sodium	**197000**

Sample ID	MW09_032217
Laboratory ID	17C0850-04
Sampling Date	3/22/2017
Screened Interval (feet bgs)	6-16
SVOCs (µg/L)	
Total SVOCs	NE
Pesticides (µg/L)	
Total Pesticides	ND
Dissolved Metals (µg/L)	
Total Dissolved Metals	NE

Sample ID	MW08_031617	GWDUP01_031617
Laboratory ID	17C0618-01	17C0618-04
Sampling Date	3/16/2017	3/16/2017
Screened Interval (feet bgs)	6-16	6-16
SVOCs (µg/L)		
Benzo(a)anthracene	**0.0385**	**0.123**
Benzo(a)pyrene	**0.0385**	**0.138**
Benzo(b)fluoranthene	ND	**0.108**
Benzo(k)fluoranthene	**0.0462**	**0.138**
Chrysene	**0.0462**	**0.131**
Indeno(1,2,3-cd)pyrene	ND	**0.0462**
Pesticides (µg/L)		
Total Pesticides	ND	ND
Dissolved Metals (µg/L)		
Selenium	**20**	**16.2**
Sodium	**93400**	**91800**

30 0 15 30
SCALE IN FEET

LEGEND:

- APPROXIMATE BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- APPROXIMATE LOCATION OF INTERIOR WALL
- SUSPECTED TANK LOCATIONS
- MW-06 LANGAN 2017 REMEDIAL INVESTIGATION MONITORING WELL LOCATION

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.
2. RI = REMEDIAL INVESTIGATION
3. GROUNDWATER ANALYTICAL RESULTS ARE COMPARED TO NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES (SGVs) FOR CLASS GA DRINKING WATER - PROVIDED IN THE TABLE BELOW.
4. ONLY CONCENTRATIONS FOR COMPOUNDS EXCEEDING CLASS GA SGVs ARE SHOWN IN THE TABLES.
5. CONCENTRATIONS DETECTED ABOVE TOGS CLASS GA SGVs ARE HIGHLIGHTED AND IN BOLD.
6. µg/L - MICROGRAM PER LITER
7. ND = NOT DETECTED
8. NE = NOT DETECTED ABOVE NYSDEC SGVs

NYSDEC TOGS Standards and Guidance Values- Class GA	
SVOCs (µg/L)	
Benzo(a)anthracene	0.002
Benzo(a)pyrene	0
Benzo(b)fluoranthene	0.002
Benzo(k)fluoranthene	0.002
Chrysene	0.002
Indeno(1,2,3-cd)pyrene	0.002
Naphthalene	10
Dissolved Metals (µg/L)	
Antimony	3
Arsenic	25
Magnesium	35000
Manganese	300
Selenium	10
Sodium	20000

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Collectively known as Langan

Project
473 PRESIDENT STREET
BLOCK No. 440, PARTIAL LOT No. 12
BROOKLYN
KINGS NEW YORK

Figure Title
GROUNDWATER SAMPLE ANALYTICAL RESULTS MAP - SVOCs, PESTICIDES, AND METALS

Project No.	Figure No.
170361301	9B
Date: 8/11/2017	
Scale: 1'=30'	
Drawn By: VZ / Checked By: PM	
Submission Date	Sheet 10 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 9B - Groundwater Sample Analytical Results Map - SVOCs, Pesticides, and Metals.dwg Date: 5/16/2019 Time: 10:17 User: mtan Style Table: Langan.stb Layout: ANSIB-BL

Sample ID	IA01_032818
Laboratory ID	L1810650-01
Sampling Date	3/28/2018
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	**2.21**
2,2,4-Trimethylpentane	**1.56**
2-Butanone	**12.8**
Acetone	**20.1**
Benzene	**1.92**
Chloroform	**1.11**
Chloromethane	**1.06**
cis-1,2-Dichloroethene	**0.111**
Cyclohexane	**0.978**
Ethanol	**81.2**
Ethyl Acetate	**1.83**
Ethylbenzene	**10.2**
Heptane	**1.4**
Isopropanol	**5.21**
n-Hexane	**3.84**
o-Xylene	**3.19**
p/m-Xylene	**9.64**
Styrene	**13.2**
Tetrachloroethene	**1.48**
Toluene	**11.2**
Trichloroethene	**9.78**

Sample ID	IA04_032818
Laboratory ID	L1810650-04
Sampling Date	3/28/2018
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	**2.02**
2,2,4-Trimethylpentane	**1.03**
2-Butanone	**8.05**
Acetone	**16.7**
Benzene	**1.71**
Chloroform	**2.17**
Chloromethane	**1.03**
cis-1,2-Dichloroethene	**0.123**
Cyclohexane	**0.709**
Ethanol	**72.2**
Ethyl Acetate	**2.17**
Ethylbenzene	**9.51**
Heptane	**1.07**
Isopropanol	**4.1**
n-Hexane	**2.89**
o-Xylene	**2.94**
p/m-Xylene	**8.82**
Styrene	**12.3**
Tetrachloroethene	**2.81**
Toluene	**10.1**
Trichloroethene	**10.4**

Sample ID	SV04_030817	DUP01_030817
Laboratory ID	17C0348-03	17C0348-04
Sampling Date	3/8/2017	3/8/2017
VOCs (µg/m3)		
1,2,4-Trimethylbenzene	**51**	**45**
1,3,5-Trimethylbenzene	**16**	**14**
2-Butanone	**13**	**38**
Acetone	**30**	**58**
Benzene	**8.4**	**14**
Carbon disulfide	**11**	**10**
Chloroform	**23**	**22**
cis-1,2-Dichloroethylene	**95**	**94**
Cyclohexane	**220**	**210**
Ethyl Benzene	**13**	**13**
n-Heptane	**400**	**400**
n-Hexane	**280**	**270**
o-Xylene	**27**	**27**
p- & m- Xylenes	**57**	**55**
p-Ethyltoluene	**40**	**38**
Tetrachloroethylene	**440**	**390**
Toluene	**18**	**20**
Trichloroethylene	**11000**	**11000**

Sample ID	IA03_032818
Laboratory ID	L1810650-03
Sampling Date	3/28/2018
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	**2.34**
2,2,4-Trimethylpentane	**1.53**
2-Butanone	**12.9**
Acetone	**23.7**
Benzene	**2.36**
Carbon tetrachloride	**0.591**
Chloroform	**1.48**
Chloromethane	**1.48**
cis-1,2-Dichloroethene	**0.218**
Cyclohexane	**1.03**
Dichlorodifluoromethane	**2.79**
Ethanol	**118**
Ethyl Acetate	**2.09**
Ethylbenzene	**15**
Heptane	**1.56**
Isopropanol	**7.1**
n-Hexane	**4.02**
o-Xylene	**4.23**
p/m-Xylene	**13.9**
Styrene	**19.1**
Tetrachloroethene	**1.86**
Toluene	**9.72**
Trichloroethene	**23.9**
Trichlorofluoromethane	**1.6**

Sample ID	SV03_030917
Laboratory ID	17C0424-01
Sampling Date	3/9/2017
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	**33**
1,3,5-Trimethylbenzene	**10**
Acetone	**23**
Benzene	**11**
Carbon disulfide	**10**
Chloroform	**55**
cis-1,2-Dichloroethylene	**38**
Cyclohexane	**42**
Ethyl Benzene	**14**
n-Heptane	**220**
n-Hexane	**89**
o-Xylene	**26**
p- & m- Xylenes	**58**
p-Ethyltoluene	**31**
Tetrachloroethylene	**120**
Toluene	**27**
Trichloroethylene	**39000**

Sample ID	IA05_032818
Laboratory ID	L1810650-05
Sampling Date	3/28/2018
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	**1.04**
2-Butanone	**2.66**
Acetone	**13.1**
Benzene	**1.28**
Carbon tetrachloride	**0.579**
Chloromethane	**1.14**
Dichlorodifluoromethane	**2.24**
Ethanol	**26.6**
Ethylbenzene	**1.61**
Heptane	**0.996**
Isopropanol	**1.72**
n-Hexane	**2.09**
o-Xylene	**1.03**
p/m-Xylene	**2.82**
Styrene	**1.33**
Tetrachloroethene	**0.685**
Toluene	**11.8**
Trichloroethene	**2.9**
Trichlorofluoromethane	**1.33**

Sample ID	SV01_030817
Laboratory ID	17C0348-01
Sampling Date	3/8/2017
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	**54**
1,3,5-Trimethylbenzene	**16**
Acetone	**11**
Ethyl Benzene	**13**
n-Heptane	**11**
o-Xylene	**27**
p- & m- Xylenes	**59**
p-Ethyltoluene	**44**
Tetrachloroethylene	**38**
Toluene	**15**
Trichloroethylene	**450**

Sample ID	IA02_032818
Laboratory ID	L1810650-02
Sampling Date	3/28/2018
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	**2.17**
2,2,4-Trimethylpentane	**1.2**
2-Butanone	**8.55**
Acetone	**19.6**
Benzene	**1.79**
Carbon tetrachloride	**0.503**
Chloroform	**1.42**
Chloromethane	**1.12**
cis-1,2-Dichloroethene	**0.111**
Cyclohexane	**0.84**
Ethanol	**85.9**
Ethyl Acetate	**3.33**
Ethylbenzene	**9.77**
Heptane	**1.17**
Isopropanol	**4.89**
n-Hexane	**3.24**
o-Xylene	**3.11**
p/m-Xylene	**9.38**
Styrene	**13.2**
Tetrachloroethene	**1.96**
Toluene	**9.38**
Trichloroethene	**10.1**

Sample ID	SV02_030817
Laboratory ID	17C0348-02
Sampling Date	3/8/2017
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	**85**
1,3,5-Trimethylbenzene	**25**
Acetone	**170**
Benzene	**8.8**
Carbon disulfide	**7.4**
Ethyl Benzene	**21**
n-Heptane	**36**
o-Xylene	**46**
p- & m- Xylenes	**97**
p-Ethyltoluene	**68**
Tetrachloroethylene	**54**
Toluene	**30**
Trichloroethylene	**470**

Sample ID	SV05_031017
Laboratory ID	17C0463-01
Sampling Date	3/10/2017
VOCs (µg/m3)	
1,4-Dichlorobenzene	**55**
Cyclohexane	**250**
Ethyl Benzene	**17**
n-Heptane	**7900**
o-Xylene	**180**
p- & m- Xylenes	**340**
Tetrachloroethylene	**60**
Toluene	**780**

Sample ID	AA01_030817
Laboratory ID	17C0348-05
Sampling Date	3/8/2017
VOCs µg/m3	
1,2,4-Trimethylbenzene	ND
1,3,5-Trimethylbenzene	ND
1,4-Dichlorobenzene	ND
2-Butanone	1.7
Acetone	4.3
Benzene	0.73
Carbon disulfide	2
Chloroform	ND
cis-1,2-Dichloroethylene	ND
Cyclohexane	ND
Ethyl Benzene	ND
n-Heptane	ND
n-Hexane	0.81
o-Xylene	ND
p- & m- Xylenes	1.2
p-Ethyltoluene	ND
Tetrachloroethylene	1.1
Toluene	2.3
Trichloroethylene	ND

Sample ID	AA02_032818
Laboratory ID	L1810650-06
Sampling Date	3/28/2018
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	ND
2,2,4-Trimethylpentane	ND
2-Butanone	ND
Acetone	7.29
Benzene	0.799
Carbon tetrachloride	0.491
Chloroform	ND
Chloromethane	0.985
cis-1,2-Dichloroethene	ND
Cyclohexane	ND
Dichlorodifluoromethane	2.12
Ethanol	ND
Ethyl Acetate	ND
Ethylbenzene	ND
Heptane	ND
Isopropanol	ND
n-Hexane	0.853
o-Xylene	ND
p/m-Xylene	ND
Styrene	ND
Tetrachloroethene	0.604
Toluene	2.89
Trichloroethene	ND
Trichlorofluoromethane	1.28

Analyte	NYSDOH AGV
VOCs (µg/m3)	
Trichloroethene	2

LEGEND:

- APPROXIMATE BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- APPROXIMATE LOCATION OF INTERIOR WALL
- APPROXIMATE EXTENT OF CELLAR
- APPROXIMATE EXTENT OF BICYCLE REPAIR AND TOUR COMPANY
- SV01 — LANGAN 2017 REMEDIAL INVESTIGATION SUB-SLAB SOIL VAPOR SAMPLE LOCATION
- AA01 — LANGAN 2017 REMEDIAL INVESTIGATION AMBIENT AIR SAMPLE LOCATION
- IA01 — MARCH 2018 INDOOR AIR SAMPLE LOCATION
- AA02 — MARCH 2018 AMBIENT AIR SAMPLE LOCATION

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.
2. SOIL VAPOR POINTS AND INDOOR AIR SAMPLE LOCATIONS WERE MEASURED OFF OF SURVEYED MONITORING WELL LOCATIONS AND ARE APPROXIMATE.
3. ONLY DETECTED VOC CONCENTRATIONS ARE SHOWN IN THE TABLES.
4. INDOOR AIR SAMPLE ANALYTICAL RESULTS ARE COMPARED TO OUTDOOR AMBIENT AIR SAMPLE AA02_032818 AND THE NYSDOH AIR GUIDELINE VALUES (AGVs).
5. SOIL VAPOR SAMPLE ANALYTICAL RESULTS ARE COMPARED TO OUTDOOR AMBIENT AIR SAMPLE AA01_031817.
6. SOIL VAPOR AND INDOOR AIR SAMPLE ANALYTICAL RESULTS ABOVE OUTDOOR AMBIENT CONCENTRATIONS ARE BOLDED.
7. INDOOR AIR SAMPLE ANALYTICAL RESULTS ABOVE NYSDOH AGVs ARE SHADED.
8. VOC = VOLATILE ORGANIC COMPOUND
9. µg/m3 - MICROGRAM PER CUBIC METER
10. ND = NOT DETECTED

PARCEL II
TAX LOT 12 IN BLOCK 440
APPROXIMATE EXTENT OF WAREHOUSE STORAGE SPACE
APPROXIMATE EXTENT OF BICYCLE TOUR COMPANY STORAGE SPACE
APPROXIMATE CELLAR EXTENTS
OPEN AT 1st STORY
ELECTRIC CABLES & CONDUITS ATTACHED TO BLDG.
CLEAR
BRICK
STORY
150'-10" BLDG.
190'
160'
100'
200'
280' TOTAL
2nd EAST
IA01
SV01
IA02
SV02
IA03
SV03
IA04
SV04
IA05
SV05
AA02
AA01
P R E S I D E N T S T R E E T

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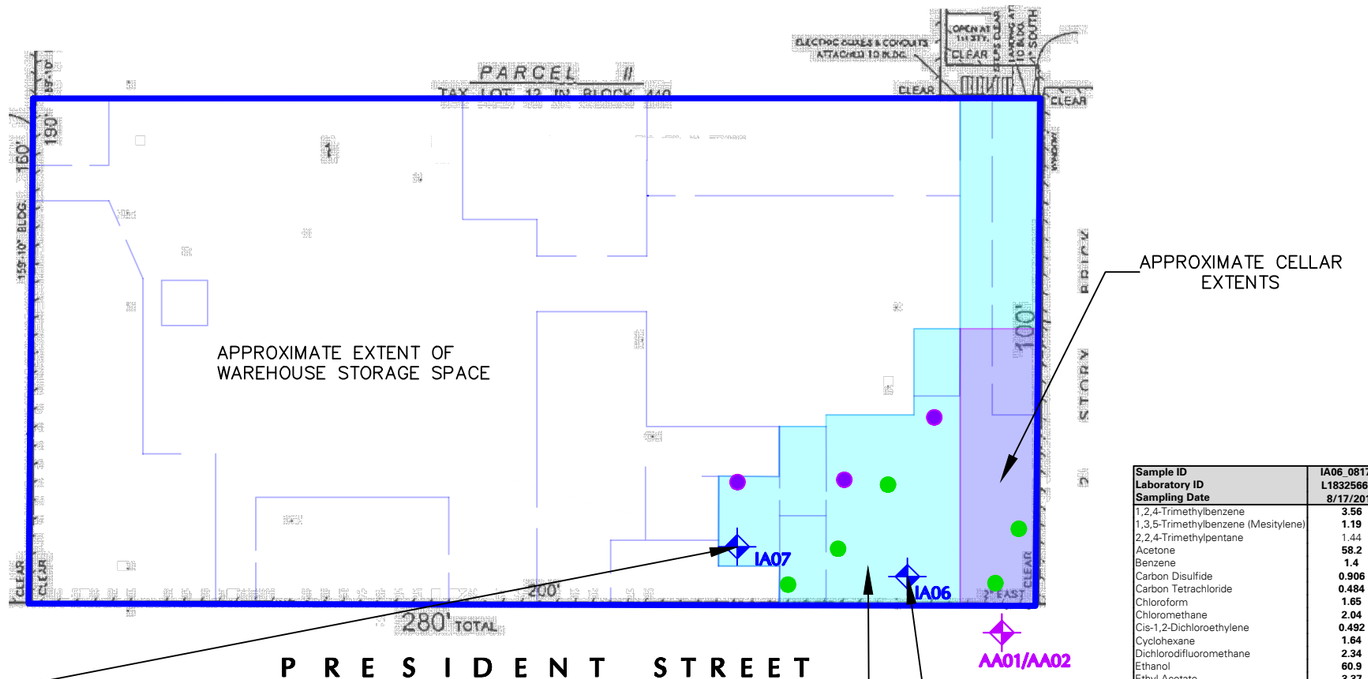
Figure Title
SOIL VAPOR AND INDOOR AIR SAMPLE ANALYTICAL RESULTS MAP

Project No. 170361301
Date 04/10/2018
Scale 1'=30'
Drawn By KWT | Checked By PM
Submission Date

Figure No. 10
Sheet 11 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 10 - Air Sample Analytical Results Map.dwg Date: 5/16/2019 Time: 09:40 User: mtan Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- APPROXIMATE BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- APPROXIMATE LOCATION OF INTERIOR WALLS
- APPROXIMATE EXTENT OF CELLAR
- APPROXIMATE EXTENT OF BICYCLE TOUR COMPANY STORAGE SPACE
- IA06 — MARCH 2018 INDOOR AIR SAMPLE LOCATION
- AA01/AA02 — AUGUST, SEPTEMBER, AND DECEMBER 2018 AMBIENT AIR SAMPLE LOCATION
- APPROXIMATE INDOOR AIR TREATMENT UNIT LOCATION (AUGUST 2018)
- APPROXIMATE INDOOR AIR TREATMENT UNIT LOCATION (NOVEMBER 2018)

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY BY BARTLETT, LUDLAM & DILL ASSOCIATES, DATED AUGUST 14, 2014.
2. INDOOR AIR SAMPLE LOCATIONS WERE MEASURED OFF OF SURVEYED MONITORING WELL LOCATIONS AND ARE APPROXIMATE.
3. ONLY DETECTED VOC CONCENTRATIONS ARE SHOWN IN THE TABLES.
4. INDOOR AIR SAMPLE ANALYTICAL RESULTS ARE COMPARED TO OUTDOOR AMBIENT AIR SAMPLE AA02_081718, AA01_090718, AND AA02_122018, AND THE NYSDOH AIR GUIDELINE VALUES (AGVs).
5. INDOOR AIR SAMPLE ANALYTICAL RESULTS ABOVE OUTDOOR AMBIENT CONCENTRATIONS ARE BOLDED.
6. INDOOR AIR SAMPLE ANALYTICAL RESULTS ABOVE NYSDOH AGVs ARE SHADED.
7. VOC = VOLATILE ORGANIC COMPOUND
8. µg/m3 - MICROGRAM PER CUBIC METER
9. ND = NOT DETECTED

Sample ID Laboratory ID Sampling Date	IA06_081718 L1832566-01 8/17/2018	IA06_090718 L1835562-02 9/7/2018	IA06_122018 L1852832-01 12/20/2018
1,2,4-Trimethylbenzene	**3.56**	1.33	ND
1,3,5-Trimethylbenzene (Mesitylene)	**1.19**	ND	ND
2,2,4-Trimethylpentane	1.44	**1.15**	ND
Acetone	**58.2**	**16.7**	**28.5**
Benzene	**1.4**	**0.776**	1.01
Carbon Disulfide	**0.906**	ND	ND
Carbon Tetrachloride	**0.484**	0.415	0.308
Chloroform	**1.65**	**1.55**	**1.16**
Chloromethane	**2.04**	**1.22**	1.14
Cis-1,2-Dichloroethylene	**0.492**	**0.317**	**0.238**
Cyclohexane	**1.64**	**0.74**	ND
Dichlorodifluoromethane	**2.34**	2.19	**2.71**
Ethanol	**60.9**	**245**	**437**
Ethyl Acetate	**3.37**	ND	ND
Ethylbenzene	**13.2**	**2.97**	ND
Isopropanol	**10.9**	**5.41**	**154**
M,P-Xylene	**20.5**	**5.04**	ND
Methyl Ethyl Ketone (2-Butanone)	**5.16**	**3.3**	ND
n-Heptane	**1.64**	ND	0.951
n-Hexane	**3.51**	**1.72**	**2.57**
o-Xylene (1,2-Dimethylbenzene)	**7.69**	**1.94**	ND
Styrene	**20.2**	**4.68**	ND
Tetrachloroethene (PCE)	**1.14**	**1.27**	1.8
Toluene	**8.71**	**3.18**	3.21
Trichloroethene (TCE)	**31.4**	**19.6**	**12.6**
Trichlorofluoromethane	**1.6**	1.19	1.48

Sample ID Laboratory ID Sampling Date	AA02_081718 L1832566-03 8/17/2018	AA01_090718 L1835562-01 8/17/2018	AA02_122018 L1852832-03 12/20/2018
1,2,4-Trimethylbenzene	2.27	0.983	1.22
1,3,5-Trimethylbenzene (Mesitylene)	0.983	0.983	0.983
2,2,4-Trimethylpentane	0.934	1.51	1.6
Acetone	15.9	7.79	13.7
Benzene	0.732	0.786	2.38
Carbon Disulfide	0.623	0.623	0.623
Carbon Tetrachloride	0.428	0.459	0.516
Chloroform	0.977	0.977	0.977
Chloromethane	0.96	0.973	1.26
Cis-1,2-Dichloroethylene	0.079	0.079	0.079
Cyclohexane	0.688	0.688	0.85
Dichlorodifluoromethane	2.3	2.21	2.02
Ethanol	9.42	15.8	23.9
Ethyl Acetate	1.8	1.8	1.8
Ethylbenzene	0.869	0.869	0.93
Isopropanol	1.57	1.55	4.74
M,P-Xylene	1.94	1.74	3.09
Methyl Ethyl Ketone (2-Butanone)	2.37	1.47	1.47
n-Heptane	0.82	0.82	1.4
n-Hexane	0.93	1.02	1.88
o-Xylene (1,2-Dimethylbenzene)	0.869	0.869	1.04
Styrene	0.852	0.852	0.852
Tetrachloroethene (PCE)	0.576	0.678	3.19
Toluene	2.92	2.68	6.71
Trichloroethene (TCE)	0.548	1.11	0.107
Trichlorofluoromethane	1.23	1.17	1.55

Sample ID Laboratory ID Sampling Date	IA07_081718 L1832566-02 8/17/2018	IA07_090718 L1835562-03 9/7/2018	IA07_122018 L1852832-02 12/20/2018
1,2,4-Trimethylbenzene	**1**	1.04	ND
Acetone	**16.7**	8.88	**28.7**
Benzene	ND	ND	0.984
Carbon Disulfide	**0.813**	ND	ND
Carbon Tetrachloride	0.333	**0.447**	0.308
Chloroform	**2.17**	**2.28**	**1.62**
Chloromethane	**2.13**	**1.17**	1.06
Cis-1,2-Dichloroethylene	**0.274**	**0.278**	**0.301**
Cyclohexane	**0.83**	ND	ND
Dichlorodifluoromethane	**2.34**	2.04	**2.2**
Ethanol	**79.5**	**135**	**511**
Ethylbenzene	**3.81**	**2.03**	ND
Isopropanol	**8.5**	**5.14**	**143**
M,P-Xylene	**6.25**	**3.74**	ND
Methyl Ethyl Ketone (2-Butanone)	**2.23**	1.92	ND
n-Heptane	ND	ND	0.926
n-Hexane	**1.19**	**1.18**	**2.26**
o-Xylene (1,2-Dimethylbenzene)	**2.48**	**1.42**	ND
Styrene	**5.11**	**3.3**	ND
Tetrachloroethene (PCE)	0.57	**1.57**	1.85
Toluene	**3.15**	2.37	2.82
Trichloroethene (TCE)	**9.03**	**14.1**	**17.4**
Trichlorofluoromethane	**1.79**	ND	**1.6**

30 0 15 30
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Project
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BLOCK No. 440, PARTIAL LOT No. 12
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KINGS **NEW YORK**

Figure Title
INDOOR AIR DOCUMENTATION SAMPLE ANALYTICAL RESULTS MAP

Project No. 170361301
Date 05/17/2019
Scale 1'=30'
Drawn By VZ | Checked By PM
Submission Date

Figure No. **11**
Sheet 12 of 12

Filename: \\Langan.com\data\NYC\data3\170361301\Cadd Data - 170361301\SheetFiles\Environmental\RIR\Figure 11 - Indoor Air Confirmation Sample Analytical Results Map.dwg Date: 5/20/2019 Time: 12:36 User: vzuluaga Style Table: Langan.stb Layout: ANSIB-BL

Table 1
Sample Summary
473 President Street
Brooklyn, New York
Langan Project No. 170361301
BCP ID No. C224220

Sample Location	Sample ID	Sampling Depth (feet bgs)	Sample Date	Area of Concern (AOC)/Rationale	Max. PID Reading (ppm)	Analysis
SOIL						
SB06	SB06_2-3	2-3	3/6/2017	AOC-1	0.0	Part 375 VOCs, SVOCs, Metals, Pesticides, Hexavalent Chromium, Cyanide
	SB06_9-10	9-10	3/6/2017	AOC-3	0.0	
	SB06_14-15	14-15	3/6/2017		1.0	
SB06D	SB06D_23-25	23-25	4/28/2017	AOC-5	0.0	Part 375/TCL VOCs
	SODUP01_042817	23-25	4/28/2017			
	SB06D_20-25	20-25	4/28/2017		0.0	Ammonia, Nitrate, Nitrite, Total Phosphate, Sulfate, Alkalinity, BOD, COD, Grain Size, Total Iron, Total Manganese, TOC
SB07	SB07_4-5	4-5	3/7/2017	AOC-1	0.0	Part 375/TCL VOCs, SVOCs, Metals, Pesticides, Hexavalent Chromium, Cyanide
	SB07_13-14	13-14	3/7/2017	AOC-3	1326	
	SB07_23-24	23-24	3/7/2017		4195	
	SODUP01_042817	23-24	3/7/2017			
SB08	SB08_1-2	1-2	3/6/2017	AOC-1/AOC-4	0.0	
	SB08_7-8	7-8	3/6/2017	AOC-4	0.025	
	SB08_8-9	8-9	3/6/2017		0.025	
SB09	SB09_1-2	1-2	3/8/2017	AOC-1	0.0	
	SB09_10-11	10-11	3/8/2017		0.0	
SB10	SB10_1-2	1-2	3/9/2017	AOC-1/AOC-2	0.0	
	SB10_6-7	6-7	3/9/2017		35	
	SB10_9-10	9-10	3/9/2017	AOC-2	0.0	
SB11	SB11_2-4	2-4	3/10/2017	AOC-1/AOC-2	0.0	
	SB11_15-16	15-16	3/10/2017	AOC-2	0.0	
SB12	SB12_1-2	1-2	3/8/2017	AOC-1	0.0	
	SB12_9-10	9-10	3/8/2017		0.0	
SB12D	SB12D_23-25	23-25	4/29/2017	AOC-5	0.0	Part 375/TCL VOCs
	SB12D_20-25	20-25	4/29/2017		0.0	Ammonia, Nitrate, Nitrite, Total Phosphate, Sulfate, Alkalinity, BOD, COD, Grain Size, Total Iron, Total Manganese, TOC
SB13	SB13_1-2	1-2	3/6/2017	AOC-1	0.025	Part 375/TCL VOCs, SVOCs, Metals, Pesticides, Hexavalent Chromium, Cyanide
	SB13_9-10	9-10	3/6/2017		0.0	
SB14	SB14_1-2	1-2	3/8/2017	AOC-1	0.2	
	SB14_10-11	10-11	3/8/2017		0.1	
SB15	SB15_1-2	1-2	3/8/2017	AOC-1	0.0	
	SB15_7-8	7-8	3/8/2017		0.0	
	SB15_10-11	10-11	3/8/3017		0.1	
SB15D	SB15D_23-25	23-25	4/28/2017	AOC-5	0.0	Part 375/TCL VOCs
	SB15D_20-25	20-25	4/28/2017		0.0	Ammonia, Nitrate, Nitrite, Total Phosphate, Sulfate, Alkalinity, BOD, COD, Grain Size, Total Iron, Total Manganese, TOC
SB16	SB16_1-2	1-2	3/9/2017	AOC-1	0.0	Part 375/TCL VOCs, SVOCs, Metals, Pesticides, Hexavalent Chromium, Cyanide
	SB16_9-11	9-11	3/9/3017	AOC-1/AOC-3	0.0	
	SB16_14-15	14-15	3/9/2017		0.0	
SB17	SB17_1-2	1-2	3/10/2017	AOC-1	0.1	
	SB17_7-8	7-8	3/10/2017		0.2	
	SB17_15-16	15-16	3/10/2017		0.0	
SB18	SB18_10-11	10-11	3/10/2017	AOC-3	475	
	SB18_23-24	23-24	3/10/2017		98	
SB19	SB19_10-11	10-11	3/10/2017	AOC-3	7	
	SB19_17-18	17-18	3/10/2017		1177	
	SB19_20-21	20-21	3/10/2017		10.3	
	DUP02_031017	20-21	3/10/2017			
SB20D	SB20D_0-2	0-2	4/27/2017	AOC-3/AOC-5	0.0	
	SB20D_17-19	17-19	4/27/2017		1121	
	SB20D_23-25	23-25	4/27/2017		17.2	
	SB20D_30-32	30-32	4/27/2017		0.0	
	SB20D_14-19	14-19	4/27/2017	AOC-3/AOC-5	1121	Ammonia, Nitrate, Nitrite, Total Phosphate, Sulfate, Alkalinity, BOD, COD, Grain Size, Total Iron, Total Manganese, TOC
	SB20D_20-30	20-30	4/27/2017		17.2	
QA/QC	TB01_030617	N/A	3/6/2017	QA/QC	N/A	Part 375/TCL VOCs
	SOFB01_030817		3/8/2017			Part 375/TCL VOCs, SVOCs, Metals, Pesticides, Hexavalent Chromium, Cyanide
	SOFB01_031017		3/10/2017			
	SOTB01_031017		3/10/2017			Part 375/TCL VOCs
	TB01_042717		4/27/2017			Part 375/TCL VOCs
GROUNDWATER						
MW06	MW06_031617	8-18	3/16/2017	AOC-3	2.4	TCL VOC, TCL SVOC, TAL Metals (dissolved), Hexavalent Chromium, Pesticides
MW06D	MW06D_050617	20-25	5/6/2017	AOC-5	4.7	TCL VOC, DHC, ammonia, nitrate, total phosphate, sulfate
MW07	MW07_032217	19-24	3/22/2017	AOC-3	548	TCL VOC, TCL SVOC, TAL Metals (dissolved), Hexavalent Chromium, Pesticides
MW08	MW08_031617	6-16	3/16/2017	AOC-4	1.6	TCL VOC, TCL SVOC, TAL Metals (dissolved), Hexavalent Chromium, Pesticides
	GWDUP01_031617		3/16/2017	QA/QC		
MW09	MW09_032217	6-16	3/22/2017	Site Coverage	0	TCL VOC, TCL SVOC, TAL Metals (dissolved), Hexavalent Chromium, Pesticides
MW10	MW10_032217	0-8	3/22/2017	AOC-2	0.1	
MW12	MW12_031617	8-18	3/16/2017	Site Coverage	0.6	
MW12D	MW12D_050617	20-25	5/6/2017	AOC-5	8.8	TCL VOC, DHC, ammonia, nitrate, total phosphate, sulfate
	GWDUP01_050617		5/6/2017	QA/QC		
MW15D	MW15D_050617	20-25	5/6/2017	AOC-5	25.2	
MW18	MW18_032217	8-18	3/22/2017	AOC-3	31.4	TCL VOC, TCL SVOC, TAL Metals (dissolved), Hexavalent Chromium, Pesticides
MW20D	MW20D_050617	20-30	5/6/2017	AOC-5	440	TCL VOC, DHC, ammonia, nitrate, total phosphate, sulfate
MW20S	MW20S_050617	8-18	5/6/2017	AOC-3/AOC-5	630	
QA/QC	GWTB01_031617	N/A	3/16/2017	QA/QC	N/A	TCL VOCs
	GWFB01_031617		3/16/2017			TCL VOC, TCL SVOC, Pesticides
	GWFB02_032217		3/22/2017			TAL Metals (dissolved)
	GWFB01_050617		5/6/2017			TCL VOCs
	GWTB01_050617		5/6/2017			
SOIL VAPOR						
SV01	SV01_030817	6	3/8/2017	AOC-3/AOC-5	1.3	TO-15 VOCs
SV02	SV02_030817	5	3/8/2017	AOC-4/AOC-5	0.8	
SV03	SV03_030917	5	3/9/2017	AOC-5/Site Coverage	19.8	
SV04	SV04_030817	5	3/8/2017	AOC-5/Site Coverage	0.0	
	DUP01_030817	5	3/8/2017	QA/QC		
SV05	SV05_031017	5	3/10/2017	AOC-2/AOC-5	0.1	
AA01	AA01_030817	N/A	3/8/2017	Outdoor Ambient Air	0.0	
INDOOR AIR						
IA01	IA01_032818	N/A	3/28/2018	AOC 5	0.0	TO-15 VOCs
IA02	IA02_032818		3/28/2018	AOC 5		
IA03	IA03_032818		3/28/2018	AOC 5		
IA04	IA04_032818		3/28/2018	AOC 5		
IA05	IA05_032818		3/28/2018	AOC 5		
INDOOR AIR CONFIRMATION SAMPLES						
IA06	IA06_081718	N/A	8/17/2018	Confirmation Sampling Event #1	0.0	TO-15 VOCs
IA07	IA07_081718	N/A	8/17/2018			
IA06	IA06_090718	N/A	9/7/2018	Confirmation Sampling Event #2		
IA07	IA07_090718	N/A	9/7/2018			
IA06	IA06_122018	N/A	12/20/2018	Confirmation Sampling Event #3		
IA07	IA07_122018	N/A	12/20/2018			

Notes:

1. TCL = Target Compound List
2. TAL = Target Analyte List
3. VOC = volatile organic compound
4. SVOC = semivolatile organic compounds
5. PCB = polychlorinated biphenyl
6. TOC = total organic carbon
7. COD = chemical oxygen demand
8. BOD = biological oxygen demand
9. TCE = trichloroethylene
10. bgs = below grade surface
11. PID = photoionization detector
12. ppm = parts per million
13. DHC = Dehalococcoides
14. N/A = Not Applicable
15. QA/QC = Quality Assurance/Quality control
16. Dissolved metals were field filtered
17. Indoor air confirmation sampling events were conducted as part of the NYSDEC-approved Interim Remedial Measures Work Plan, dated July 19, 2018.

AOC-1: Historic Fill (Site-Wide)
AOC-2: Petroleum Spill in the Southeastern Portion of the Site
AOC-3: Potential UST - Northwestern Portion of the Site
AOC-4: Potential UST - Southwestern Portion of the Site
AOC-5: Chlorinated Volatile Organic Compound (CVOC) Impacts to Soil, Groundwater, Soil Vapor, and Indoor Air (Site-Wide)

TABLES

Table 2
Groundwater Elevation Data Summary
473 President Street
Brooklyn, NY
Langan Project No.: 170361301
BCP Site ID: C224220

Well ID	Date/Time	Depth to Water (feet bgs)	Top of Casing Elevation[1] (feet)	Water Elevation[1] (feet)
MW06	3/22/2017	10.56	12.97	2.41
	6/23/2017	10.36		2.61
MW06D	3/22/2017	NI	12.79	NI
	6/23/2017	10.28		2.51
MW07	3/22/2017	10.34	13.02	2.68
	6/23/2017	10.37		2.65
MW08	3/22/2017	8.84	11.00	2.16
	6/23/2017	8.50		2.50
MW09	3/22/2017	14.21	12.91	-1.30
	6/23/2017	10.25		2.66
MW10	3/22/2017	2.91	6.03	3.12
	6/23/2017	NA		NA
MW12	3/22/2017	9.84	12.22	2.38
	6/23/2017	9.59		2.63
MW12D	3/22/2017	NI	12.12	NI
	6/23/2017	9.48		2.64
MW15D	3/22/2017	NI	12.77	NI
	6/23/2017	10.15		2.62
MW18	3/22/2017	10.67	12.98	2.31
	6/23/2017	10.37		2.61
MW20S	3/22/2017	NI	12.97	NI
	6/23/2017	10.25		2.72
MW20D	3/22/2017	NI	12.98	NI
	6/23/2017	10.38		2.60

Notes:
1. Elevations are relative to the North American Vertical Datum of 1988 (NAVD88).
2. Water Elevation = Top of Casing Elevation - Depth to Water.
3. bgs = below grade surface.
4. NA = not accessible
5. NI = not installed

Table 3
Soil Sample Analytical Detection Summary
473 President Street
Brooklyn, New York
Langan Project No. 170361301
BCP Site ID: C224220

Sample ID	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives Commercial	SB06_2-3		SB06_9-10		SB06_14-15		DUPLICATE SB06D_23-25		DUPLICATE SODUP01_042817		SB07_4-5		SB07_13-14		DUPLICATE SB07_23-24		DUPLICATE DUP01_030717		SB08_1-2		SB08_7-8		SB08_8-9		SB09_1-2		SB09_10-11		SB10_1-2		SB10_6-7		SB10_9-10	
Laboratory ID			17C0226-03		17C0226-04		17C0226-05		L1713775-03		L1713775-04		17C0278-01		17C0278-02		17C0278-03		17C0278-04		17C0226-06		17C0226-07		17C0226-08		17C0343-11		17C0343-10		17C0418-05		17C0418-01		17C0418-02	
Sampling Date			3/6/2017		3/6/2017		3/6/2017		4/28/2017		4/28/2017		3/7/2017		3/7/2017		3/7/2017		3/7/2017		3/6/2017		3/6/2017		3/6/2017		3/8/2017		3/8/2017		3/9/2017		3/9/2017		3/9/2017	
Sample Depth (feet bgs)			2-3		9-10		14-15		23-25		23-25		4-5		13-14		23-24		23-24		1-2		7-8		8-9		1-2		10-11		1-2		6-7		9-10	
Volatile Organic Compounds (mg/kg)																																				
1,2,4-Trimethylbenzene	3.6	190	0.0044	U	0.0022	U	0.0019	U	0.0053	U	0.0048	U	0.0024	J	0.38	U	**100**	D	**68**	DE	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
1,2,4,5-Tetramethylbenzene	~	~	NA		NA		NA		0.0042	U	0.0038	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
1,3,5-Trimethylbenzene	8.4	190	0.0044	U	0.0022	U	0.0019	U	0.0053	U	0.0048	U	0.0024	U	0.38	U	**28**	D	**29**	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
2-Butanone	0.12	500	0.0044	U	0.0022	U	0.013		0.011	U	0.0096	U	0.0024	U	*0.38*	U	*0.24*	U	*0.49*	U	0.003	U	0.002	U	0.0021	U	*0.3*	U	0.0036		0.0036	U	0.0044	U	0.0022	U
4-Methyl-2-pentanone	~	~	0.0044	U	0.0022	U	0.0019	U	0.011	U	0.0096	U	0.0024	U	0.38	U	0.24	U	6.4	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	U	0.0044	U	0.0022	U
Acetone	0.05	500	0.012	J	0.0045	U	0.05		0.003	J	0.0059	J	0.0067	J	*0.76*	U	*0.47*	U	*0.98*	U	0.006	U	0.0044	J	0.0042	U	*0.6*	U	0.019		0.035		0.043		0.0043	U
Benzene	0.06	44	0.0044	U	0.0022	U	0.0019	U	0.0011	U	0.00096	U	0.0024	U	**0.55**	JD	*0.24*	U	*0.49*	U	0.003	U	0.002	U	0.0021	U	*0.3*	U	0.0013	U	0.0036	U	0.0044	U	0.0022	U
Carbon disulfide	~	~	0.0044	U	0.0022	U	0.0019	U	0.011	U	0.0096	U	0.0024	U	0.38	U	0.24	U	0.49	U	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	U	0.0044	U	0.0022	U
Chloroform	0.37	350	0.0044	U	0.0022	U	0.0019	U	0.0016	U	0.0014	U	0.0024	U	*0.38*	U	0.24	U	*0.49*	U	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0071	J	0.0044	U	0.0022	U
cis-1,2-Dichloroethylene	0.25	500	0.0044	U	0.0022	U	0.0019	U	0.00067	J	0.00096	U	0.0024	U	*0.38*	U	**3.7**	D	**0.57**	JD	0.003	U	0.002	U	0.0021	U	*0.3*	U	0.0013	U	0.0036	U	0.0044	U	0.0022	U
Cyclohexane	~	~	0.0044	U	0.0022	U	0.011		NA		NA		0.0024	U	11	DE	11	DE	11	DE	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	U	0.0044	U	0.0022	U
Ethyl Benzene	1	390	0.0044	U	0.0022	U	0.0019	U	0.0011	U	0.00096	U	0.0024	U	**2.2**	D	**31**	D	**32**	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
Isopropylbenzene	~	~	0.0044	U	0.0022	U	0.0019	U	0.0011	U	0.00096	U	0.0024	U	14	D	8.7	D	9.6	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
Methylcyclohexane	~	~	0.0044	U	0.0022	U	0.021		NA		NA		0.0034	J	230	D	120	D	160	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.01		0.0022	U
Naphthalene	12	500	NA		NA		NA		0.0053	U	0.00036	J	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
n-Butylbenzene	12	500	0.0044	U	0.0022	U	0.0019	U	0.0011	U	0.00096	U	0.0024	U	11	D	10	D	11	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
n-Propylbenzene	3.9	500	0.0044	U	0.0022	U	0.0019	U	0.0011	U	0.00096	U	0.0024	U	**22**	D	**17**	DE	**17**	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
o-Xylene	~	~	0.0044	U	0.0022	U	0.0019	U	0.0021	U	0.0019	U	0.0024	U	0.38	U	29	D	42	JD	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
p- & m- Xylenes	~	~	0.0089	U	0.0045	U	0.0038	U	0.0021	U	0.0019	U	0.0047	U	0.76	U	140	D	200	D	0.006	U	0.0041	U	0.0042	U	0.6	U	0.0025	U	0.0072	R	0.0088	U	0.0043	U
p-Diethylbenzene	~	~	NA		NA		NA		0.0042	U	0.0038	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
p-Ethyltoluene	~	~	NA		NA		NA		0.0042	U	0.0038	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
p-Isopropyltoluene	~	~	0.0044	U	0.0022	U	0.0019	U	0.0011	U	0.00096	U	0.0024	U	0.38	U	5	D	5.2	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	U	0.0044	U	0.0022	U
sec-Butylbenzene	11	500	0.0044	U	0.0022	U	0.0019	U	0.0011	U	0.00096	U	0.0024	U	5.8	D	3.4	D	4	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
tert-Butylbenzene	5.9	500	0.0044	U	0.0022	U	0.0019	U	0.0053	U	0.0048	U	0.0024	U	0.68	JD	0.24	U	0.49	U	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
Tetrachloroethylene	1.3	150	0.0044	U	0.0022	U	0.0019	U	0.0011	U	0.00096	U	0.0024	U	0.38	U	0.24	U	0.49	U	0.003	U	0.002	U	0.0021	U	0.92	D	0.0013	U	0.0036	R	0.0044	U	0.0022	U
Toluene	0.7	500	0.0044	U	0.0022	U	0.0019	U	0.0016	U	0.00021	J	0.0024	U	0.38	U	**5.3**	D	**5.5**	D	0.003	U	0.002	U	0.0021	U	0.3	U	0.0013	U	0.0036	R	0.0044	U	0.0022	U
Trichloroethylene	0.47	200	0.0074	J	0.0022	U	0.0019	U	0.0086		0.0022		0.0047	J	0.38	U	*0.24*	U	*0.49*	U	0.012		0.0086		0.0021	U	**5.1**	D	0.0013	U	0.015	J	0.0044	U	0.0022	U
Vinyl Chloride	0.02	13	0.0044	U	0.0022	U	0.0019	U	0.0021	U	0.0019	U	0.0024	U	*0.38*	U	*0.24*	U	*0.49*	U	0.003	U	0.002	U	0.0021	U	*0.3*	U	0.0013	U	0.0036	U	0.0044	U	0.0022	U
Xylenes, Total	0.26	500	0.013	U	0.0067	U	0.0057	U	0.0021	U	0.0019	U	0.0071	U	*1.1*	U	**170**	D	**250**	D	0.009	U	0.0061	U	0.0063	U	*0.89*	U	0.0038	U	0.011	R	0.013	U	0.0065	U
Semivolatile Organic Compounds (mg/kg)																																				
1,1-Biphenyl	~	~	0.0485	U	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	0.358	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
2,4-Dimethylphenol	~	~	0.0485	U	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	0.149	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
2-Methylnaphthalene	~	~	0.0781	JD	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.487	D	0.647	D	1.39	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.204	D	0.126	D	0.0487	U
2-Methylphenol	0.33	500	0.0485	U	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	0.0886	JD	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
3- & 4-Methylphenols	~	~	0.0485	U	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	0.195	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Acenaphthene	20	500	0.177	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	1.13	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Acenaphthylene	100	500	0.0485	U	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	1.04	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Anthracene	100	500	0.168	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	1.94	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Benzaldehyde	~	~	0.0485	U	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	0.0606	JD	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Benzo(a)anthracene	1	5.6	0.511	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	**5.9**	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Benzo(a)pyrene	1	1	0.521	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	**7.05**	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0857	JD	0.0487	U
Benzo(b)fluoranthene	1	5.6	0.378	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	**4.89**	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0585	JD	0.0487	U
Benzo(g,h,i)perylene	100	500	0.446	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	5.33	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Benzo(k)fluoranthene	0.8	56	0.453	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	**5.71**	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0609	JD	0.0487	U
Bis(2-ethylhexyl)phthalate	~	~	0.0696	JD	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	0.0487	U	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Carbazole	~	~	0.239	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	1.7	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Chrysene	1	56	0.597	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.054	JD	**6.28**	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0982	D	0.0502	U	0.0487	U
Dibenzo(a,h)anthracene	0.33	0.56	0.172	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	**1.96**	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	UJ	0.0502	U	0.0487	U
Dibenzofuran	7	350	0.0719	JD	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	2.03	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Fluoranthene	100	500	1.39	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.122	D	0.112	D	15.3	DE	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.238	D	0.0487	U
Fluorene	30	500	0.0843	JD	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	2.06	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	U	0.0502	U	0.0487	U
Indeno(1,2,3-cd)pyrene	0.5	5.6	0.349	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0489	U	0.0491	U	**4.44**	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0453	UJ	0.0502	U	0.0487	U
Naphthalene	12	500	0.109	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.232	D	1.68	D	2.29	D	3.11	DE	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.0542	JD	0.0502	U	0.0487	U
Phenanthrene	100	500	1.31	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.099	D	0.129	D	11.8	D	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.163	D	0.0502	U	0.0487	U
Pyrene	100	500	1.07	D	0.0471	U	0.0581	U	NA		NA		0.0479	U	0.0569	U	0.0888	JD	0.103	D	14.8	DE	0.0492	U	0.0497	U	0.0471	U	0.0519	U	0.112	D	0.424	D	0.0487	U
Pesticides (mg/kg)																																				
4,4'-DDT	0.0033	47	0.00191	U	0.00186	U	0.00229	U	NA		NA		0.00189	U	0.00225	U	0.00193	U	0.00194	U	0.00192	U	0.00194	U	0.00196	U	0.00186	U	0.00205	U	0.00179	U	0.00198	U	0.00192	U
alpha-Chlordane	0.094	24	0.00191	U	0.00186	U	0.00229	U	NA		NA		0.00189	U	0.00225	U	0.00193	U	0.00194	U	0.00192	U	0.00194	U	0.00196	U	0.00186	U	0.00205	U	0.00179	U	0.00198	U	0.00192	U
Chlordane, total	~	~	0.0383	U	0.0372	U	0.0458	U	NA		NA		0.0379	U	0.045	U	0.0386	U	0.0387	U	0.0385	U	0.0389	U	0.0393	U	0.0372	U	0.041	U	0.0357	U	0.0397	U	0.0384	U
gamma-Chlordane	~	~	0.00191	U	0.00186	U	0.00229	U	NA		NA		0.00189	U	0.00225	U	0.00193	U	0.00194	U	0.00192	U	0.00194	U	0.00196	U	0.00186	U	0.00205	U	0.00179	U	0.00198	U	0.00192	U
Heptachlor	0.042	15	0.00191	U	0.00186	U	0.00229	U	NA		NA		0.00189	U	0.00225	U	0.00193	U	0.00194	U	0.00192	U	0.00194	U	0.00196	U	0.00186	U	0.00205	U	0.00179	U	0.00198	U	0.00192	U
Metals (mg/kg)																																				
Aluminum	~	~	5990	B	10100	B	17400	B	NA		NA		5600		13000		4790		4990		5490	B	7670	B	5100	B	1480		9050		729		5200		5770	
Antimony	~	~	0.58	U	0.563	U	0.694	U	NA		NA		0.573	U	0.681	U	0.584	U	0.587	U	0.583	U	0.589	U	0.595	U	0.563	U	0.621	U	0.542	U	0.601	U	0.582	U
Arsenic	13	16	5.64		2.79		5.92		NA		NA		12.8		5.25		2.57		2.28		6.71		3.88		4.14		3.92		3.48		5.39		**14.8**		**16.2**	
Barium	350	400	46.7		31.6		66.2		NA		NA		193		44.4		28.6		27.8		104		66		14.2		20.4		43.8		63.8		24.4		17.3	
Beryllium	7.2	590	0.298		0.453		1.05		NA		NA		0.115	U	0.369		0.117	U	0.117	U	0.298		0.41		0.368		0.301		0.643		0.555		0.12	U	0.116	U
Cadmium	2.5	9.3	0.348	U	0.338	U	0.417	U	NA		NA		0.43		0.409	U	0.351	U	0.352	U	0.35	U	0.353	U	0.357	U	0.338	U	0.373	U	0.325	U	0.361	U	0.349	U
Calcium	~	~	61800		1680		1690		NA		NA		20600		1040		334		336		19500		1400		429		2620		897		1650		2270		493	
Chromium, Hexavalent	1	400	**1.07**		0.563	U	0.694	U	NA		NA		**1.79**		0.681	U	0.584	U	0.587	U	0.583	U	0.589	U	0.595	U	0.563	U	0.621	U	0.542	U	0.601	U	0.582	U
Chromium, Trivalent	30	1500	11.73		18.7		16.9		NA		NA		10.41		13.8		7.86		7.55		24.7		11.6		8.61		4.31		11.7		1.58		10.9		10.4	
Cobalt	~	~	4.34		6.12		7.27		NA		NA		5.69		6.89		3.53		3.46		6.3		5.12		5.46		4.13		5.77		4.59		5.23		4.9	
Copper	50	270	18.7		10.7		9.47		NA		NA		32.4		9.17		8.16		8.3		**50.7**		12		5.69		17.3		9.22		14.2		6.96		7.92	
Iron	~	~	13900		14900		13200		NA		NA		40400	BD	11100		9350		9610		16200		14100		12100		3230		12200		3210		9340		9990	
Lead	63	1000	24.5		5.99		8.2		NA		NA		**632**		16.9		3.24		3.3		**274**		**89.1**		4.77		13.7		16.8		3.75		7.79		6.78	
Magnesium	~	~	2810		2680		2450		NA		NA		2140		1990		1500		1500		2380		1520		1370		254		1520		257		1630		1520	
Manganese	1600	10000	192		278		101		NA		NA		230		105		127		125		292		244		284		26.3		275		16.8		103		106	
Mercury	0.18	2.8	**0.194**		0.0624		0.044		NA		NA		**0.338**		0.0409	U	0.0351	U	0.0352	U	**1.91**		**0.414**		0.0357	U	0.0887		0.0396		0.0654		0.0828		0.0349	U
Nickel	30	310	16.5		19.8		18.7		NA		NA		19.9		14.2		11.7		11.7		21.2		13		9.27		12.3		13.3		5.56		16.6		13.3	
Potassium	~	~	1580		960		983		NA		NA		715		807		673		715		1180		867		844		411		424		122		435		480	
Selenium	3.9	1500	1.16	U	1.13	U	1.39	U	NA		NA		**5.32**		1.94		1.17	U	1.17	U	1.23		1.18	U	1.19	U	1.13	U	1.55		1.08	UJ	1.2	U	1.16	U
Sodium	~	~	570		126		149		NA		NA		124		178		65		64.3		437		255		102		242		83.8		104		108		101	
Vanadium	~	~	26		21.2		23.4		NA		NA		14.4		18.4		10.9		11.3		31.2		17		15.2		8.17		15.6		4.12		11.2		15.4	
Zinc	109	10000	29.1		25.4		38.8		NA		NA		**133**		30.8		21.1		23.3		**125**		41.3		22		14.5		26.9		12		20.2		19.1	

NOTES:

1. Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the official compilation of New York Codes, Rules and Regulation (NYCRR) Part 375 Unrestricted Use Soil Cleanup Objective (SCOs) and Restricted Commercial Use SCOs
2. Only compounds with detections are shown in the table.
3. NYSDEC Part 375 Unrestricted Use SCO exceedances are bolded.
4. NYSDEC Part 375 Restricted Commercial Use SCO exceedances are shaded and bolded
5. Reporting limits for undetected results above NYSDEC Unrestricted Use SCOs are italicized
6. mg/kg = milligrams per kilogram
7. ~ = no regulatory limit has been established for this analyte
8. DUP01_030717 is a duplicate sample of SB07_23-24
9. DUP02_031017 is a duplicate sample of SB19_20-21
10. SODUP01_042817 is a duplicate of SB6D_23-25
11. bgs = below grade surface
12. NA = not analyzed

QUALIFIERS:

J = analyte detected at or above the MDL (method detection Limit) but below the RL (Reporting Limit). Result in an estimated concentration
U = analyte not detected at or above the level indicated
P = The Relative Percent Difference (RPD) between the results for two columns exceeds the method-specified criteria
B = The analyte was detected above the reporting limit in the associated methods blank.
D = Result is from an analysis that required a dilution

Table 3
Soil Sample Analytical Detection Summary
473 President Street
Brooklyn, New York
Langan Project No. 170361301
BCP Site ID: C224220

Sample ID Laboratory ID Sampling Date Sample Depth (feet bgs)	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives Commercial	SB11_2-4 17C0464-04 3/10/2017 2-4		SB11_15-16 17C0464-03 3/10/2017 15-16		SB12_1-2 17C0343-12 3/8/2017 1-2		SB12_9-10 17C0343-13 3/8/2017 9-10		SB12D_23-25 L1713789-02 4/29/2017 23-25		SB13_1-2 17C0226-01 3/6/2017 1-2		SB13_9-10 17C0226-02 3/6/2017 9-10		SB14_1-2 17C0343-08 3/8/2017 1-2		SB14_10-11 17C0343-09 3/8/2017 10-11		SB15_1-2 17C0343-05 3/8/2017 1-2		SB15_7-8 17C0343-06 3/8/2017 7-8		SB15_10-11 17C0343-07 3/8/2017 10-11		SB15D_23-25 L1713775-01 4/28/2017 23-25		SB16_1-2 17C0418-03 3/9/2017 1-2		SB16_9-11 17C0418-04 3/9/2017 9-11		SB16_14-15 17C0418-06 3/9/2017 14-15	
Volatile Organic Compounds (mg/kg)																																				
1,2,4-Trimethylbenzene	3.6	190	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0048	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.0052	U	0.0025	U	0.0032	U	0.0013	U
1,2,4,5-Tetramethylbenzene	~	~	NA		NA		NA		NA		0.0038	U	NA		NA		NA		NA		NA		NA		NA		0.0042	U	NA		NA		NA	
1,3,5-Trimethylbenzene	8.4	190	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0048	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.0052	U	0.0025	U	0.0032	U	0.0013	U
2-Butanone	0.12	500	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.01	U	0.0025	U	0.0032	U	0.0013	U
4-Methyl-2-pentanone	~	~	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.01	U	0.0025	U	0.0032	U	0.0013	U
Acetone	0.05	500	0.0065	J	0.015		0.0061	U	0.0048	J	0.0096	U	0.0057	J	0.0057	J	0.005	U	0.0038	U	0.0081	J	0.0035	U	0.0047	J	0.0024	J	0.0053	J	0.0064	U	0.0097	
Benzene	0.06	44	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.001	U	0.0025	U	0.0032	U	0.0013	U
Carbon disulfide	~	~	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.01	U	0.0025	U	0.0032	U	0.0013	U
Chloroform	0.37	350	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0014	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.0016	U	0.0025	U	0.0032	U	0.0013	U
cis-1,2-Dichloroethylene	0.25	500	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.0033		0.0025	U	0.0032	U	0.0013	U
Cyclohexane	~	~	0.0022	U	0.002	U	0.003	U	0.0024	U	NA		0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	NA		0.0025	U	0.0032	U	0.0044	
Ethyl Benzene	1	390	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.001	U	0.0025	U	0.0032	U	0.0013	U
Isopropylbenzene	~	~	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.001	U	0.0025	U	0.0032	U	0.0013	U
Methylcyclohexane	~	~	0.0022	U	0.002	U	0.003	U	0.0024	U	NA		0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	NA		0.0025	U	0.0032	U	0.0024	J
Naphthalene	12	500	NA		NA		NA		NA		0.0048	U	NA		NA		NA		NA		NA		NA		NA		0.0052	U	NA		NA		NA	
n-Butylbenzene	12	500	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.001	U	0.0025	U	0.0032	U	0.0013	U
n-Propylbenzene	3.9	500	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.001	U	0.0025	U	0.0032	U	0.0013	U
o-Xylene	~	~	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0019	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.0021	U	0.0025	U	0.0032	U	0.0013	U
p- & m- Xylenes	~	~	0.0044	U	0.004	U	0.0061	U	0.0047	U	0.0019	U	0.0047	U	0.0033	U	0.005	U	0.0038	U	0.0045	U	0.0035	U	0.0044	U	0.0021	U	0.005	U	0.0064	U	0.0025	U
p-Diethylbenzene	~	~	NA		NA		NA		NA		0.0038	U	NA		NA		NA		NA		NA		NA		NA		0.0042	U	NA		NA		NA	
p-Ethyltoluene	~	~	NA		NA		NA		NA		0.0038	U	NA		NA		NA		NA		NA		NA		NA		0.0042	U	NA		NA		NA	
p-Isopropyltoluene	~	~	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.001	U	0.0025	U	0.0032	U	0.0013	U
sec-Butylbenzene	11	500	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.001	U	0.0025	U	0.0032	U	0.0013	U
tert-Butylbenzene	5.9	500	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0048	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.0052	U	0.0025	U	0.0032	U	0.0013	U
Tetrachloroethylene	1.3	150	0.0022	U	0.002	U	0.003	U	0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0031	J	0.0018	U	0.0022	U	0.001	U	0.0025	U	0.0032	U	0.0013	U
Toluene	0.7	500	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0014	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.0002	J	0.0025	U	0.0032	U	0.0013	U
Trichloroethylene	0.47	200	0.0029	J	0.002	U	0.1		0.0024	U	0.00096	U	0.0024	U	0.0017	U	0.08		0.0019	U	0.014		0.0018	U	0.0022	U	0.0028		0.048		0.0032	U	0.0013	U
Vinyl Chloride	0.02	13	0.0022	U	0.002	U	0.003	U	0.0024	U	0.0019	U	0.0024	U	0.0017	U	0.0025	U	0.0019	U	0.0022	U	0.0018	U	0.0022	U	0.0021	U	0.0025	U	0.0032	U	0.0013	U
Xylenes, Total	0.26	500	0.0066	U	0.0061	U	0.0091	U	0.0071	U	0.0019	U	0.0071	U	0.005	U	0.0074	U	0.0057	U	0.0067	U	0.0053	U	0.0066	U	0.0021	U	0.0075	U	0.0096	U	0.0038	U
Semivolatile Organic Compounds (mg/kg)																																				
1,1-Biphenyl	~	~	0.367	D	0.0504	U	0.0492	U	0.0478	U	NA		0.0439	U	0.0436	U	0.24	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
2,4-Dimethylphenol	~	~	0.0461	U	0.0504	U	0.0492	U	0.0478	U	NA		0.0439	U	0.0436	U	0.0471	U	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
2-Methylnaphthalene	~	~	1.38	D	0.0504	U	0.0492	U	0.0478	U	NA		0.0439	U	0.0436	U	0.953	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
2-Methylphenol	0.33	500	0.0461	U	0.0504	U	0.0492	U	0.0478	U	NA		0.0439	U	0.0436	U	0.0471	U	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
3- & 4-Methylphenols	~	~	0.0461	U	0.0504	U	0.0492	U	0.0478	U	NA		0.0439	U	0.0436	U	0.0481	JD	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Acenaphthene	20	500	3.14	D	0.0504	U	0.381	D	0.0478	U	NA		0.0439	U	0.0436	U	2.69	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Acenaphthylene	100	500	0.726	D	0.0504	U	0.143	D	0.0478	U	NA		0.0439	U	0.0436	U	0.338	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Anthracene	100	500	8.34	D	0.0504	U	0.722	D	0.0478	U	NA		0.0439	U	0.0436	U	3.27	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Benzaldehyde	~	~	0.0461	U	0.0504	U	0.0492	U	0.0478	U	NA		0.0439	U	0.0436	U	0.0471	U	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Benzo(a)anthracene	1	5.6	0.0461	U	0.0504	U	**2.46**	D	0.0478	U	NA		0.1	D	0.0436	U	**6.09**	D	0.0499	U	0.0627	JD	0.0745	U	0.05	U	NA		0.0662	JD	0.0648	U	0.0506	U
Benzo(a)pyrene	1	1	**12.5**	D	0.0504	U	**2.21**	D	0.0478	U	NA		0.134	D	0.0436	U	**5.53**	D	0.0499	U	0.0583	JD	0.0745	U	0.05	U	NA		0.0565	JD	0.0648	U	0.0506	U
Benzo(b)fluoranthene	1	5.6	**9.66**	D	0.0504	U	**2.39**	D	0.0478	U	NA		0.0832	JD	0.0436	U	**4.98**	D	0.0499	U	0.0569	JD	0.0745	U	0.05	U	NA		0.0572	JD	0.0648	U	0.0506	U
Benzo(g,h,i)perylene	100	500	8.72	D	0.0504	U	1.36	D	0.0478	U	NA		0.169	D	0.0436	U	4.52	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0468	JD	0.0648	U	0.0506	U
Benzo(k)fluoranthene	0.8	56	**11.3**	D	0.0504	U	**1.97**	D	0.0478	U	NA		0.108	D	0.0436	U	**4.98**	D	0.0499	U	0.0605	JD	0.0745	U	0.05	U	NA		0.055	JD	0.0648	U	0.0506	U
Bis(2-ethylhexyl)phthalate	~	~	0.0461	U	0.0579	JD	0.0492	U	0.0478	U	NA		0.0756	JD	0.0436	U	0.0471	U	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Carbazole	~	~	4.66	D	0.0504	U	0.339	D	0.0478	U	NA		0.0439	U	0.0436	U	3	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Chrysene	1	56	0.0461	U	0.0504	U	**2.76**	D	0.0478	U	NA		0.125	D	0.0436	U	**6.54**	D	0.0499	U	0.0838	JD	0.0745	U	0.05	U	NA		0.0877	JD	0.0648	U	0.0506	U
Dibenzo(a,h)anthracene	0.33	0.56	**0.959**	D	0.0504	U	**0.596**	D	0.0478	U	NA		0.0567	JD	0.0436	U	**2.02**	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Dibenzofuran	7	350	0.0461	U	0.0504	U	0.155	D	0.0478	U	NA		0.0439	U	0.0436	U	1.75	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Fluoranthene	100	500	49.3	D	0.0504	U	8.06	D	0.0478	U	NA		0.178	D	0.0436	U	20.1	D	0.0499	U	0.142	D	0.0832	JD	0.05	U	NA		0.211	D	0.0648	U	0.0976	JD
Fluorene	30	500	2.77	D	0.0504	U	0.23	D	0.0478	U	NA		0.0439	U	0.0436	U	1.9	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Indeno(1,2,3-cd)pyrene	0.5	5.6	**8.59**	D	0.0504	U	**1.25**	D	0.0478	U	NA		0.114	D	0.0436	U	**3.74**	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Naphthalene	12	500	3.56	D	0.0504	U	0.0492	U	0.0478	U	NA		0.0439	U	0.0436	U	2.18	D	0.0499	U	0.0457	U	0.0745	U	0.05	U	NA		0.0466	U	0.0648	U	0.0506	U
Phenanthrene	100	500	40	D	0.0504	U	5.15	D	0.0478	U	NA		0.0993	D	0.0436	U	20.7	D	0.0499	U	0.0853	JD	0.0745	U	0.05	U	NA		0.156	D	0.0648	U	0.0815	JD
Pyrene	100	500	40.2	D	0.0504	U	6.78	D	0.0478	U	NA		0.178	D	0.0436	U	15.8	D	0.0499	U	0.132	D	0.0745	U	0.05	U	NA		0.178	D	0.0648	U	0.088	JD
Pesticides (mg/kg)																																				
4,4'-DDT	0.0033	47	0.00182	U	0.00199	U	0.00194	U	0.00188	U	NA		**0.00491**	D	0.00172	U	0.00186	U	0.00197	U	0.0018	U	0.00196	U	0.00197	U	NA		0.00184	U	0.00256	U	0.002	U
alpha-Chlordane	0.094	24	0.00182	U	0.00199	U	0.00194	U	0.00188	U	NA		**0.28**	DP	0.00172	U	0.00186	U	0.00197	U	0.0018	U	0.00196	U	0.00197	U	NA		0.00184	U	0.00256	U	0.002	U
Chlordane, total	~	~	0.0364	U	0.0398	U	0.0388	U	0.0377	U	NA		1.09	D	0.0344	U	0.0372	U	0.0394	U	0.0361	U	0.0392	U	0.0395	U	NA		0.0368	U	0.0512	U	0.0399	U
gamma-Chlordane	~	~	0.00182	U	0.00199	U	0.00194	U	0.00188	U	NA		0.17	D	0.00172	U	0.00186	U	0.00197	U	0.0018	U	0.00196	U	0.00197	U	NA		0.00184	U	0.00256	U	0.002	U
Heptachlor	0.042	15	0.00182	U	0.00199	U	0.00194	U	0.00188	U	NA		0.0316	D	0.00172	U	0.00186	U	0.00197	U	0.0018	U	0.00196	U	0.00197	U	NA		0.00184	U	0.00256	U	0.002	U
Metals (mg/kg)																																				
Aluminum	~	~	4910		10400		2580		4260		NA		5110	B	6850	B	2970		8410		1670		13700		8770		NA		2090		13600		12000			
Antimony	~	~	0.551	U	0.603	U	0.588	U	0.571	U	NA		0.525	U	0.521	U	0.563	U	0.597	U	0.547	U	0.594	U	0.598	U	NA		0.558	U	11.4		0.605	U		
Arsenic	13	16	7.45		4.99		9.63		1.94		NA		4.01		3		**14.1**		3.1		4.8		6.92		3.11		NA		4.68		**203**		8.32			
Barium	350	400	63.5		22		75.9		13.8		NA		**885**		36.2		**397**		27.9		86.3		221		32.3		NA		57.3		**1170**		24.1			
Beryllium	7.2	590	0.11	U	0.121	U	0.353		0.348		NA		0.317		0.382		0.35		0.539		0.231		0.157		0.599		NA		0.112	U	0.155	U	0.121	U		
Cadmium	2.5	9.3	0.331	U	0.362	U	0.353	U	0.343	U	NA		0.315	U	0.313	U	0.338	U	0.358	U	0.328	U	0.357	U	0.359	U	NA		0.335	U	**6.48**		0.363	U		
Calcium	~	~	20100		721		15800		348		NA		14700		1480		9260		521		26100		77900		627		NA		2620		42600		683			
Chromium, Hexavalent	1	400	0.551	U	0.603	U	0.588	U	0.571	U	NA		**3.86**		0.521	U	0.563	U	0.597	U	0.962		0.856		0.598	U	NA		0.558	U	0.775	U	0.605	U		
Chromium, Trivalent	30	1500	10.8		13.7		7.55		6.95		NA		**69.14**		8.57		19.8		10.7		4.378		25.844		12		NA		6.34		24.4		16.6			
Cobalt	~	~	4.64		7.03		4.71		3.72		NA		5.21		4.09		5.17		5.29		3.64		11.6		5.9		NA		4.75		9.38		9.95			
Copper	50	270	23.2		9.37		28.3		7.67		NA		17.2		12.8		**53.4**		5.95		13.8		41.5		8.3		NA		41.1		**242**		12.4			
Iron	~	~	8730		17500		8490		6970		NA		11400		9470		9630		12600		4370		20900	D	12400		NA		7410		16800		20600			
Lead	63	1000	**132**		5.66		**99.6**		2.57		NA		**808**		**126**		**623**		9.44		**341**		**982**		14.4		NA		**96.6**		**1080**		9.61			
Magnesium	~	~	3550		1780		841		1560		NA		2850		1160		1230		1670		2580		13300		1550		NA		276		14300		2180			
Manganese	1600	10000	195		149		98.2		172		NA		196		165		170		387		76.7		686		109		NA		95.9		1360		124			
Mercury	0.18	2.8	**1.19**		0.0372		**0.466**		0.0343	U	NA		**0.555**		**0.215**		**0.74**		0.0358	U	**0.387**		**0.981**		0.0431		NA		0.137		0.0512	U	0.175			
Nickel	30	310	15.7		12.7		12.8		14.5		NA		17.5		10.3		20.9		10.9		9.99		**40.6**		12.5		NA		12.3		21.9		13.5			
Potassium	~	~	791		756		985		473		NA		1340		542		833		772		497		1430		442		NA		796		5050		1100			
Selenium	3.9	1500	1.17		1.82		1.46		1.14	U	NA		1.05	U	1.04	U	2.51		1.36		1.09	U	**5.09**		1.84		NA		1.24		**63.1**		1.71			
Sodium	~	~	227		127		402		65.6		NA		306		61.1		295		126		256		232		78.4		NA		499		2690		138			
Vanadium	~	~	14		21.2		14.4		11.1		NA		22.9		12.6		19.5		14.9		8.48		36.5		17.4		NA		11.4		43.2		23.1			
Zinc	109	10000	71.5		28.5		66.2		15.5		NA		**177**		40.7		**148**		24.2		81.9		**125**		27.2		NA		**167**		**577**		38.3			

NOTES:
1. Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the official compilation of New York Codes, Rules and Regulation (NYCRR) Part 375 Unrestricted Use Soil Cleanup Objective (SCOs) and Restricted Commercial Use SCOs
2. Only compounds with detections are shown in the table.
3. NYSDEC Part 375 Unrestricted Use SCO exceedances are bolded.
4. NYSDEC Part 375 Restricted Commercial Use SCO exceedances are shaded and bolded
5. Reporting limits for undetected results above NYSDEC Unrestricted Use SCOs are italicized
6. mg/kg = milligrams per kilogram
7. ~ = no regulatory limit has been established for this analyte
8. DUP01_030717 is a duplicate sample of SB07_23-24
9. DUP02_031017 is a duplicate sample of SB19_20-21
10. SODUP01_042817 is a duplicate of SB6D_23-25
11. bgs = below grade surface
12. NA = not analyzed

QUALIFIERS:
J = analyte detected at or above the MDL (method detection Limit) but below the RL (Reporting Limit). Result in an estimated concentration
U = analyte not detected at or above the level indicated
P = The Relative Percent Difference (RPD) between the results for two columns exceeds the method-specified criteria
B = The analyte was detected above the reporting limit in the associated methods blank.
D = Result is from an analysis that required a dilution

Table 3
Soil Sample Analytical Detection Summary
473 President Street
Brooklyn, New York
Langan Project No. 170361301
BCP Site ID: C224220

Sample ID Laboratory ID Sampling Date Sample Depth (feet bgs)	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives-Commercial	SB17_1-2 17C0343-02 3/8/2017 1-2		SB17_7-8 17C0343-04 3/8/2017 7-8		SB17_15-16 17C0343-03 3/8/2017 15-16		SB18_10-11 17C0464-05 3/10/2017 10-11		SB18_23-24 17C0464-06 3/10/2017 23-24		SB19_10-11 17C0464-01 3/10/2017 10-11		SB19_17-18 17C0464-07 3/10/2017 17-18		DUPLICATE SB19_20-21 17C0464-02 3/10/2017 20-21		DUPLICATE DUP02_031017 17C0464-10 3/10/2017 20-21		SB20D_0-2 L1713501-01 4/27/2017 0-2		SB20D_17-19 L1713501-02 4/27/2017 17-19		SB20D_23-25 L1713501-03 4/27/2017 23-25		SB20D_30-32 L1713501-04 4/27/2017 30-32	
Volatile Organic Compounds (mg/kg)																														
1,2,4-Trimethylbenzene	3.6	190	0.002	U	0.0022	U	0.002	U	0.0018	U	0.056	E	0.0026	U	0.0019	U	0.22	U	0.076		0.07	J	**52**		0.0005	J	0.00068	J
1,2,4,5-Tetramethylbenzene	~	~	NA		NA		NA		NA		NA		NA		NA		NA		NA		0.016	J	6.7		0.021		0.0038	U
1,3,5-Trimethylbenzene	8.4	190	0.002	U	0.0022	U	0.002	U	0.0018	U	0.022		0.0026	U	0.0019	U	0.22	U	0.027		0.022	J	**18**		0.00034	J	0.00027	J
2-Butanone	0.12	500	0.002	U	0.0022	U	0.0026	J	0.002	J	0.0014	U	0.0026	U	0.0034	J	*0.22*	U	0.0021	U	**0.19**	J	*5.5*	U	0.0097	U	0.0096	U
4-Methyl-2-pentanone	~	~	0.002	U	0.0022	U	0.002	U	0.0018	U	0.0014	U	0.0026	U	0.0019	U	0.22	U	0.0021	U	0.7	U	5.5	U	0.0097	U	0.0096	U
Acetone	0.05	500	0.0065	J	0.0051	J	0.015		0.018		0.0038	J	0.012		0.023		*0.44*	U	0.0063	J	*0.7*	U	*5.5*	U	0.035		0.033	
Benzene	0.06	44	0.002	U	0.0022	U	0.002	U	0.012		0.0086		0.0026	U	0.0019	J	*0.22*	U	0.0021	U	*0.07*	U	**2.1**		0.00097	U	0.00096	U
Carbon disulfide	~	~	0.002	U	0.0022	U	0.002	U	0.0018	U	0.0014	U	0.0026	U	0.0019	U	0.22	U	0.0021	U	0.7	U	3.7	J	0.0097	U	0.0096	U
Chloroform	0.37	350	0.002	U	0.0022	U	0.002	U	0.0028	J	0.0014	U	0.0026	U	0.0019	U	0.22	U	0.0021	U	0.1	U	*0.82*	U	0.0014	U	0.0018	
cis-1,2-Dichloroethylene	0.25	500	0.002	U	0.0022	U	0.002	U	0.0018	U	**0.64**	D	0.0026	U	0.0019	U	0.22	U	0.0024	J	0.052	J	*0.55*	U	0.004		0.00062	J
Cyclohexane	~	~	0.002	U	0.0022	U	0.002	U	0.041		0.063	E	0.0026	U	0.0019	U	0.22	U	0.026		NA		NA		NA		NA	
Ethyl Benzene	1	390	0.002	U	0.0022	U	0.002	U	0.0018	U	0.031		0.0026	U	0.0019	U	0.22	U	0.019		0.018	J	**18**		0.00097	U	0.00035	J
Isopropylbenzene	~	~	0.002	U	0.0022	U	0.002	U	0.016		0.0077		0.0026	U	0.0019	U	0.22	U	0.0074		0.07	U	3.4		0.0024		0.00096	U
Methylcyclohexane	~	~	0.002	U	0.0022	U	0.002	U	0.06		0.099	E	0.0026	U	0.0019	U	0.32	JD	0.078		NA		NA		NA		NA	
Naphthalene	12	500	NA		NA		NA		NA		NA		NA		NA		NA		NA		0.068	J	8.5		0.0018	J	0.0003	J
n-Butylbenzene	12	500	0.002	U	0.0022	U	0.002	U	0.0048		0.0046		0.0026	U	0.0019	U	0.22	U	0.01		0.07	U	2.6		0.0064		0.00096	U
n-Propylbenzene	3.9	500	0.002	U	0.0022	U	0.002	U	0.022		0.01		0.0026	U	0.0019	U	0.22	U	0.015		0.07	U	**6.9**		0.0016		0.00096	U
o-Xylene	~	~	0.002	U	0.0022	U	0.002	U	0.0018	U	0.0096		0.0026	U	0.0019	U	0.22	U	0.014		0.14	U	0.5	J	0.0019	U	0.0019	U
p- & m- Xylenes	~	~	0.004	U	0.0044	U	0.004	U	0.0036	U	0.078		0.0051	U	0.0038	U	0.44	U	0.055		0.056	J	39		0.0019	U	0.0011	J
p-Diethylbenzene	~	~	NA		NA		NA		NA		NA		NA		NA		NA		NA		0.28	U	24		0.008		0.0038	U
p-Ethyltoluene	~	~	NA		NA		NA		NA		NA		NA		NA		NA		NA		0.048	J	30		0.001	J	0.00052	J
p-Isopropyltoluene	~	~	0.002	U	0.0022	U	0.002	U	0.0018	U	0.0054		0.0026	U	0.0019	U	0.22	U	0.0078		0.07	U	1.6		0.00097	U	0.00096	U
sec-Butylbenzene	11	500	0.002	U	0.0022	U	0.002	U	0.0041		0.0025	J	0.0026	U	0.0019	U	0.22	U	0.0036	J	0.07	U	1.3		0.0081		0.00096	U
tert-Butylbenzene	5.9	500	0.002	U	0.0022	U	0.002	U	0.0018	U	0.0014	U	0.0026	U	0.0019	U	0.22	U	0.0021	U	0.35	U	0.15	J	0.0013	J	0.0048	U
Tetrachloroethylene	1.3	150	0.002	U	0.0022	U	0.002	U	0.0018	U	0.0083		0.0026	U	0.0019	U	0.22	U	0.007		0.052	J	0.55	U	0.00097	U	0.00089	J
Toluene	0.7	500	0.002	U	0.0022	U	0.002	U	0.0018	U	0.0033		0.0026	U	0.0019	U	0.22	U	0.0021	U	0.1	U	0.57	J	0.002		0.0032	
Trichloroethylene	0.47	200	0.0099		0.0041	J	0.002	U	0.0018	U	0.47	D	0.0026	U	0.0019	U	**2.4**	D	**2.3**	D	**4.1**		*0.55*	U	0.00097	U	0.28	
Vinyl Chloride	0.02	13	0.002	U	0.0022	U	0.002	U	0.0018	U	0.012		0.0026	U	0.0019	U	*0.22*	U	0.0021	U	*0.14*	U	*1.1*	U	0.0019	U	0.0019	U
Xylenes, Total	0.26	500	0.006	U	0.0066	U	0.0061	U	0.0054	U	0.087		0.0077	U	0.0057	U	*0.67*	U	0.069		0.056	J	**40**	J	0.0019	U	0.0011	J
Semivolatile Organic Compounds (mg/kg)																														
1,1-Biphenyl	~	~	0.0465	U	0.0486	U	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
2,4-Dimethylphenol	~	~	0.0465	U	0.0486	U	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
2-Methylnaphthalene	~	~	0.0465	U	0.0486	U	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
2-Methylphenol	0.33	500	0.0465	U	0.0486	U	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
3- & 4-Methylphenols	~	~	0.0465	U	0.0486	U	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Acenaphthene	20	500	0.0465	U	0.316	D	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Acenaphthylene	100	500	0.0465	U	0.19	D	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Anthracene	100	500	0.0465	U	3.13	D	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Benzaldehyde	~	~	0.0465	U	0.0486	U	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Benzo(a)anthracene	1	5.6	0.0465	U	**8.42**	D	0.0509	U	0.0459	U	0.0476	U	0.0827	JD	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Benzo(a)pyrene	1	1	0.0465	U	**7.76**	D	0.0509	U	0.0459	U	0.0476	U	0.0913	JD	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Benzo(b)fluoranthene	1	5.6	0.0465	U	**7.25**	D	0.0509	U	0.0459	U	0.0476	U	0.0749	JD	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Benzo(g,h,i)perylene	100	500	0.0465	U	6.95	D	0.0509	U	0.0459	U	0.0476	U	0.0734	JD	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Benzo(k)fluoranthene	0.8	56	0.0465	U	**7.77**	D	0.0509	U	0.0459	U	0.0476	U	0.0976	JD	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Bis(2-ethylhexyl)phthalate	~	~	0.0465	U	0.119	D	0.0509	U	0.147	D	0.0476	U	0.0523	JD	0.0471	U	0.0998	JD	0.0505	U	NA		NA		NA		NA	
Carbazole	~	~	0.0465	U	1.43	D	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Chrysene	1	56	0.0465	U	**8.82**	D	0.0509	U	0.0459	U	0.0476	U	0.096	JD	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Dibenzo(a,h)anthracene	0.33	0.56	0.0465	U	**2.12**	D	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Dibenzofuran	7	350	0.0465	U	0.305	D	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Fluoranthene	100	500	0.0465	U	24	D	0.0512	JD	0.0459	U	0.0476	U	0.12	D	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Fluorene	30	500	0.0465	U	0.119	D	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	0.5	5.6	0.0465	U	**5.88**	D	0.0509	U	0.0459	U	0.0476	U	0.0609	JD	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Naphthalene	12	500	0.0465	U	0.0486	U	0.0509	U	0.0622	JD	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Phenanthrene	100	500	0.0465	U	15.9	D	0.0509	U	0.0459	U	0.0476	U	0.0489	U	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Pyrene	100	500	0.0465	U	20.2	D	0.0512	JD	0.0459	U	0.0476	U	0.0945	JD	0.0471	U	0.0505	U	0.0505	U	NA		NA		NA		NA	
Pesticides (mg/kg)																														
4,4'-DDT	0.0033	47	0.00183	U	0.00192	U	0.00201	U	0.00181	U	0.00188	U	0.00193	U	NT		0.00199	U	0.00199	U	NA		NA		NA		NA	
alpha-Chlordane	0.094	24	0.00183	U	0.00192	U	0.00201	U	0.00181	U	0.00188	U	0.00193	U	NT		0.00199	U	0.00199	U	NA		NA		NA		NA	
Chlordane, total	~	~	0.0367	U	0.0384	U	0.0402	U	0.0362	U	0.0376	U	0.0386	U	NT		0.0399	U	0.0398	U	NA		NA		NA		NA	
gamma-Chlordane	~	~	0.00183	U	0.00192	U	0.00201	U	0.00181	U	0.00188	U	0.00193	U	NT		0.00199	U	0.00199	U	NA		NA		NA		NA	
Heptachlor	0.042	15	0.00183	U	0.00192	U	0.00201	U	0.00181	U	0.00188	U	0.00193	U	NT		0.00199	U	0.00199	U	NA		NA		NA		NA	
Metals (mg/kg)																														
Aluminum	~	~	7100		3850		8290		4840		3160		4410		NA		5270		5420		NA		NA		NA		NA	
Antimony	~	~	0.556	U	0.582	U	0.609	U	0.549	U	0.569	U	2.01		NA		0.604	U	0.604	U	NA		NA		NA		NA	
Arsenic	13	16	7.51		6.29		4.18		1.98		1.87		7.85		NA		2.15		2.21		NA		NA		NA		NA	
Barium	350	400	85.3		53.1		32.4		28.8		18.7		35.8		NA		35.2		37.9		NA		NA		NA		NA	
Beryllium	7.2	590	0.539		0.346		0.491		0.11	U	0.114	U	0.117	U	NA		0.121	U	0.121	U	NA		NA		NA		NA	
Cadmium	2.5	9.3	0.334	U	0.349	U	0.366	U	0.33	U	0.342	U	0.351	U	NA		0.362	U	0.362	U	NA		NA		NA		NA	
Calcium	~	~	1990		36600		4170		940		485		10500		NA		722		735		NA		NA		NA		NA	
Chromium, Hexavalent	1	400	0.556	U	0.582	U	0.609	U	0.549	U	0.569	U	0.585	U	NA		0.604	U	0.604	U	NA		NA		NA		NA	
Chromium, Trivalent	30	1500	12.9		8.87		12.5		7.04		6.59		8.01		NA		11		11.8		NA		NA		NA		NA	
Cobalt	~	~	5.64		4.49		9.24		3.21		3.96		4.07		NA		5.66		5.66		NA		NA		NA		NA	
Copper	50	270	**54.6**		35.4		21.2		24.7		6.88		23.4		NA		9.39		9.66		NA		NA		NA		NA	
Iron	~	~	13200		23300		11200		8510		7470		7350		NA		10900		10800		NA		NA		NA		NA	
Lead	63	1000	**194**		**213**		**64.8**		28.4		1.9		**81.4**		NA		3.14		3.11		NA		NA		NA		NA	
Magnesium	~	~	2570		5070		1990		954		1140		2170		NA		1830		1850		NA		NA		NA		NA	
Manganese	1600	10000	287		287		106		76		186		144		NA		297		288		NA		NA		NA		NA	
Mercury	0.18	2.8	**2.96**		**0.964**		**1.09**		0.0654		0.0342	U	**0.328**		NA		0.0362	U	0.0362	U	NA		NA		NA		NA	
Nickel	30	310	15.1		22.7		13.3		8.18		11.4		13.8		NA		15.1		15.5		NA		NA		NA		NA	
Potassium	~	~	1130		650		871		393		525		728		NA		920		967		NA		NA		NA		NA	
Selenium	3.9	1500	2.08		2.21		1.22	U	1.1	U	1.14	U	1.17	U	NA		1.21	U	1.21	U	NA		NA		NA		NA	
Sodium	~	~	622		394		209		115		70.2		169		NA		86.2		85.7		NA		NA		NA		NA	
Vanadium	~	~	18.6		16.2		18.4		10.1		9.49		13		NA		13.8		14.9		NA		NA		NA		NA	
Zinc	109	10000	101		**148**		42.8		25.1		17.4		34.2		NA		24		24.3		NA		NA		NA		NA	

NOTES:

1. Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the official compilation of New York Codes, Rules and Regulation (NYCRR) Part 375 Unrestricted Use Soil Cleanup Objective (SCOs) and Restricted Commercial Use SCOs
2. Only compounds with detections are shown in the table.
3. NYSDEC Part 375 Unrestricted Use SCO exceedances are bolded.
4. NYSDEC Part 375 Restricted Commercial Use SCO exceedances are shaded and bolded
5. Reporting limits for undetected results above NYSDEC Unrestricted Use SCOs are italicized
6. mg/kg = milligrams per kilogram
7. ~ = no regulatory limit has been established for this analyte
8. DUP01_030717 is a duplicate sample of SB07_23-24
9. DUP02_031017 is a duplicate sample of SB19_20-21
10. SODUP01_042817 is a duplicate of SB6D_23-25
11. bgs = below grade surface
12. NA = not analyzed

QUALIFIERS:

J = analyte detected at or above the MDL (method detection Limit) but below the RL (Reporting Limit). Result in an estimated concentration
U = analyte not detected at or above the level indicated
P = The Relative Percent Difference (RPD) between the results for two columns exceeds the method-specified criteria
B = The analyte was detected above the reporting limit in the associated methods blank.
D = Result is from an analysis that required a dilution

Table 4
Soil Design Criteria Sample Analytical Results Summary
473 President Street
Brooklyn, New York
Langan Project No. 170361301
BCP Site ID: C224220

LOCATION	SB06D_20-25		SB12D_20-25		SB15D_20-25		SB20D_14-19		SB20D_20-30	
SAMPLING DATE	4/28/2017		4/29/2017		4/28/2017		4/27/2017		4/27/2017	
LAB SAMPLE ID	L1713775-05		L1713789-01		L1713775-02		L1713501-06		L1713501-05	
SAMPLE DEPTH (feet bgs)	20-25		20-25		20-25		14-19		20-30	
General Chemistry (mg/kg)										
Solids, Total	85.6		77.6		87.1		84.7		85.7	
Nitrogen, Ammonia	9.3		5.3	J	11		16		20	
Nitrogen, Nitrite	1.1	U	1.3	U	1.1	U	1.1	U	1.1	U
Nitrogen, Nitrate	0.68	J	1.1	J	0.38	J	6.7		1.1	U
Phosphate, Total	860		370		950		850		960	
Sulfate	120	U	130	U	110	U	220		120	U
Alkalinity	29	U	33	U	32	U	320		29	U
Biological Oxygen Demand	70	U	79	U	77	U	340		70	U
Chemical Oxygen Demand	4100		1950		918	U	7680		6660	
Grain Size Analysis (%)										
Cobbles	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
% Coarse Gravel	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
% Fine Gravel	0.1	U	0.3		0.1	U	1.4		0.1	U
% Coarse Sand	0.2		2.2		0.5		2.8		1.8	
% Medium Sand	20.6		29.2		18.2		15.2		15.8	
% Fine Sand	60.6		58.7		63.3		47.3		50.6	
% Total Fines	18.6		9.6		18		33.3		31.8	
Total Metals (mg/kg)										
Iron, Total	7400		6300		6800		10000		7300	
Manganese, Total	94		78		69		77		80	
Total Organic Carbon (mg/kg)										
Total Organic Carbon (Rep1)	606		513		782		5580		573	
Total Organic Carbon (Rep2)	506		591		661		4620		620	

Notes and Qualifiers:

1. bgs = below grade surface
2. mg/kg = milligrams per kilogram
3. J = analyte detected at or above the MDL (method detection Limit) but below the RL (Reporting Limit). Result in an estimated
4. U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL; the value shown in the table is the RL.

Table 5
Groundwater Sample Analytical Detection Summary
473 President Street
Brooklyn, New York
Langan Project No. 170361301
BCP Site ID: C224220

						Duplicate						Duplicate					
Sample ID		**MW06_031617**	**MW06D_050617**	**MW07_032217**	**MW08_031617**	**GWDUP01_031617**	**MW09_032217**	**MW10_032217**	**MW12_031617**	**MW12D_050617**	**GWDUP01_050617**	**MW15D_050617**	**MW18_032217**	**MW20D_050617**	**MW20S_050617**
York ID	**NYSDEC TOGS SGVs**	**17C0618-02**	**L1714721-01**	**17C0850-02**	**17C0618-01**	**17C0618-04**	**17C0850-04**	**17C0850-03**	**17C0618-03**	**L1714721-01**	**L1714721-01**	**L1714721-01**	**17C0878-01**	**L1714721-01**	**L1714721-01**
Sampling Date	**- Class GA**	**3/16/2017**	**5/6/2017**	**3/22/2017**	**3/16/2017**	**3/16/2017**	**3/22/2017**	**3/22/2017**	**3/16/2017**	**5/6/2017**	**5/6/2017**	**5/6/2017**	**3/22/2017**	**5/6/2017**	**5/6/2017**
Screened Interval (feet bgs)		**8-18**	**20-25**	**19-24**	**6-16**	**6-16**	**6-16**	**0-8**	**8-18**	**20-25**	**20-25**	**20-25**	**8-18**	**20-30**	**8-18**
Volatile Organic Compounds (VOC) (µg/L)															
1,2,3-Trichloropropane	0.04	*2* U	*2.5* U	*40* UJ	*0.2* U	*0.2* U	*0.2* UJ	*0.2* UJ	*0.2* U	*2.5* U	*2.5* U	*2.5* U	*5* U	**34** J	**23**
1,2,4-Trimethylbenzene	5	2 U	2.5 U	**1600** J	0.58	0.6	0.2 UJ	0.2 UJ	0.2 U	2.5 U	2.5 U	**6.2**	**1600** D	**1200**	**430**
1,2,4,5-Tetramethylbenzene	5	**57** JD	2 U	NA	NA	NA	NA	NA	NA	2 U	2 U	0.91 J	NA	**66**	**73**
1,3,5-Trimethylbenzene	5	2 U	2.5 U	**470** D	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.5	**460** D	**360**	**250**
2-Butanone	50	2 U	5 U	40 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5 U	5 U	5 U	28 JD	*100* U	25 U
Acetone	50	10 U	5 U	*200* U	2.4 U	2.9 U	3.5	1 U	1 U	5 U	5 U	2.1 J	**120** BD	**120**	**71**
Benzene	1	**70** D	0.21 J	**890** D	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.39 J	**3500** D	**280**	**140**
Bromomethane	5	2 UJ	2.5 U	*40* UJ	0.5 U	0.5 U	0.2 UJ	0.2 U	0.32 J	0.5 U	2.5 U	2.5 U	5 UJ	*50* U	*12* U
Carbon disulfide	~	2 U	5 U	40 U	0.34 J	0.28 J	0.2 U	0.2 U	0.2 U	5 U	5 U	5 U	5 U	100 U	25 U
Chloroform	7	2 UJ	2.5 U	*40* U	0.25 J	0.28 J	0.2 U	0.2 U	0.2 U	2.7	2.7	1.6 J	5 U	*50* U	*12* U
Chloromethane	5	2 UJ	2.5 UJ	*40* U	0.23 J	0.2 UJ	0.2 U	0.2 U	0.2 U	2.5 UJ	2.5 UJ	2.5 U	5 U	*50* U	*12* U
cis-1,2-Dichloroethylene	5	2 U	2.5 U	**4900** D	1.9	1.7	1.4	0.2 U	0.44 J	2.5 U	2.5 U	**20**	**26** D	*50* U	*12* U
Cyclohexane	~	120 D	NA	1100 D	0.21 J	0.21 J	0.2 U	0.2 U	0.2 U	NA	NA	NA	800 D	NA	NA
Ethyl Benzene	5	4.5 JD	2.5 U	**2000** D	0.3 J	0.31 J	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.1 J	**1400** D	**820**	**110**
Isopropylbenzene	5	**45** D	2.5 U	**130** D	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.5 U	**160** D	**82**	**34**
Methylcyclohexane	~	57 D	NA	640 D	0.22 J	0.25 J	0.2 U	0.2 U	0.2 U	NA	NA	NA	780 D	NA	NA
Naphthalene	10	NA	2.5 U	NA	NA	NA	NA	NA	NA	2.5 U	2.5 U	2.6	NA	**360**	**120**
n-Butylbenzene	5	**8.3** D	2.5 U	*40* U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.5 U	**62** D	*50* U	**8.8** J
n-Propylbenzene	5	**72** D	2.5 U	**180** D	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	0.88 J	**220** D	**130**	**32**
o-Xylene	5	2 U	2.5 U	**1300** D	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.5 U	**450** D	**68**	**31**
p- & m- Xylenes	5	**5.8** JD	2.5 U	**5600** D	0.98 J	1.1	0.5 U	0.5 U	0.5 U	2.5 U	2.5 U	5	**4500** D	**2100**	**420**
p-Isopropyltoluene	5	2.4 JD	2.5 U	*40* U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.5 U	**24** D	*50* U	**10** J
p-Diethylbenzene	~	NA	2 U	NA	NA	NA	NA	NA	NA	2 U	2 U	2.6	NA	150	150
p-Ethyltoluene	~	NA	2 U	NA	NA	NA	NA	NA	NA	2 U	2 U	4	NA	670	380
sec-Butylbenzene	5	**13** D	2.5 U	*40* U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.5 U	**23** D	*50* U	**9.6** J
tert-Butyl alcohol (TBA)	~	8 U	NA	100 U	0.8 U	0.8 U	0.5 U	1.2 J	0.8 U	NA	NA	NA	91 D	NA	NA
tert-Butylbenzene	5	2.1 JD	2.5 U	*40* U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.5 U	5 U	*50* U	*12* U
Tetrachloroethylene	5	2 UJ	0.5 U	*40* U	0.92 J	0.76 J	0.2 U	0.2 U	0.36 J	0.5 U	0.5 U	0.95	5 UJ	3.9 J	0.98 J
Toluene	5	3.7 JD	2.5 U	**740** D	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	2.5 U	**340** BD	**43** J	**9.8** J
trans-1,2-Dichloroethylene	5	2 U	2.5 U	*40* U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.5 U	2.5 U	0.93 J	5 U	*50* U	*12* U
Trichloroethylene	5	2 U	**7.3**	**1300** D	**5.7**	**5.4**	1.8	0.2 U	**39**	3.8	3.5	**16**	5 U	**830**	**78**
Vinyl Chloride	2	2 U	1 U	**190** D	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 UJ	1 UJ	**2.8**	**7** J	*20* U	*5* U
Xylenes, Total	5	*6* U	2.5 U	**6900** D	0.98 J	1.1 J	0.6 U	0.6 U	0.6 U	2.5 U	2.5 U	5	**4900** D	**2200**	**450**
Semivolatile Organic Compounds (SVOC) (µg/L)															
2,4-Dimethylphenol	50	0.962 U	NA	2.67 J	0.962 U	0.962 U	3.12 U	2.78 U	0.962 U	NA	NA	NA	1.47 U	NA	NA
2-Methylnaphthalene	~	1.92 U	NA	25.4	1.92 U	1.92 U	3.12 U	2.78 U	1.92 U	NA	NA	NA	121 D	NA	NA
Acenaphthene	20	4.62	NA	0.05 U	0.0538 J	0.0385 UJ	0.0625 U	0.0556 U	0.0385 U	NA	NA	NA	2.94 U	NA	NA
Acenaphthylene	~	0.0923	NA	0.05 U	0.0385 U	0.0385 U	0.0625 U	0.0556 U	0.0385 U	NA	NA	NA	2.94 U	NA	NA
Anthracene	50	0.338	NA	0.05 U	0.0385	0.0538	0.0625 U	0.0556 U	0.0385 U	NA	NA	NA	2.94 U	NA	NA
Benzo(a)anthracene	0.002	*0.0385* U	NA	*0.05* U	**0.0385** J	**0.123** J	*0.0625* U	*0.0556* U	*0.0385* U	NA	NA	NA	*2.94* U	NA	NA
Benzo(a)pyrene	0	*0.0385* U	NA	*0.05* U	**0.0385** J	**0.138** J	*0.0625* U	*0.0556* U	*0.0385* U	NA	NA	NA	*2.94* U	NA	NA
Benzo(b)fluoranthene	0.002	*0.0385* U	NA	*0.05* U	*0.0385* UJ	**0.108** J	*0.0625* U	*0.0556* U	*0.0385* U	NA	NA	NA	*2.94* U	NA	NA
Benzo(g,h,i)perylene	~	0.0385 U	NA	0.05 U	0.0385 UJ	0.0462 J	0.0625 U	0.0556 U	0.0385 U	NA	NA	NA	2.94 U	NA	NA
Benzo(k)fluoranthene	0.002	*0.0385* U	NA	*0.05* U	**0.0462** J	**0.138** J	*0.0625* U	*0.0556* U	*0.0385* U	NA	NA	NA	*2.94* U	NA	NA
Bis(2-ethylhexyl)phthalate	5	0.385 U	NA	0.5 U	0.592	0.385 U	2.72 B	0.556 U	0.385 U	NA	NA	NA	2.94 U	NA	NA
Chrysene	0.002	*0.0385* U	NA	*0.05* U	**0.0462** J	**0.131** J	*0.0625* U	*0.0556* U	*0.0385* U	NA	NA	NA	*2.94* U	NA	NA
Fluoranthene	50	0.331	NA	0.11	0.146 J	0.323 J	0.0625 U	0.0556 U	0.0385 U	NA	NA	NA	2.94 U	NA	NA
Fluorene	50	1.11	NA	0.16	0.0385 U	0.0385 U	0.0625 U	0.0667	0.0385 U	NA	NA	NA	2.94 U	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	*0.0385* U	NA	*0.05* U	*0.0385* UJ	**0.0462** J	*0.0625* U	*0.0556* U	*0.0385* U	NA	NA	NA	*2.94* U	NA	NA
Naphthalene	10	**19.4**	NA	**214** D	0.0769	0.0923	0.138	0.122	0.123	NA	NA	NA	**427** D	NA	NA
Phenanthrene	50	0.315	NA	0.52	0.0538 J	0.115 J	0.0625 U	0.0556 U	0.0385	NA	NA	NA	2.94 U	NA	NA
Pyrene	50	0.154	NA	0.1	0.108 J	0.308 J	0.312	0.0556 U	0.0385 U	NA	NA	NA	2.94 U	NA	NA
Pesticides (µg/L)															
Total Pesticides	~	ND	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA
Dissolved Metals (µg/L)															
Antimony	3	2.22 U	NA	**3.09** D	2.22 U	2.22 U	2.22 U	2.22 U	2.38 D	NA	NA	NA	2.22 UJ	NA	NA
Arsenic	25	3.04 D	NA	**37.2** D	2.22 U	2.22 U	3.24 D	5.53 D	2.22 U	NA	NA	NA	**38.2** D	NA	NA
Barium	1000	18.6	NA	204	18.1	17.1	14.2	150	96.1	NA	NA	NA	89	NA	NA
Calcium	~	76000	NA	34700	52200	50400	35200	92700	75300	NA	NA	NA	84100	NA	NA
Copper	200	15.5 J	NA	0.00634 U	17.9 J	9.74 J	0.00959 U	0.0105 U	15.3 J	NA	NA	NA	34.6 J	NA	NA
Iron	~	1950	NA	16200	57.3	81.1	307	0.221 U	76.6	NA	NA	NA	20800	NA	NA
Lead	25	3.33 U	NA	3.33 U	3.33 U	3.33 U	3.33 U	3.33 U	3.33 U	NA	NA	NA	3.33 J	NA	NA
Magnesium	35000	25500	NA	20400	11600	11300	7630	15600	**37600**	NA	NA	NA	**54100**	NA	NA
Manganese	300	**436**	NA	**413**	66.6	63	294	52.4	**743**	NA	NA	NA	**882**	NA	NA
Molybdenum	~	2.22 U	NA	10.4 D	11.8 D	10.6 D	11.2 D	3.6 D	3.22 D	NA	NA	NA	5.82 D	NA	NA
Potassium	~	16000	NA	43500	17000	16500	10100	13000	32000	NA	NA	NA	30000	NA	NA
Selenium	10	2.22 U	NA	2.22 U	**20** D	**16.2** D	2.22 U	3.91 D	**20** D	NA	NA	NA	2.22 UJ	NA	NA
Sodium	20000	**70300**	NA	**66700**	**93400**	**91800**	13800	**197000**	**37700**	NA	NA	NA	**149000**	NA	NA
Zinc	2000	19.8	NA	0.0193 U	30.6	20.9	0.0181 U	0.018 U	24.6	NA	NA	NA	36.8	NA	NA

Notes and Qualifiers:

1. Groundwater results are compared to the New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (SGV) for Class GA water.

2. Only analytes with detections are shown in this table.
3. Concentrations exceeding their NYSDEC TOGS 1.1.1 SGVs are shaded and bolded
4. Reporting limits for undetected results above NYSDEC TOGS 1.1.1. SGVs are italicized
5. µg/L = micrograms per liter
6. ~ = Criterion does not exist
7. ND = No detections
8. NA = Not analyzed
9. The analyte was detected above the method detection limit (MDL), but below the Reporting Limit (RL); therefore, the result is an estimated concentration.
10. U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL; the value shown in the table is the RL.
11. D = The sample was diluted; the dilution factor is included in the laboratory data report.
12. B = The analyte was found in the analysis batch blank.
13. UJ = The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
14. J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
15. bgs = below grade surface

Table 6
Groundwater Design Criteria Sample Analytical Results Summary
473 President Street
Brooklyn, New York
Langan Project No. 170361301
BCP Site ID: C224220

LOCATION	MW06D_050617		MW12D_050617		MW15D_050617		MW20D_050617		MW20S_050617	
SAMPLING DATE	5/6/2017		5/6/2017		5/6/2017		5/6/2017		5/6/2017	
LAB SAMPLE ID	L1714721-01		L1714721-02		L1714721-05		L1714721-04		L1714721-03	
SCREEN INTERVAL (feet bgs)	20-25		20-25		20-25		20-30		8-18	
General Chemistry (ug/L)										
Nitrogen, Ammonia	1010	J	117	J	882	J	930	J	748	J
Nitrogen, Nitrate	100	U	6010		100	U	3430		3790	
Phosphate, Total	300	J	400	J	460	J	460	J	2400	J
Sulfate	18000		29000		39000		68000		57000	
Dechlorinating Bacteria (cells/mL)										
DHC	9.15E+01		1.60E+00	U	1.50E+00	U	3.40E+00		9.10E+00	U

Notes and Qualifiers:

1. DHC = Dehalococcoides
2. ug/L = micrograms per liter
3. cells/mL = cells per mililiter
4. bgs = below grade surface
5. U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL; the value shown in the table is the RL.

Table 7
Sub-Slab Soil Vapor and Air Sample Analytical Detection Summary
473 President Street
Brooklyn, New York
Langan Project No.: 170361301
BCP ID No.:C224220

											DUPLICATE							
Sample ID	**AA01_030817**		**SV01_030817**		**SV02_030817**		**SV03_030917**		**SV04_030817**		**DUP01_030817**		**SV05_031017**	
Sample Location	**Outdoor Ambient**		**SV01**		**SV02**		**SV03**		**SV04**		**SV04**		**SV05**	
Laboratory ID	**17C0348-05**		**17C0348-01**		**17C0348-02**		**17C0424-01**		**17C0348-03**		**17C0348-04**		**17C0463-01**	
Sampling Date	**3/8/2017**		**3/8/2017**		**3/8/2017**		**3/9/2017**		**3/8/2017**		**3/8/2017**		**3/10/2017**	
Volatile Organic Compounds (VOCs) µg/m^3														
1,2,4-Trimethylbenzene	0.66	U	**54**	D	**85**	D	**33**	D	**51**	D	**45**	D	20	U
1,3,5-Trimethylbenzene	0.66	U	**16**	D	**25**	D	**10**	D	**16**	D	**14**	D	20	U
1,4-Dichlorobenzene	0.81	U	12	U	12	U	13	U	12	U	12	U	**55**	D
2-Butanone	1.7	D	5.9	U	5.8	R	6.1	U	**13**	JD	**38**	JD	12	U
Acetone	4.3	D	**11**	D	**170**	JD	**23**	D	**30**	JD	**58**	JD	19	U
Benzene	0.73	D	6.4	U	**8.8**	JD	**11**	D	**8.4**	D	**14**	D	13	U
Carbon disulfide	2	D	6.3	U	**7.4**	JD	**10**	D	**11**	D	**10**	D	12	U
Chloroform	0.66	U	9.8	U	9.6	R	**55**	D	**23**	D	**22**	D	20	U
cis-1,2-Dichloroethylene	0.54	U	8	U	7.8	R	**38**	D	**95**	D	**94**	D	16	U
Cyclohexane	0.47	U	6.9	U	6.8	R	**42**	D	**220**	D	**210**	D	**250**	D
Ethyl Benzene	0.59	U	**13**	D	**21**	D	**14**	D	**13**	D	**13**	D	**17**	D
n-Heptane	0.55	U	**11**	D	**36**	D	**220**	D	**400**	D	**400**	D	**7900**	D
n-Hexane	0.81	D	7.1	U	7	U	**89**	D	**280**	D	**270**	D	14	U
o-Xylene	0.59	U	**27**	D	**46**	D	**26**	D	**27**	D	**27**	D	**180**	D
p- & m- Xylenes	1.2	D	**59**	D	**97**	D	**58**	D	**57**	D	**55**	D	**340**	D
p-Ethyltoluene	0.66	U	**44**	D	**68**	D	**31**	D	**40**	D	**38**	D	20	U
Tetrachloroethylene	1.1	D	**38**	D	**54**	D	**120**	D	**440**	D	**390**	D	**60**	D
Toluene	2.3	D	**15**	D	**30**	D	**27**	D	**18**	D	**20**	D	**780**	D
Trichloroethylene	0.18	U	**450**	D	**470**	D	**39000**	D	**11000**	D	**11000**	D	5.4	U
Total VOCs	19.75		738		1,118.2		39,807		12,742.4		12,718		9,582	

Notes and Qualifiers:

1. Sub-slab soil vapor sample analytical results are compared to outdoor ambient air sample AA01_030817.
2. Only compounds with detections are shown in this table.
3. Results above outdoor ambient concentrations are bolded.
4. DUP01_030817 is a duplicate sample of SV04_030817.
5. µg/m3 = microgram per cubic meter
6. U = The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
7. D = Result is from an analysis that required a dilution
8. R = The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample
9. UJ = The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise
10. J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample

Table 8
Air Sample Analytical Results Summary
473 President Street
Brooklyn, New York
Langan Project No.: 170361301
BCP ID No.: C224220

Location	NYSDOH AGVs	AA02		IA01		IA02		IA03		IA04		IA05	
Sample ID		AA02_032818		IA01_032818		IA02_032818		IA03_032818		IA04_032818		IA05_032818	
Laboratory ID		L1810650-06		L1810650-01		L1810650-02		L1810650-03		L1810650-04		L1810650-05	
Sample Date		3/28/2018		3/28/2018		3/28/2018		3/28/2018		3/28/2018		3/28/2018	
Sample Type		AA		IA		IA		IA		IA		IA	
Volatile Organic Compounds (µg/m³)													
1,2,4-Trimethylbenzene	~	0.983	U	**2.21**	J	**2.17**	J	**2.34**		**2.02**	J	**1.04**	J
1,3,5-Trimethylbenzene (Mesitylene)	~	0.983	U	0.983	U	0.983	U	0.983	U	0.983	U	0.983	U
2,2,4-Trimethylpentane	~	0.934	U	**1.56**		**1.2**		**1.53**		**1.03**		0.934	U
Acetone	~	7.29	J	**20.1**	J	**19.6**	J	**23.7**	J	**16.7**	J	**13.1**	J
Benzene	~	0.799		**1.92**		**1.79**		**2.36**		**1.71**		**1.28**	
Carbon Disulfide	~	0.623	U	0.623	U	0.623	U	0.623	U	0.623	U	0.623	U
Carbon Tetrachloride	~	0.491		0.434		**0.503**		**0.591**		0.465		**0.579**	
Chloroform	~	0.977	U	**1.11**		**1.42**		**1.48**		**2.17**		0.977	U
Chloromethane	~	0.985		**1.06**		**1.12**		**1.48**		**1.03**		**1.14**	
Cis-1,2-Dichloroethene	~	0.079	UJ	**0.111**	J	**0.111**	J	**0.218**	J	**0.123**	J	0.079	UJ
Cyclohexane	~	0.688	U	**0.978**		**0.84**		**1.03**		**0.709**		0.688	U
Dichlorodifluoromethane	~	2.12		2.05		2.1		**2.79**		2.04		**2.24**	
Ethanol	~	9.42	U	**81.2**		**85.9**		**118**		**72.2**		**26.6**	
Ethyl Acetate	~	1.8	U	**1.83**		**3.33**		**2.09**		**2.17**		1.8	U
Ethylbenzene	~	0.869	U	**10.2**		**9.77**		**15**		**9.51**		**1.61**	
Isopropanol	~	1.23	UJ	**5.21**	J	**4.89**	J	**7.1**	J	**4.1**	J	**1.72**	J
M,P-Xylene	~	1.74	U	**9.64**		**9.38**		**13.9**		**8.82**		**2.82**	
Methyl Ethyl Ketone (2-Butanone)	~	1.47	U	**12.8**		**8.55**		**12.9**		**8.05**		**2.66**	
n-Heptane	~	0.82	U	**1.4**		**1.17**		**1.56**		**1.07**		**0.996**	
n-Hexane	~	0.853		**3.84**		**3.24**		**4.02**		**2.89**		**2.09**	
o-Xylene (1,2-Dimethylbenzene)	~	0.869	U	**3.19**		**3.11**		**4.23**		**2.94**		**1.03**	
Styrene	~	0.852	U	**13.2**		**13.2**		**19.1**		**12.3**		**1.33**	
Tetrachloroethene (PCE)	30	0.604		**1.48**		**1.96**		**1.86**		**2.81**		**0.685**	
Toluene	~	2.89		**11.2**		**9.38**		**9.72**		**10.1**		**11.8**	
Trichloroethene (TCE)	2	0.107	U	**9.78**		**10.1**		**23.9**		**10.4**		**2.9**	
Trichlorofluoromethane	~	1.28		1.19		1.2		**1.6**		1.17		**1.33**	
Total VOCs	~	17.312		**197.693**		**196.034**		**272.499**		**176.527**		**76.95**	

Notes:
1. Indoor air sample analytical results are compared to the New York State Department of Health Air Guideline Values (AGVs) as set forth in the New York State Department of Health (NYSDOH) October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York and subsequent updates (2013, 2015) and their respective ambient air sample AA02_032818
2. Only detected analytes are shown in the table.
3. Analytes detected with concentrations above the ambient air concentrations are bolded.
4. Analytes detected with concentrations above the minimum concentrations are shaded.
5. Analytical results with reporting limits (RL) above the minimum concentrations are italicized.
6. Sample AA02_032818 is background outdoor, ambient air sample.
7. ~ = Regulatory limit for this analyte does not exist
8. µg/m³ = micrograms per cubic meter
9. IA = Indoor Air
10. AA = Ambient Air

Qualifiers:
J – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
UJ – The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is approximate and may be inaccurate or imprecise.
U – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

Table 9
Indoor Air Documentation Sample Analytical Results Summary
473 President Street
Brooklyn, New York
Langan Project No.: 170361301
BCP ID No.: C224220

Location	NYSDOH AGVs	Documentation Sample Event # 1			Documentation Sample Event # 2			Documentation Sample Event # 3		
Sample ID		AA02_081718	IA06_081718	IA07_081718	AA01_090718	IA06_090718	IA07_090718	AA02_122018	IA06_122018	IA07_122018
Laboratory ID		L1832566-03	L1832566-01	L1832566-02	L1835562-01	L1835562-02	L1835562-03	L1852832-03	L1852832-01	L1852832-02
Sample Date		8/17/2018	8/17/2018	8/17/2018	9/7/2018	9/7/2018	9/7/2018	12/20/2018	12/20/2018	12/20/2018
Sample Type		AA	IA	IA	AA	IA	IA	AA	IA	IA
Volatile Organic Compounds (µg/m³)										
1,2,4-Trimethylbenzene	~	2.27	**3.56**	1	0.983 U	**1.33**	**1.04**	1.22	0.983 U	0.983 U
1,3,5-Trimethylbenzene (Mesitylene)	~	0.983 U	**1.19**	0.983 U	0.983 U	0.983 U	0.983 U	0.983 U	0.983 U	0.983 U
2,2,4-Trimethylpentane	~	0.934 U	**1.44**	0.934 U	1.51	1.15	0.934 U	1.6	0.934 U	0.934 U
Acetone	~	15.9 J	**58.2** J	**16.7** J	7.79 J	**16.7** J	**8.88** J	13.7 J	**28.5**	**28.7**
Benzene	~	0.732	**1.4**	0.639 U	0.786	0.776	0.639 U	2.38	1.01	0.984
Carbon Disulfide	~	0.623 U	**0.906**	**0.813**	0.623 U	0.623 U	0.623 U	0.623 U	0.623 U	0.623 U
Carbon Tetrachloride	~	0.428	**0.484**	0.333	0.459	0.415	0.447	0.516	0.308	0.308
Chloroform	~	0.977 U	**1.65**	**2.17**	0.977 U	**1.55**	**2.28**	0.977 U	**1.16**	**1.62**
Chloromethane	~	0.96	**2.04**	**2.13**	0.973	**1.22**	**1.17**	1.26	1.14	1.06
Cis-1,2-Dichloroethene	~	0.079 U	**0.492**	**0.274**	0.079 U	**0.317**	**0.278**	0.079 U	**0.238**	**0.301**
Cyclohexane	~	0.688 U	**1.64**	**0.83**	0.688 U	**0.74**	0.688 U	0.85	0.688 U	0.688 U
Dichlorodifluoromethane	~	2.3	**2.34**	**2.34**	2.21	2.19	2.04	2.02	**2.71** J	**2.2**
Ethanol	~	9.42 U	**60.9**	**79.5**	15.8	**245**	**135**	23.9	**437**	**511**
Ethyl Acetate	~	1.8 U	**3.37**	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Ethylbenzene	~	0.869 U	**13.2**	**3.81**	0.869 U	**2.97**	**2.03**	0.93	0.869 U	0.869 U
Isopropanol	~	1.57	**10.9**	**8.5**	1.55	**5.41**	**5.14**	4.74	**154**	**143**
M,P-Xylene	~	1.94	**20.5**	**6.25**	1.74 U	**5.04**	**3.74**	3.09	1.74 U	1.74 U
Methyl Ethyl Ketone (2-Butanone)	~	2.37	**5.16**	2.23	1.47 U	**3.3**	**1.92**	1.47 U	1.47 U	1.47 U
n-Heptane	~	0.82 U	**1.64**	0.82 U	0.82 U	0.82 U	0.82 U	1.4	0.951	0.926
n-Hexane	~	0.93	**3.51**	**1.19**	1.02	**1.72**	**1.18**	1.88	**2.57**	**2.26**
o-Xylene (1,2-Dimethylbenzene)	~	0.869 U	**7.69**	**2.48**	0.869 U	**1.94**	**1.42**	1.04	0.869 U	0.869 U
Styrene	~	0.852 U	**20.2**	**5.11**	0.852 U	**4.68**	**3.3**	0.852 U	0.852 U	0.852 U
Tetrachloroethene (PCE)	30	0.576	**1.14**	0.57	0.678	**1.27**	**1.57**	3.19	1.8	1.85
Toluene	~	2.92	**8.71**	**3.15**	2.68	**3.18**	2.37	6.71	3.21	2.82
Trichloroethene (TCE)	2	0.548	**31.4**	**9.03**	1.11	**19.6**	**14.1**	0.107 U	**12.6**	**17.4**
Trichlorofluoromethane	~	1.23	**1.6**	**1.79**	1.17	**1.19**	1.12 U	1.55	1.48	**1.6**
Total VOCs	~	34.674	**265.262**	**150.2**	37.736	**321.688**	**187.905**	71.976	**648.677**	**716.029**

Notes:
1. Indoor air sample analytical results are compared to the New York State Department of Health Air Guideline Values (AGVs) as set forth in the New York State Department of Health (NYSDOH) October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York and subsequent updates (2013, 2015) and their respective ambient air samples AA01_090718, AA02_081718, and AA02_122018
2. Only detected analytes are shown in the table.
3. Analytes detected with concentrations above the ambient air concentrations are bolded.
4. Analytes detected with concentrations above the minimum concentrations are shaded.
5. Samples AA01_090718, AA02_081718, and AA02_122018 are background outdoor, ambient air samples.
6. ~ = Regulatory limit for this analyte does not exist
7. µg/m³ = micrograms per cubic meter
8. IA = Indoor Air
9. AA = Ambient Air

Qualifiers:
J – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
UJ – The analyte was not detected at a level greater than or equal to the RL; however, the reported RL is approximate and may be inaccurate or imprecise.
U – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

Table 10
QA/QC Sample Analytical Detection Summary
473 President Street
Brooklyn, New York
Langan Project No. 170361301
BCP Site ID: C224220

Sample ID York ID Sampling Date Sample Type	NYSDEC TOGS SGVs - Class GA	TB01_030617 17C0226-09 3/6/2017 Trip Blank (Soil)		SOFB01_030817 17C0343-01 3/8/2017 Field Blank (Soil)		SOTB01_031017 17C0464-08 3/10/2017 Trip Blank (Soil)		SOFB01_031017 17C0464-09 3/10/2017 Field Blank (Soil)		GWFB01_031617 17C0618-05 3/16/2017 Field Blank (Groundwater)		GWTB01_031617 17C0618-06 3/16/2017 Trip Blank (Groundwater)		GWFB02_032217 17C0850-01 3/22/2017 Field Blank (Groundwater)		GWFB01_050617 L1714721-07 5/6/2017 Field Blank (Groundwater)		GWTB01_050617 L1714721 5/6/2017 Trip Blank (Groundwater)		TB01_042717 L1713501 4/27/2017 Trip Blank (Soil)	
Volatile Organic Compounds (VOC) (µg/L)																					
1,2,4-Trimethylbenzene	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	NA		0.82	J	2.5	U	2.5	U
Acetone	50	1.4	J	1.3	J	1	U	1.9	J	2.9		1	U	NA		5	U	5	U	5	U
Bromomethane	5	0.2	U	0.2	U	0.2	U	0.2	U	0.38	J	0.2	UJ	NA		2.5	U	2.5	U	2.5	U
p/m-Xylene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NA		0.74	J	2.5	U	2.5	U
Semivolatile Organic Compounds (SVOC) (µg/L)																					
Total SVOCs	~	ND		ND		ND		ND		ND		ND		NA		NA		NA		NA	
Pesticides (µg/L)																					
Total Pesticides	~	ND		ND		ND		ND		ND		ND		NA		NA		NA		NA	
Metals (µg/L)																					
Calcium	~	NA		441		NA		243		NA		NA		58.2		NA		NA		NA	
Chromium	50	NA		14		NA		6	U	NA		NA		5.56	U	NA		NA		NA	
Copper	200	NA		21		NA		4		NA		NA		8.95	J	NA		NA		NA	
Iron	~	NA		1,530		NA		65		NA		NA		29		NA		NA		NA	
Magnesium	35000	NA		601		NA		56	U	NA		NA		55.6	U	NA		NA		NA	
Manganese	300	NA		19		NA		6	U	NA		NA		5.56	U	NA		NA		NA	
Nickel	100	NA		6	U	NA		8		NA		NA		5.56	U	NA		NA		NA	
Potassium	~	NA		211		NA		56	U	NA		NA		55.6	U	NA		NA		NA	
Sodium	20000	NA		5,590		NA		758		NA		NA		193		NA		NA		NA	
Zinc	2000	NA		33		NA		54		NA		NA		20.5		NA		NA		NA	

Notes and Qualifiers:

1. Groundwater results are compared to the New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (SGV) for Class GA water.
2. Only analytes with detections are shown in this table.
3. µg/L = micrograms per liter
4. ~ = Criterion does not exist
5. ND = No detections
6. NA = Not analyzed
7. J = The analyte was detected above the method detection limit (MDL), but below the Reporting Limit (RL); therefore, the result is an estimated concentration.
8. U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL; the value shown in the table is the RL.
9. UJ = The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.

Appendix B
Geophysical Report

GEOPHYSICAL ENGINEERING SURVEY REPORT

Commercial Property

473 President Street
Brooklyn, New York 11215

NOVA PROJECT NUMBER
17-0087

DATED
March 14, 2017

PREPARED FOR:
LANGAN
&
MCP PRESIDENT STREET, LLC
550 Grand Street
Brooklyn, New York 11211

PREPARED BY:

NOVA
GEOPHYSICAL
ENGINEERING
Subsurface Mapping Solutions
56-01 Marathon Parkway # 765
Douglaston, New York 11362
347-556-7787 (PHONE)
718-261-1527(FAX)
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NOVA GEOPHYSICAL SERVICES

SUBSURFACE MAPPING SOLUTIONS
56-01 Marathon Parkway, # 765, Douglaston, New York 11362
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www.nova-gsi.com

March 14, 2017

Ms. Cynthia Schlegel
MCP President Street, LLC
550 Grand Street
Brooklyn, New York 11211

Re: Geophysical Engineering Survey (GES) Report
Commercial Property
473 President Street
Brooklyn, New York 11215

Dear Ms. Schlegel:

Nova Geophysical Services (NOVA) is pleased to provide findings of the geophysical engineering survey (GES) at the above referenced project site: Commercial Property, 473 President Street, Brooklyn, New York (the "Site"). Please see attached Site Location and Geophysical Survey maps for more details.

INTRODUCTION TO GEOPHYSICAL ENGINEERING SURVEY (GES)

NOVA performed a Geophysical engineering surveys (GES) consisting of a Ground Penetrating Radar (GPR) survey at the site. The purpose of this survey is to locate and identify USTs, anomalies, utilities and other substructures and to clear and mark proposed environmental boring areas on March 6th, 2017.

The equipment selected for this investigation was Noggin's 250 MHz ground penetrating radar (GPR) shielded antenna and 3M DYNATL.

A GPR system consists of a radar control unit, control cable and a transducer (antenna). The control unit transmits a trigger pulse at a normal repetition rate of 250 MHz. The trigger pulse is sent to the transmitter electronics in the transducer via the control cable. The transmitter electronics amplify the trigger pulses into bipolar pulses that are radiated to the surface. The transformed pulses vary in shape and frequency according to the transducer used. In the subsurface, variations of the signal occur at boundaries where there is a dielectric contrast (void, steel, soil type, etc.). Signal reflections travel back to the control unit and are represented as color graphic images for interpolation.

GEOPHYSICAL METHODS

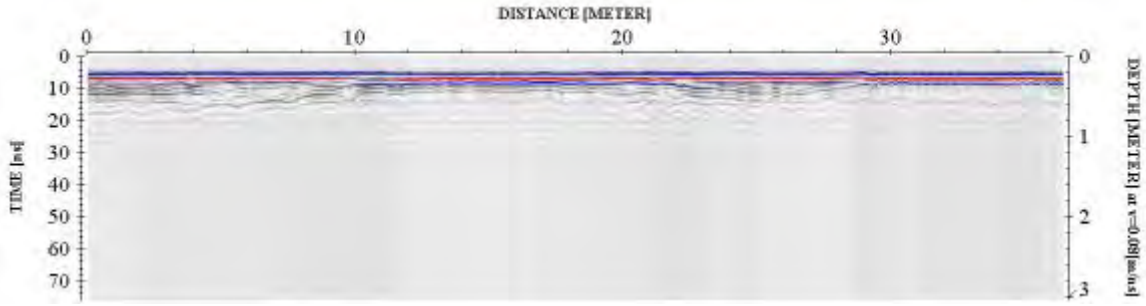
The project site was screened using the GPR to search the areas of interest and inspected for reflections, which could be indicative of major anomalies and substructures. Specific borehole locations were then individually cleared.

GPR data profiles were collected for the areas of the Site specified by the client. The surveyed areas consisted of concrete and tile surfaces.

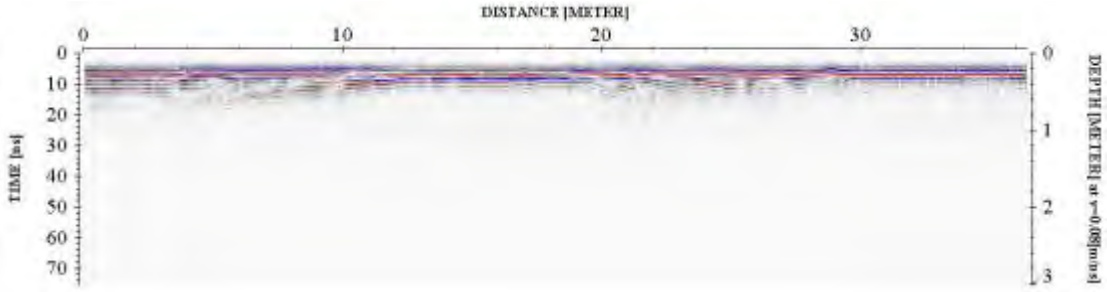
DATA PROCESSING

In order to improve the quality of the results and to better identify subsurface anomalies NOVA processed the collected data. The processes flow is briefly described at this section.

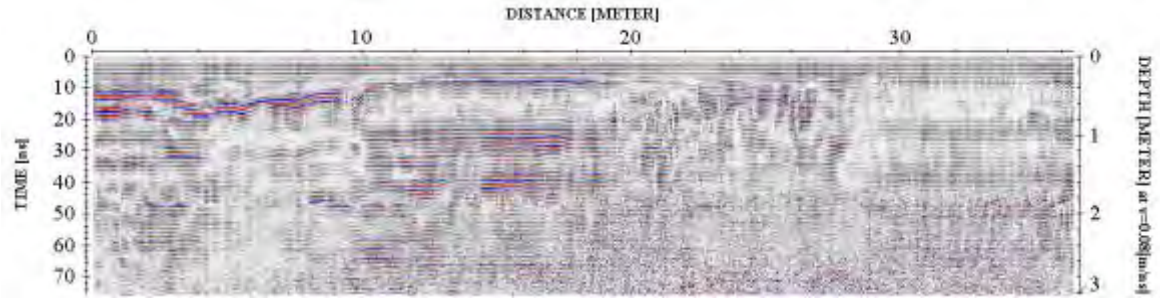
Step 1. Import raw RAMAC data to standard processing format



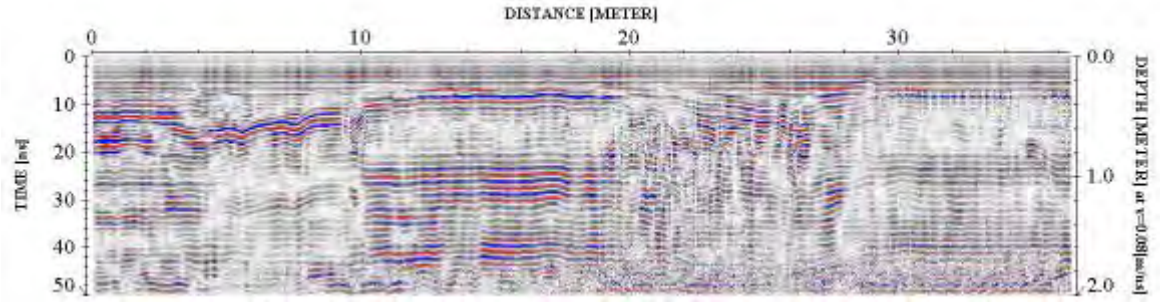
Step 2. Remove instrument noise *(dewow)*



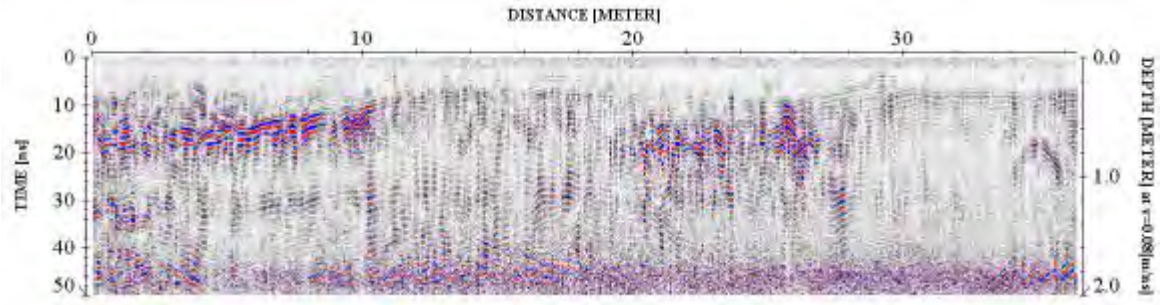
Step 3. Correct for attenuation losses *(energy decay function)*



Step 4. Remove static from bottom of profile *(time cut)*



Step 5. Mute horizontal ringing/noise *(subtracting average)*



The above example shows the significance of data processing. The last image (step 5) has higher resolution than the starting image (raw data – step 1) and describes the subsurface anomalies more accurately.

PHYSICAL SETTINGS

Nova observed following physical conditions at the time of the survey:

The weather: Clear skies

Temp: 45 Degrees (F).

Surface: Concrete and tile surfaces

Geophysical Noise Level (GNL): Geophysical Noise Level (GNL) was medium to high at the site. The noise was a result of the site being located in a heavily urbanized area and the thick concrete floor slab.

RESULTS

The results of the geophysical engineering survey (GES) identified following at the project Site:

- GES survey identified scattered anomalies located throughout the project site. Based on their rates and proximity, these anomalies were inconsistent with any USTs. These areas were indicated on the on-site markout.

- Two large anomalies, potentially consistent with USTs, were located on the site. These are indicated both on the onsite markout and on the survey map.

- Several utilities (sewer, water, gas and electrical) were located on the site. These utilities were indicated on the survey map.

- Geophysical Survey Plan portrays the areas investigated during the geophysical survey.

If you have any questions, please do not hesitate to contact the undersigned.
Sincerely,

NOVA Geophysical Services

Levent Eskicakit, P.G., E.P.
Project Engineer

Attachments:
Figure 1 Site Location Map
Geophysical Survey Plan
Geophysical Images

FIGURE 1
SITE LOCATION MAP

NOVA
Geophysical Services
Subsurface Mapping Solutions
56-01 Marathon Pkwy, # 765, Douglaston, NY11362
(347) 556-7787 Fax (718) 261-1528
www.nova-gsi.com

SITE: **Commercial Property**
473 President Street
Brooklyn, New York 11215

SCALE: See Map

1- All anomalies were marked in the field.

NOVA
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GEOPHYSICAL SURVEY PLAN

SITE : **Commercial Property**
473 President Street
Brooklyn, New York 11215

CLIENT: **LANGAN**
DATE: March 6, 2017
Scale See Map

INFORMATION

- Survey Area
- Gas Line
- Water Line
- Sewer Line
- Electrical Line
- Large Anomaly

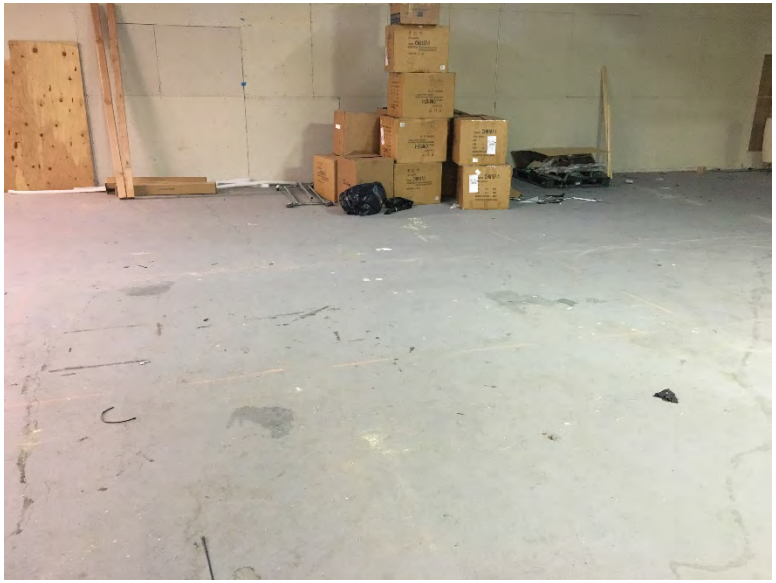
50 ft.

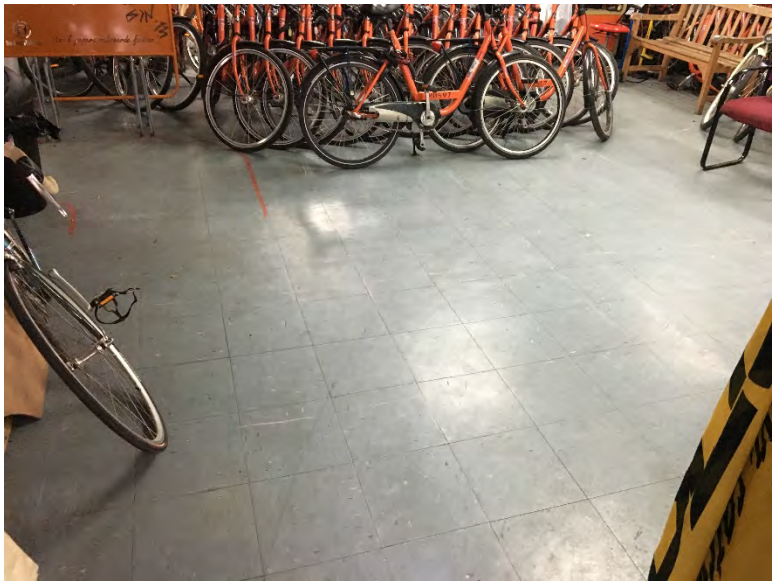
GEOPHYSICAL IMAGES

Commercial Property
473 President Street
Brooklyn, New York 11215
March 6, 2017

GEOPHYSICAL IMAGES

Commercial Property
473 President Street
Brooklyn, New York 11215
March 6, 2017





Appendix C
Soil Boring Logs

LANGAN

Log of Boring **SB-06/MW-06** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 13.17 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/6/17 — Date Finished: 3/6/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 16 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 3 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 9.5 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	24-inch concrete slab	0						
	R1 (0-6") loose, brown, fine SAND, coal, coal ash (dry) [FILL]	1	R1	MACROCORE	6"/48"	NA	0.0	11:45 Collected SB06_2-3
	R2 (0-24") medium dense, brown, fine SAND, coal, coal ash (dry) [FILL]	2	R2	MACROCORE	24"/48"	NA	0.0	12:10 Collected WCSB06_7-8
	R3a (0-18") medium dense, brown, fine SAND, coal, coal ash (dry) [FILL]	3	R3	MACROCORE	42"/48"	NA	0.0	11:55 Collected SB06_9-10
	R3b (18-42") medium dense, brown, fine SAND, trace silt (moist), [FILL]	4	R4	MACROCORE	38"/48"	NA	0.0	
	R4a (0-15") medium dense, brown, fine SAND, coal, coal ash, brick, (moist) [FILL]	5					0.0	
	R4b (15-22") medium dense, gray-brown fine SAND, trace clay, trace silt (wet)	6					0.0	
	R4c (22-31") medium dense, gray-brown fine SAND, some silt, trace clay (wet)	7					0.0	
	R4d (31-38") medium dense, gray-brown, fine SAND, trace silt, trace clay (wet)	8					0.0	
	E.O.B. at 16' below grade surface (bgs). Permanent monitoring well installed, screened from 8 to 18 feet bgs. See contruction log for details.	9					0.0	
		10					0.0	
		11					0.0	
		12					0.0	
		13					0.0	
		14					0.0	
		15					1.0	
		16					1.2	
		17					0.0	
		18						
		19						
		20						

LANGAN

Log of Boring **SB-06D/MW-06D** Sheet 1 of 2

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 13.09 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 4/28/17 — Date Finished: 4/28/17
Drilling Equipment: Geoprobe 7822 DT	Completion Depth: 30 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 6 — Undisturbed NA — Core NA
Casing Diameter (in): 4.25-inch-diameter Hollow Stem Auger — Casing Depth (ft): 25'	Water Level (ft.): First ▽ 9 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Tim Kelly
Sampler: 2" diameter 5' macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	36" Concrete slab	0	R1	MACROCORE	20"/48"	NA		
	R1 (0-20") loose, dark brown fine SAND, concrete, brick, coal, coal ash (dry) [FILL]	3					0.0	
		4					0.0	
		5					0.0	
		6	R2	MACROCORE	24"/60"	NA		
	R2 (0-24") medium dense, brown fine SAND, concrete, brick, coal, coal ash (moist) [FILL]	7						
		8					0.0	
	▽	9					0.0	
		10					0.0	
		11	R3	MACROCORE	12"/60"	NA		
	R3 (0-12") medium dense, brown, silty fine SAND, trace clay (moist)	14					0.0	
		15					0.0	
		16	R4	MACROCORE	2"/60"	NA		
	R4 (0-2") medium dense, brown fine SAND, some silt (moist)	19						
		20					0.0	

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Log of Boring **SB-06D/MW-06D** Sheet 2 of 2

Project	Project No.
473 President Street	170361301
Location	**Elevation and Datum**
Brooklyn, NY	13.09 NAVD88

MATERIAL SYMBOL	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	R5 (0-48") medium dense, brown fine SAND, trace silt (wet)	20	R5	MACROCORE	48"/60"	NA		13:50 Collected SB06D_20-25
		21					0.0	
		22					0.0	
		23					0.0	13:30 Collected SB06D_23-25 Collected Duplicate & MS/MSD
		24					0.0	
		25					0.0	
		26					0.0	
	R6 (0-36") medium dense, brown fine SAND, trace silt (wet)	27	R6	MACROCORE	36"/60"	NA	0.0	
		28					0.0	13:40 Collected SB06D_28-30
		29					0.0	
		30					0.0	
	E.O.B at 30' Monitoring well installed. See construction log for details.	31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						
		41						
		42						
		43						
		44						
		45						

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Log of Boring **SB-07/MW-07** Sheet 1 of 2

Project: 473 President Street		Project No.: 170361301	
Location: Brooklyn, NY		Elevation and Datum: 13.23 NAVD88	
Drilling Company: AARCO Environmental Services Corp.		Date Started: 3/7/17	Date Finished: 3/7/17
Drilling Equipment: Geoprobe 6610 DT		Completion Depth: 28 ft	Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe		Number of Samples: Disturbed 7	Undisturbed NA / Core NA
Casing Diameter (in): NA	Casing Depth (ft):	Water Level (ft.): First ▽ 10.5	Completion ▼ NA / 24 HR. ▽ NA
Casing Hammer: NA	Weight (lbs): NA / Drop (in): NA	Drilling Foreman: Greg Freese	
Sampler: 2" diameter 4' steel macrocore		Field Engineer: Veronica Zuluaga	
Sampler Hammer: NA	Weight (lbs): NA / Drop (in): NA		

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	24-inch concrete slab	0						
		1	R1	MACROCORE	0"/48"	NA		
	R1 no recovery	2						No recovery
		3						
		4						
		5	R2	MACROCORE	14"/48"	NA		Collect SB07_4-5
	R2 (0-14") medium dense, brown fine SAND, trace silt, brick, concrete, coal, coal ash (dry) [FILL]	6					0.0	
		7					58	
		8						
		9	R3	MACROCORE	32"/48"	NA		
	R3a (0-20") medium dense, brown fine SAND, trace silt, brick, concrete, coal, coal ash (moist) [FILL]	10					17	
		11					23	
	R3b (20-32") medium dense, fine SAND, some silt, trace clay (moist) [FILL]						112	Staining and petroleum-like odors observed smear (shaker test)
							1562	
		12					3280	
	R4a (0-14") medium dense, brown medium SAND, trace silt, brick, concrete, coal, coal ash (moist) [FILL]						338	
		13	R4	MACROCORE	48"/48"	NA	1326	
	R4b (14-27") medium dense, gray fine SAND, some clay, trace silt (wet)						805	Collect SB07_13-14 MC-open point
		14					1550	
	R4c (27-48") medium dense, brown fine SAND, some clay, trace silt (moist)						3333	
		15					2489	
							3580	
		16					1587	
		17	R5	MACROCORE	29"/48"	NA		Petroleum-like odor
							3931	
	R5 (0-29") medium dense, brown fine SAND, trace silt, trace medium sand (moist)	18					3945	
		19					2612	
							3269	
		20					3414	

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Log of Boring **SB-07/MW-07** Sheet 2 of 2

Project	Project No.
473 President Street	170361301
Location	**Elevation and Datum**
Brooklyn, NY	13.23 NAVD88

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	R6 (0-27") medium dense, grayish brown fine SAND, trace silt (wet)	20–24	R6	MACROCORE	27"/48"	NA	3423 4195 4183 3636	Collect SB07_23-24 and DUP01_030717
	R7 (0-48") dense to medium, brown fine SAND, trace silt (wet)	24–28	R7	MACROCORE	48"/48"	NA	254 313 263 194 135 100 48 48	
	E.O.B. at 28 feet below grade surface (bgs). Permanent monitoring well installed, screened from 20 to 25 feet bgs. See construction log for details	28–45						

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Log of Boring **SB-08/MW-08** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 11.18 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/6/17 — Date Finished: 3/6/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 12 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 3 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 7.5 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	11-inch concrete slab	0					0.0	
	R1 (0-14") loose, brown, fine SAND, coal, coal ash, concrete, brick (dry) [FILL]	1	R1	MACROCORE	14"/48"	NA	0.0	14:00 Collected SB08_1-2
		2						
		3						
		4						
	R2a (0-6") loose, black, fine SAND, coal, coal ash, brick (dry) [FILL]	5	R2	MACROCORE	24"/48"	NA	.025	
	R2b (6-24") medium dense, brown fine SAND, trace silt, trace clay, trace coal (moist) [FILL] ▽	6					.025	
		7					.025	14:10 Collected SB08_6-7
		8					.025	
	R3 (0-40") medium dense, brown fine SAND, trace silt, trace clay (wet)	9	R3	MACROCORE	40"/48"	NA	.025	
		10					.025	14:20 Collected SB08_8-9
		11					.025	
		12					.025	
	E.O.B. at 12 feet below grade surface (bgs). Permanent monitoring well installed, screened from 6-16 feet bgs. See construction log for details.	13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

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Log of Boring **SB-09/MW-09** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 13.12 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/8/17 — Date Finished: 3/8/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 16 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 4 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 7 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Kyle Twombly
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	14-inch concrete slab	0						
	R1 (0-19") loose, brown, fine SAND, concrete, coal ash (dry) [FILL]	1	R1	MACROCORE	19"/48"	NA	0.0	Collected SB09_1-2
		2					0.0	
		3					0.0	
		4						
	R2 (0-22") medium dense, gray-brown, fine SAND, trace medium sand, concrete, brick, coal ash (moist) [FILL] ▽	5	R2	MACROCORE	22"/48"	NA		
		6					0.0	
		7					0.0	
		8					0.0	
	R3 (0-44") medium dense, dark gray, silty fine SAND, trace clay (wet)	9	R3	MACROCORE	44"/48"	NA	0.0	
		10					0.0	
		11					0.0	Collected SB09_10-11
		12					0.0	
		13					0.0	
	R4 (0-26") medium dense, grayish brown clayey SILT, trace fine sand (wet)	14	R4	MACROCORE	26"/48"	NA	0.0	
		15					0.0	
		16					0.0	
	E.O.B. at 16'	17						
		18						
		19						
		20						

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Log of Boring **SB-10/MW-10** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 4.82 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/9/16 — Date Finished: 3/9/16
Drilling Equipment: DeWalt Jackhammer	Completion Depth: 10 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 3 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 4 — Completion ▼ NA — 24 HR. ▽ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Kyle Twombly
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	6-inch Slab	0						
	R1 (0-24") medium dense, black COAL (wet) [FILL]	1	R1	HAND AUGER	24"/24"		0.0	
		2						
		3						
		4 ▽	R2	MACROCORE	14"/48"		19.0	Well Graded Coal
	R2 (0-14") medium dense, black COAL (wet) [FILL]	5					35	
		6					30	
	R3a(0-11") medium dense, black COAL (wet) [FILL] R3b(11"-13") CONCRETE (wet) [FILL]	7	R3	MACROCORE	48"/48"		25.2 0.0 0.0	
	R3c(13"-48") brown fine SAND, some medium sand, trace silt (wet)	8					0.0 0.0 0.0	
		9					0.0 0.0	
	E.O.B at 10 feet below grade surface (bgs). Monitoring well installed, screened from 0 to 8 feet bgs. See construction log for details.	10						
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						

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Log of Boring **SB-11** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: NA
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/10/17 — Date Finished: 3/10/17
Drilling Equipment: DeWalt Jackhammer	Completion Depth: 16 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 4 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 14.5 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	2-foot concrete slab	0						
	R1 (0-13") loose, brown, fine SAND, concrete, brick, coal, coal ash, coal tar (dry) [FILL]	1	R1	MACROCORE	13"/48"		0.0	
		2					0.0	
		3						0820 Collected SB11_2-4
		4						
	R2 (0-21") loose, brown, fine SAND, concrete, brick, coal, coal ash, coal tar (dry) [FILL]	5	R2	MACROCORE	21"/48"			
		6					0.0	
		7					0.0	
		8					0.0	Mothball-like odor
	R3 (0-14") loose, brown, fine SAND, concrete, brick, coal, coal ash, coal tar (dry) [FILL]	9	R3	MACROCORE	14"/48"			
		10						
		11					0.0	
		12					0.0	
	R4a(0-16") medium dense, fine SAND, concrete, brick, coal, coal ash (dry) [FILL]	13	R4	MACROCORE	34"/48"		0.0	
		14					0.0	
	R4b(16"-26") medium dense to dense, brown, low plasticity, clayey SILT, trace fine sand, (moist) [SILT] ▽	14					0.0	
		15					0.0	0840 Collected SB11_11-15
	R4c(26"-34") medium dense, brown, fine SAND, some low plasticity clay, trace silt (wet)	16					0.0	
	E.O.B at 30' Backfilled with #2 sand. Patched with concrete.	17						
		18						
		19						
		20						

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Log of Boring **SB-12/MW-12** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 12.46 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/8/17 — Date Finished: 3/8/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 16 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 4 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 9.5 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	6" thick concrete slab	0						
	R1 (0-24") medium dense, brown fine SAND, concrete, brick, coal, coal ash (dry) [FILL]	1	R1	MACROCORE	24"/48"	NA	0.0 0.0 0.1 0.0	13:15 Collect SB12_1-2
		2						
		3						
		4						
	R2 (0-26") medium dense, brown fine SAND, concrete, brick, glass, coal, coal ash (dry) [FILL]	5	R2	MACROCORE	26"/48"	NA		
		6					0.0	
		7					0.0 0.1	
		8					0.0	
	R3 (0-32") medium dense, brown fine SAND, trace medium sand (moist) ▽	9	R3	MACROCORE	32"/48"	NA		13:25 Collect SB12_9-10
		10					0.1	
		11					0.1 0.1	
		12					0.1	
	R4 (0-44") medium dense, brown fine SAND, trace medium sand, trace silt (wet)	13	R4	MACROCORE	44"/48"	NA	0.0	
		14					0.0 0.0	
		15					0.0 0.0	
		16					0.0	
	E.O.B. at 16 feet below grade surface (bgs). Permanent monitoring well installed, screened from 8 to 18 feet bgs. See construction log for details.	17						
		18						
		19						
		20						

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Log of Boring **SB-12D/MW-12D** Sheet 1 of 2

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 12.43 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 4/29/17 — Date Finished: 4/29/17
Drilling Equipment: Geoprobe 7822 DT	Completion Depth: 30 ft — Rock Depth: NA
Size and Type of Bit: 2" direct push dual tube	Number of Samples: Disturbed 6 — Undisturbed NA — Core NA
Casing Diameter (in): 3.75-inch-diameter Steel Casing — Casing Depth (ft): 25'	Water Level (ft.): First ▽ 9.5 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Tom Sieckel
Sampler: 1.75-inch-diameter, 5-foot dual tube sampler	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	7" Concrete slab	0						
	R1 (0-10") loose, brown, fine SAND, CD (concrete, brick), coal, coal ash (dry) [FILL]	1	R1	2" DUAL TUBE	10"/60"		0.0	
		2						
		3						
		4						
		5						
	R2a (0-32") medium dense, gray-brown fine SAND, coal, coal ash, CD (brick) (dry) [FILL]	6	R2	2" DUAL TUBE	38"/60"		0.0	
		7					0.0	
		8					0.0	
		9					0.0	
	R2b (32"-38") medium dense, brown, fine SAND (wet)	10					0.0	
	R3 (0-40") medium dense, brown, fine SAND (wet)	11	R3	2" DUAL TUBE	40"/60"		0.0	
		12					0.0	
		13					0.0	
		14					0.0	
		15					0.0	
	R4 (0-48") medium dense, brown, fine SAND, trace silt (wet)	16	R4	2" DUAL TUBE	48"/60"		0.0	
		17					0.0	
		18					0.0	
		19					0.0	
		20					0.0	

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Log of Boring **SB-12D/MW-12D** Sheet 2 of 2

Project	Project No.
473 President Street	170361301
Location	**Elevation and Datum**
Brooklyn, NY	12.43 NAVD88

MATERIAL SYMBOL	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	R5 (0-40") medium dense, brown fine SAND, trace silt (wet)	20–25	R5	2" DUAL TUBE	40"/60"		0.0 0.0 0.0 0.0 0.0 0.0	09:30 Collected SB12D_23-25 09:40 Collected SB12D_20-25
	R6 (0-10") medium dense, brown fine SAND, trace coarse sand, trace silt (wet)	25–30	R6	2" DUAL TUBE	10"/60"		0.0 0.0	10:10 Collected SB12D_28-30
	E.O.B. at 30' Monitoring well installed. See construction log for details.	30–45						

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Log of Boring **SB-13** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: NA
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/6/17 — Date Finished: 3/6/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 12 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 3 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 8 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	5-inch concrete slab	0						
	R1a (0-12") medium dense, gray-brown fine SAND, trace medium sand, concrete, tile, brick (dry) [FILL]	1	R1	MACROCORE	16"/48"	NA	0.0	9:15 Collect SB13_1-2
	R1b (12-16") insulation material, dry wall (dry) [FILL]	2					0.025	
		3					0.025	
		4						
	R2a (0-16") medium dense, gray fine SAND, trace silt, trace fine gravel, concrete (dry) [FILL]	5	R2	MACROCORE	33"/48"	NA		
	R2b (16-24") CONCRETE (dry) [FILL]	6					0.025	
		7					0.025	
	R2c (24-33") BRICK, trace fine sand (moist) [FILL] ▽	8					0.025	
		9					0.025	
	R3 (0-30") medium dense, brown, low plasticity, clayey fine SAND, trace silt (wet)	10	R3	MACROCORE	30"/48"	NA	0.025	9:25 Collect SB13_9-10 No staining odors observed
		11					0.0	
		12					0.0	
	E.O.B. at 12 feet below grade surface. Backfilled with #2 sand and patched with concrete.	13					0.0	E.O.B. at 12' Backfill and patch w/ concrete
		14					0.0	
		15					0.0	
		16						
		17						
		18						
		19						
		20						

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Log of Boring **SB-14** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: NA
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/8/17 — Date Finished: 3/8/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 16 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 4 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 10.5 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	6-inch concrete slab	0						
	R1 (0-25") medium dense, grayish brown fine SAND, concrete, brick, coal, coal ash (dry) [FILL]	1	R1	MACROCORE	25"/48"	NA	0.2	11:30 Collect SB14_1-2
		2					0.2	
		3					0.2	
		4					0.2	
	R2 (0-29") medium dense, grayish brown fine SAND, brick, concrete, coal, coal ash (dry) [FILL]	5	R2	MACROCORE	29"/48"	NA		
		6					0.2	
		7					0.2	
		8					0.2	
		9					0.2	
	R3 (0-24") dense-medium dense, brown clayey SILT, trace fine sand, trace till (moist) [SILT]	10 ▽	R3	MACROCORE	24"/48"	NA	0.1	Approx water table depth 11:40 Collect SB14_10-11
		11					0.1	
		12					0.1	
	R4 (0-48") medium dense, brown fine SAND (wet)	13	R4	MACROCORE	48"/48"	NA	0.1	
		14					0.1	
		15					0.1	
		16					0.1	
	E.O.B. at 16 feet below grade surface. Backfilled with #2 sand and patched with concrete.	17					0.1	
		18					0.1	
		19					0.1	
		20					0.1	

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Log of Boring **SB-15** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: NA
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/8/17 — Date Finished: 3/8/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 16 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 4 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 7 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Kyle Twombly
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	14-inch concrete slab	0						
	R1 (0-18") light brown fine SAND, concrete, coal ash (dry) [FILL]	1	R1	MACROCORE	18"/48"	NA	0.0	Collect SB15_1-2
		2					0.0	
		3					0.0	
	R2a (0-9") loose, concrete, coal ash, trace brick (dry) [FILL]	4						
		5	R2	MACROCORE	20"/48"	NA		
	R2b (9-20") light brown fine SAND, trace medium sand, trace concrete, trace gravel (moist) [FILL]	6						
		7 ▽					0.0	
		8					0.0	Collect SB15_7-8
	R3a (0-10") grayish brown fine SAND, trace silty sand, coal ash (moist) [FILL]	9					0.0	
	R3b (10-29") grayish brown clayey fine SAND, trace silt (wet)	10	R3	MACROCORE	29"/48"	NA	0.0	Collect SB15_10-11
		11					0.0	
		12					0.0	
	R4 (0-30") grayish brown clayey fine SAND, trace silt (wet)	13	R4	MACROCORE	30"/48"	NA		
		14					0.0	
		15					0.0	
		16					0.0	
	E.O.B. at 16 feet below grade surface. Backfilled with #2 sand and patched with concrete.	17					0.0	
		18						
		19						
		20						

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Log of Boring **SB-15D/MW-15D** Sheet 1 of 2

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 13.21 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 4/28/17 — Date Finished: 4/28/17
Drilling Equipment: Geoprobe 7822 DT	Completion Depth: 40 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 8 — Undisturbed NA — Core NA
Casing Diameter (in): 4.25" Hollow Stem Auger — Casing Depth (ft): 25'	Water Level (ft.): First ▽ 10 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Tim Kelly
Sampler: 2" diameter 5' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	24-inch Concrete slab	0	R1	MACROCORE	24"/60"	NA		
		1					0.0	
	R1 (0-24") loose, brown, fine SAND, concrete, brick, coal, coal ash (dry) [FILL]	2					0.0	
		3					0.0	
		4					0.0	08:15 First run finished
		5	R2	MACROCORE	29"/60"	NA		
		6						
	R2a (0-5") CONCRETE (dry) [FILL]	7					0.0	
		8					0.0	
	R2c (5"-12") loose, brown, fine SAND, coal ash (dry) [FILL]	9					0.0	
	R2c (12"-29") BRICK (dry) [FILL]	10 ▽					0.0	08:20 Second run finished
		11	R3	MACROCORE	36"/60"	NA		
	R3a (0-10") medium dense, dark brown fine SAND, coal ash (moist) [FILL]	12					0.0	
	R3b (10"-18") medium dense, gray-brown, fine SAND, trace silt (wet)	13					0.0	
	R3c (18"-24") medium dense, gray, fine SAND, some silt, trace clay (moist)	14					0.0	
	R3d (24"-36") medum dense , gray, silty, fine SAND, trace clay (moist)	15					0.0	08:35 Third run finished
		16	R4	MACROCORE	48"/60"	NA		
	R4a (0-26") medium dense, gray, silty fine SAND, some clay (wet)	17					0.0	
		18					0.0	
	R4b (26"-48") medium dense, brown, fine SAND, some medium SAND (wet)	19					0.0	
		20					0.0	

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Log of Boring **SB-15D/MW-15D** Sheet 2 of 2

Project	Project No.
473 President Street	170361301
Location	**Elevation and Datum**
Brooklyn, NY	13.21 NAVD88

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		20						
		21				NA		
		22					0.0	11:00
		23					0.0	Collected SB15D_20-25
	R5 (0-48") medium dense, brown, fine SAND, trace silt (wet)	24	R5	MACROCORE	48"/60"		0.0	Design Criteria
		25					0.0	
		26					0.0	09:30
		27					0.0	Collected SB15D_23-25
		28					0.0	
		29					0.0	
		30					0.0	
	R6 (0-46") medium dense, brown, fine SAND, trace silt (wet)	31	R6	MACROCORE	46"/60"	NA	0.0	
		32					0.0	
		33					0.0	
		34					0.0	
		35					0.0	
		36					0.0	
		37					0.0	
		38					0.0	
	R7 (0-60") medium dense, brown, fine SAND, trace silt (wet)	39	R7	MACROCORE	60"/60"	NA	2.0	10:20
		40					0.4	Collected SB15D_31-33
		41					1.2	
		42					0.0	
		43					0.0	
		44					0.0	
		45					0.0	
		46					0.0	
		47					0.0	
		48					0.0	
		49					0.0	
		50					0.0	
		51					0.0	
		52					0.0	
		53					0.0	
		54					0.0	
		55					0.0	
		56					0.0	
		57					0.0	
		58					0.0	
		59					0.0	
		60					0.0	
	R8 (0-42") medium dense, gray-brown, fine SAND, trace silt (wet)	61	R8	MACROCORE	42"/60"	NA	0.0	10:30
		62					0.0	Collected SB15D_37-39
		63					0.0	10:25
		64					0.0	Eighth run finished
		65					0.0	
		66					0.0	
		67					0.0	
		68					0.0	
		69					0.0	
		70					0.0	
	E.O.B. at 40' Monitoring well installed. See construction log for details. MD-15D screened from 20'-25'	71						
		72						
		73						
		74						
		75						
		76						
		77						
		78						
		79						
		80						
		81						
		82						
		83						
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		120						

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Log of Boring **SB-16** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: NA
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/9/17 — Date Finished: 3/9/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 16 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 4 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 9 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Kyle Twombly
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	10-inch Concrete Slab	0						
	R1 (0-14") loose, dark brown,fine SAND, coal, coal ash, slag (dry) [FILL]	1	R1	MACROCORE	14"/48"		0.0	
		2					0.0	Collect SB16_1-2
		3						
	R2a(0-7") loose, red BRICK, fine coal, coal ash, slag (dry) [FILL]	4						
		5						
	R2b (7"-11") loose, brown fine SAND, coal ash (moist) [FILL]	6	R2	MACROCORE	18"/48"			
	R2b(11"-18") loose red BRICK, fine coal, coal ash, slag (dry) [FILL]	7					0.0	
		8					0.0	
	R3 (0-30") medium dense, dark gray, fine SAND, trace medium sand, trace sily, coal ash, red brick (moist) [FILL] ▽	9					0.0	
		10	R3	MACROCORE	30"/48"		0.0	Collect SB16_9-11
		11					0.0	
		12					0.0	
	R4a(0-18") medium dense, dark gray, fine SAND, trace medium sand, trace silt, coal ash, red brick (moist) [FILL]	13					0.0	
	R4b(18"-24") medium dense, grayish brown, fine SAND, some clay, trace silt (moist)	14	R4	MACROCORE	48"/48"		0.0	
	R4c(24"-48") medium dense, brown, fine SAND, trace silt (moist)	15					0.0	Collect SB16_14-15
		16					0.0.	
	E.O.B. at 16 feet below grade surface. Backfilled and patched with concrete	17					0.0	
		18						
		19						
		20						

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Log of Boring **SB-17** Sheet 1 of 1

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: NA
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/8/17 — Date Finished: 3/8/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 16 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 4 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 8 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	14-inch concrete slab	0						
	R1a (0-6") BRICK, concrete (dry) [FILL]	1	R1	MACROCORE	18"/48"	NA	0.1	8:15 Collect SB17_1-2
	R1b (6"-18") medium dense, brown fine SAND, coal, coal ash, trace silt (dry) [FILL]	2					0.1	
		3					0.1	
		4	R2	MACROCORE	22"/48"	NA		
		5						
	R2 (0-22") medium dense, brown fine SAND, brick, concrete, coal, coal ash (moist) [FILL]	6					0.2	
		7					0.1	8:15 Collect SB17_7-8
	▽	8					0.0	
		9	R3	MACROCORE	6"/48"	NA		
		10						
	R3 (0-6") medium dense, brown fine SAND, coal, coal ash (moist) [FILL]	11						
		12					0.1	
		13	R4	MACROCORE	12"/48"	NA		
	R4 (0-12") medium dense, brown fine SAND, trace silt (wet)	14						
		15					0.0	8:35 Collect SB17_15-16
		16					0.0	
	E.O.B. at 16 feet below grade surface. Backfilled and patched with concrete	17						
		18						
		19						
		20						

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Log of Boring **SB-18/MW-18** Sheet 1 of 2

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 13.22 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/10/17 — Date Finished: 3/10/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 24 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 6 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 10.5 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	14" Concrete slab	0						
	R1 (0-5") CONCRETE (dry) [FILL]	1	R1	MACROCORE	16"/48"			
		2						
		3					0.0	
		4					0.0	
	R2 (0-20") loose, brown, fine SAND, concrete, brick, coal, coal ash (dry) [FILL]	5	R2	MACROCORE	20"/48"			
		6					0.0	
		7					0.0	
		8					0.0	
		9	R3	MACROCORE	27"/48"		564	
	R3a (0-8") loose, concrete, brick, coal, coal ash (dry) [FILL]	10					16.5	
	R3b (8"-27") medium dense, dark gray, fine SAND, some silt, trace clay (moist)	11					29.2	1230 Collected SB18_10-11
		12					221	
		13					475	Staining and petroleum-like oder present
	R4 (0-34") medium dense to dense, brown, silty, fine SAND, trace clay (wet)	14	R4	MACROCORE	34"/48"		969	
		15					640	
		16					828	
		17					930	
	R5 (0-45") medium dense, brown, fine SAND, trace silt (wet)	18	R5	MACROCORE	45"/48"		976	
		19					1337	Petroleum-like odor present
		20					272	
							1390	
							1493	
							1395	
							1387	
							994	
							1107	Petroleum-like odor present
							1222	

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Log of Boring **SB-18/MW-18** Sheet 2 of 2

Project	Project No.
473 President Street	170361301
Location	**Elevation and Datum**
Brooklyn, NY	13.22 NAVD88

MATERIAL SYMBOL	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	R6 (0-18") medium dense, brown fine SAND, trace silt (wet)	20–24	R6	MACROCORE	18"/48"		98	
	E.O.B. at 24 feet below grade surface (bgs). Permanent monitoring well installed screened from 8 to 18 feet. See construction log for details.	24						1250 Collected SB18_23-24

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Log of Boring **SB-19** Sheet 1 of 2

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: NA
Drilling Company: AARCO Environmental Services Corp.	Date Started: 3/10/17 — Date Finished: 3/10/17
Drilling Equipment: Geoprobe 6610 DT	Completion Depth: 24 ft — Rock Depth: NA
Size and Type of Bit: 2" Macrocore Cutting Shoe	Number of Samples: Disturbed 6 — Undisturbed NA — Core NA
Casing Diameter (in): NA — Casing Depth (ft):	Water Level (ft.): First ▽ 10.5 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Greg Freese
Sampler: 2" diameter 4' steel macrocore	Field Engineer: Kyle Twombly
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	14-inch concrete slab	0						
	R1a(0-12") CONCRETE (dry) [FILL]	1						
	R1b(12"-24") medium dense, brown, fine SAND, concrete, brick, coal, coal ash (dry) [FILL]	2	R1	MACROCORE	24"/48"		9.5	
		3					9.5	
		4						
		5						
	R2 (0-22") medium dense, brown, fine SAND, coal, coal ash, concrete, brick (dry) [FILL]	6	R2	MACROCORE	22"/48"		15.7	
		7					13.5	
		8					19.5	
		9						
	R3 (0-19") medium dense, brown, fine SAND, concrete, brick (moist) [FILL] ▽	10	R3	MACROCORE	19"/48"		7	Collected SB19_10-11
		11					5.5	
		12					3.5	
		13						
	R4a (0-17") medium dense, brown, fine SAND, coal, coal ash, concrete, brick, wood (moist) [FILL]	14	R4	MACROCORE	31"/48"		659	
	R4b (14"-31") medium dense, grayish-brown, silty SAND, trace clay (wet)	15					1042	
		16					1276	
		17					789	
	(0-48") medium dense, grayish-brown, fine SAND, trace silt (wet)	18					740	
		19	R5	MACROCORE	48"/48"		983	Some staining present.
		20					1500	
							1177	
							1105	
							39.0	
							39.0	
							12.1	

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Log of Boring **SB-19** Sheet 2 of 2

Project	Project No.
473 President Street	170361301
Location	**Elevation and Datum**
Brooklyn, NY	NA

MATERIAL SYMBOL	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	(0-24") medium dense, brown, fine SAND (wet)	20–24	R6	MACROCORE			10.3 10	Collected SB19_20-22 MS/MSD DUPLICATE Liner was stuck in the macrocone. Soil was collected into bag.
	E.O.B. at 24 feet below grade surface. Backfilled with #2 sand and patched with concrete.	24–45						

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Log of Boring **SB-20/MW-20D** Sheet 1 of 3

Project: 473 President Street	Project No.: 170361301
Location: Brooklyn, NY	Elevation and Datum: 13.27 NAVD88
Drilling Company: AARCO Environmental Services Corp.	Date Started: 4/27/17 — Date Finished: 4/27/17
Drilling Equipment: Geoprobe 7822 DT	Completion Depth: 55 ft — Rock Depth: NA
Size and Type of Bit: 2" direct push dual tube	Number of Samples: Disturbed 11 — Undisturbed NA — Core NA
Casing Diameter (in): 4.25" Hollow Stem Auger — Casing Depth (ft): 25'	Water Level (ft.): First ▽ 10 — Completion ▼ NA — 24 HR. ▼ NA
Casing Hammer: NA — Weight (lbs): NA — Drop (in): NA	Drilling Foreman: Tim Kelly
Sampler: 1.75-inch-diameter, 5-foot dual tube sampler	Field Engineer: Veronica Zuluaga
Sampler Hammer: NA — Weight (lbs): NA — Drop (in): NA	

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	24" Concrete Slab	0	R1	2" DUAL TUBE	4"/60"	NA		Collected SB20D_0-2 VOCs Only
	R1 (0-4") medium dense, gray-brown, fine SAND, brick, coal ash (dry) [FILL]	1					0.0	
		2						
		3						
		4						
		5	R2	2" DUAL TUBE	22"/60"	NA		
		6						
		7						
	R2 (0-22") medium dense, brown, fine SAND, concrete, brick, coal, coal ash (moist) [FILL]	8					0.4	
		9					0.8	
		10 ▽					1.2	
		11	R3	2" DUAL TUBE	36"/60"	NA		
	R3a (0-18") medium dense, gray, fine SAND, coal (moist) [FILL]	12					907	Petroleum-like odor
	R3b (18"-26") medium dense, silty fine SAND, trace clay (moist) [FILL]	13					851	
							749	
	R3c (26"-36") medium dense, gray, fine SAND, some silt, trace clay (wet)	14					117	
							667	Staining & odors present
		15					967	
		16	R4	2" DUAL TUBE	42"/60"	NA		15:15 Collected SB20_14-19
	R4a (0-10") medium dense, gray fine SAND, some silt (wet)	17					856	
							1121	
	R4b (10-42") medium dense, gray, fine SAND, trace silt (wet)	18					1095	13:00 Collected SB20_17-19
							320	
		19					471	
							398	
		20					7.1	

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Log of Boring **SB-20/MW-20D** Sheet 2 of 3

Project	Project No.
473 President Street	170361301
Location	**Elevation and Datum**
Brooklyn, NY	13.27 NAVD88

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	R5 (0-60") medium dense, brown fine SAND, trace medium sand (moist)	20	R5	2" DUAL TUBE	60"/60"	NA	8.4	
		21					6.4	
		22					3.1	
		23					0.2	
		24					2.4	
		25					17.2	13:40 Collected SB20_23-25
							2.5	
							5.6	
							0.8	
	R6 (0-47") medium dense, brown, fine SAND, trace silt (moist)	26	R6	2" DUAL TUBE	47"/60	NA		15:05 Collected SB20_20-30
		27						
		28						
		29					295	
		30					3.9	
							0.8	
	R7 (0-52") medium dense, brown, fine SAND (wet)	31	R7	2" DUAL TUBE	52"/60"	NA	0.0	14:00 Collected SB20_30-32
		32					0.0	
		33					0.0	
		34					0.0	
		35					0.0	
							0.0	
							0.0	
	R8 (0-46") medium dense, brown, fine SAND, trace medium sand (wet)	36	R8	2" DUAL TUBE	46"/60	NA		
		37					0.0	
		38					0.0	
		39					0.0	
		40					0.0	
							0.0	
							0.0	
	R9 (0-50") medium dense, brown, fine SAND, trace medium sand (wet)	41	R9	2" DUAL TUBE	50"/60"	NA		
		42					0.0	
		43					0.0	
		44					0.0	
		45					0.0	
							0.0	
							0.0	
							0.0	

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Log of Boring **SB-20/MW-20D** Sheet 3 of 3

Project	Project No.
473 President Street	170361301
Location	**Elevation and Datum**
Brooklyn, NY	13.27 NAVD88

Material Symbol	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	PID Reading (ppm)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	R10 (0-49") medium dense, brown fine SAND, trace medium sand (wet)	45–50	R10	2" DUAL TUBE	49"/60"	NA	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
	R11a (0-50") medium dense, brown fine SAND, medium SAND, trace silt (wet) R11b (50"-55") medium dense, brown, medium SAND, trace fine sand (wet)	50–55	R11	2" DUAL TUBE	55"/60"	NA	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
	E.O.B. at 55' Monitoring well installed. See construction log for details.	55–70						

Appendix D
Monitoring Well Construction Logs

LANGAN

WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-06

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 13.17 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 3/7/2017 **DATE FINISHED** 3/7/2017
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Greg Freese
SIZE AND TYPE OF BIT 3-3/4-inch diameter steel casing	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 6-inch diameter steel core barrel to remove the concrete slab cover. A 2-inch diameter steel macro-core sampler was used to recover soil samples, followed by advancement of 3-3/4–inch diameter steel casing fitted with an expendable point to support a borehole opening for installation of the PVC well. The casing was advanced to about 18 feet below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the casing The well was constructed of 10 feet of 2-inch diameter pre-pack well constructed of an outer layer of 65 mesh stainless steel screen, 20 x 40 silica sand over a 0.01-slot screen set from 8 to 18 feet bgs and 8 feet of solid PVC riser set from 0.2 feet bgs to 8 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 6 to 18 feet bgs and the depth of the pack was measured during backfilling to ensure correct depth placement. A bentonite grout slurry was backfilled between 2 to 6 feet bgs to seal the well annulus. Filpro #2 sand was backfilled between 1 to 2 feet bgs and the well was capped with a removable J-plug and finished within a bolt-down flush-mount manhole cover set in concrete.

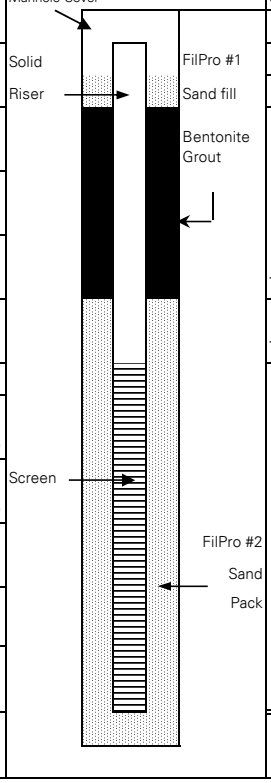
METHOD OF WELL DEVELOPMENT

Langan surged a 1.75-inch bailer across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand
TYPE OF SCREEN Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout
BOREHOLE DIAMETER 3-3/4-inch	**TYPE OF FILTER MATERIAL** FilPro #2 Sand

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	12.97	0.2
TOP OF SEAL	10.97	2
TOP OF FILTER	6.97	6
TOP OF SCREEN	4.97	8
BOTTOM OF WELL	-5.03	18
SCREEN LENGTH		LENGTH (ft) 10
SLOT SIZE	0.01-inch	

WELL DETAILS



SUMMARY SOIL CLASSIFICATION [1], NOTES	DEPTH (FT) [2]
Ground Surface	0.0
	0.23
	1.0
	2.0
Top of filter pack	6.0
Top of screen	8.0
	18.0
EOB	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
2.41	3/22/2017	10.56
2.61	6/23/2017	10.36

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WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-6D

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 13.09 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 4/28/2017 **DATE FINISHED** 4/28/2017
DRILLING EQUIPMENT Geoprobe 7822DT	**DRILLER** Tim Kelly
SIZE AND TYPE OF BIT 3-1/4-inch steel dual tube	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 9-inch steel core barrel to remove concrete slab. A 3.25-inch diameter steel macrocore sampler was used to recover soil samples follow by advancement of 4-1/4-inch diameter steel hollow steel augers fitted with an expendable point to support a borehole opening for installation of the PVC well. The augers were advanced to about 25 below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the augers. The well was constructed of 5 feet of 0.01-slot screen set from 20 to 25 feet bgs and 20 feet of solid PVC riser from 0.5 to 13 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 18 and 25 feet and the depth of the pack was measured during backfilling to ensure correct depth placement. Bentonite grout was backfilled between 2 and 18 ft bgs. FilPro #2 sand was backfilled between 1 and 2 feet bgs and the well was capped with a removable J-plug and finished with a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

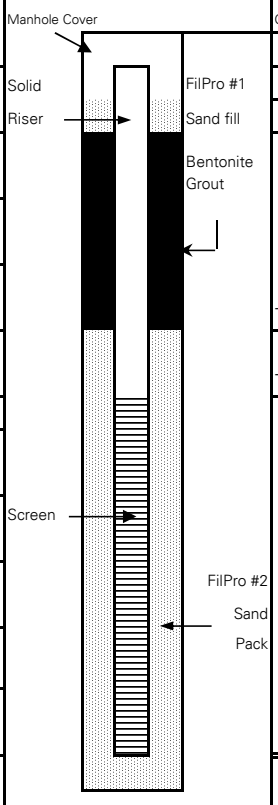
AARCO used a surge block across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand
TYPE OF SCREEN Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout
BOREHOLE DIAMETER 4-1/4-inch		**TYPE OF FILTER MATERIAL** FilPro #2 Sand

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	12.79	0.3
TOP OF SEAL	10.79	DEPTH (ft) 2
TOP OF FILTER	-5.21	DEPTH (ft) 18
TOP OF SCREEN	-7.21	DEPTH (ft) 20
BOTTOM OF WELL	-12.21	DEPTH (ft) 25
SCREEN LENGTH		LENGTH (ft) 5
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
2.51	6/23/2017	10.28



SUMMARY SOIL CLASSIFICATION [1], NOTES	DEPTH (FT) [2]
Ground Surface	0.0
	0.30
	1.0
	2.0
Top of filter pack	18.0
Top of screen	20.0
	25.0
EOB	

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WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-07

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 13.23 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 3/10/2017 **DATE FINISHED** 3/10/2017
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Greg Freese
SIZE AND TYPE OF BIT 3-3/4-inch diameter steel casing	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 6-inch diameter steel core barrel to remove the concrete slab cover. A 2-inch diameter steel macro-core sampler was used to recover soil samples, followed by advancement of 3-3/4–inch diameter steel casing fitted with an expendable point to support a borehole opening for installation of the PVC well. The casing was advanced to about 24 feet below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the casing The well was constructed of 5 feet of 2-inch diameter pre-pack well constructed of an outer layer of 65 mesh stainless steel screen, 20 x 40 silica sand over a 0.01-slot screen set from 19 to 24 feet bgs and 8 feet of solid PVC riser set from 0.2 feet bgs to 8 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 17 to 24 feet bgs and the depth of the pack was measured during backfilling to ensure correct depth placement. A bentonite grout slurry was backfilled between 2 to 17 feet bgs to seal the well annulus. Filpro #2 sand was backfilled between 1 to 2 feet bgs and the well was capped with a removable J-plug and finished within a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

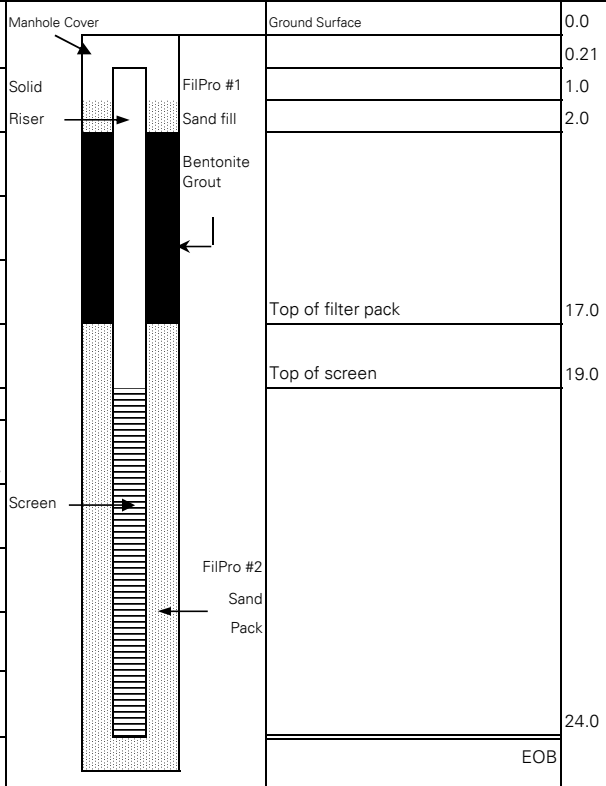
Langan surged a 1.75-inch bailer across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand
TYPE OF SCREEN Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout
BOREHOLE DIAMETER 3-3/4-inch	**TYPE OF FILTER MATERIAL** FilPro #2 Sand

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	13.02	0.21
TOP OF SEAL	11.02	2
TOP OF FILTER	-3.98	17
TOP OF SCREEN	-5.98	19
BOTTOM OF WELL	-10.98	24
SCREEN LENGTH		LENGTH (ft): 5
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
2.68	3/22/2017	10.34
2.65	6/23/2017	10.37



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WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-08

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 11.18 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 3/7/2017 **DATE FINISHED** 3/7/2017
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Greg Freese
SIZE AND TYPE OF BIT 3-3/4-inch diameter steel casing	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 6-inch diameter steel core barrel to remove the concrete slab cover. A 2-inch diameter steel macro-core sampler was used to recover soil samples, followed by advancement of 3-3/4–inch diameter steel casing fitted with an expendable point to support a borehole opening for installation of the PVC well. The casing was advanced to about 16 feet below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the casing The well was constructed of 10 feet of 2-inch diameter pre-pack well constructed of an outer layer of 65 mesh stainless steel screen, 20 x 40 silica sand over a 0.01-slot screen set from 6 to 16 feet bgs and about 6 feet of solid PVC riser set from 0.2 feet bgs to 6 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 4 to 16 feet bgs and the depth of the pack was measured during backfilling to ensure correct depth placement. A bentonite grout slurry was backfilled between 2 to 4 feet bgs to seal the well annulus. Filpro #2 sand was backfilled between 1 to 2 feet bgs and the well was capped with a removable J-plug and finished within a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

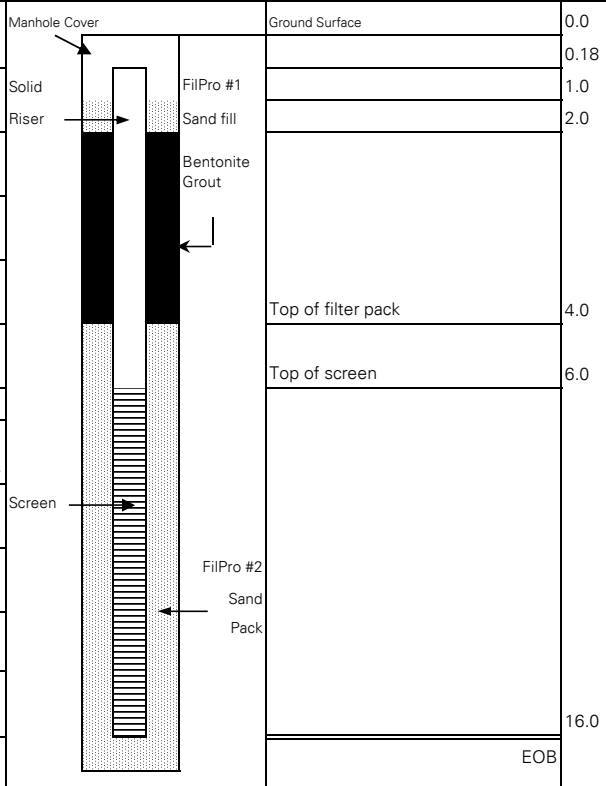
Langan surged a 1.75-inch bailer across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand
TYPE OF SCREEN Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout
BOREHOLE DIAMETER 3-3/4-inch	**TYPE OF FILTER MATERIAL** FilPro #2 Sand

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	11.00	0.18
TOP OF SEAL	9.00	2
TOP OF FILTER	7.00	4
TOP OF SCREEN	5.00	6
BOTTOM OF WELL	-5.00	16
SCREEN LENGTH		LENGTH (ft) 10
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
2.16	3/22/2017	8.84
2.5	6/23/2017	8.50



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WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-09

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 13.12 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 3/7/2017 **DATE FINISHED** 3/7/2017
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Greg Freese
3-3/4-inch diameter steel casing	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 6-inch diameter steel core barrel to remove the concrete slab cover. A 2-inch diameter steel macro-core sampler was used to recover soil samples, followed by advancement of 3-3/4–inch diameter steel casing fitted with an expendable point to support a borehole opening for installation of the PVC well. The casing was advanced to about 16 feet below grade surface (bgs) and the well was installed in the open annulus and the wooden plug was pushed out of the bottom of the casing The well was constructed of 10 feet of 2-inch diameter pre-pack well constructed of an outer layer of 65 mesh stainless steel screen, 20 x 40 silica sand over a 0.01-slot screen set from 6 to 16 feet bgs and about 6 feet of solid PVC riser set from 0.2 feet bgs to 6 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 4 to 16 feet bgs and the depth of the pack was measured during backfilling to ensure correct depth placement. A bentonite grout slurry was backfilled between 2 to 4 feet bgs to seal the well annulus. Filpro #2 sand was backfilled between 1 to 2 feet bgs and the well was capped with a removable J-plug and finished within a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

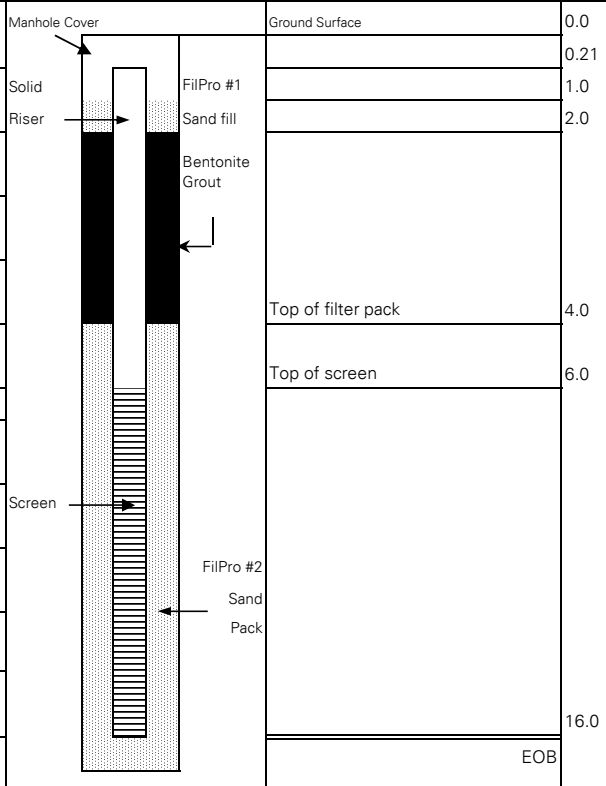
Langan surged a 1.75-inch bailer across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand
TYPE OF SCREEN Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout
BOREHOLE DIAMETER 3-3/4-inch	**TYPE OF FILTER MATERIAL** FilPro #2 Sand

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	12.91	0.21
TOP OF SEAL	10.91	2
TOP OF FILTER	8.91	4
TOP OF SCREEN	6.91	6
BOTTOM OF WELL	-3.09	16
SCREEN LENGTH		10
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
-1.30	3/22/2017	14.21
2.66	6/23/2017	10.25



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WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-10

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 4.82 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 3/7/2017 **DATE FINISHED** 3/7/2017
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Greg Freese
SIZE AND TYPE OF BIT 3-3/4-inch diameter steel casing	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 6-inch diameter steel core barrel to remove the concrete slab cover. A 2-inch diameter steel macro-core sampler attached to a jackhammer was used to recover soil samples. The well was installed in the open annulus. The well was constructed of 10 feet of 2-inch 0.01-slot screen set to about 8.8 feet bgs. FilPro #2 sand was used to backfill the annulus to surface grade. The well was capped with a removable J-plug.

METHOD OF WELL DEVELOPMENT

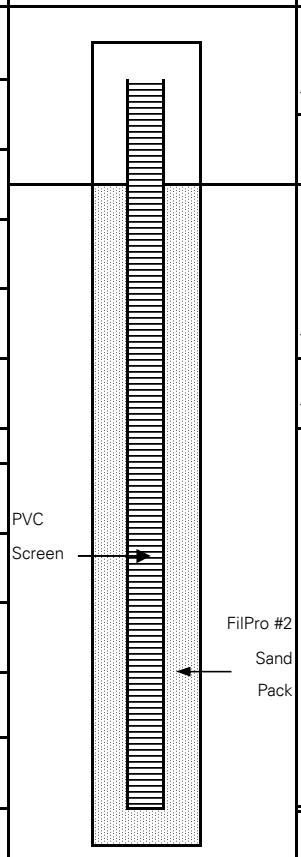
Langan surged a 1.75-inch bailer across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand	
TYPE OF SCREEN Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** NA	
BOREHOLE DIAMETER 3-3/4-inch		**TYPE OF FILTER MATERIAL** FilPro #2 Sand	

TOP OF CASING **ELEVATION (ft) [3]**	4.82	**DEPTH (ft)** 1.20
TOP OF SEAL	NA	**DEPTH (ft)** na
TOP OF FILTER	4.82	**DEPTH (ft)** 0
TOP OF SCREEN	4.82	**DEPTH (ft)** 1.19
BOTTOM OF WELL	-3.98	**DEPTH (ft)** 8.8
SCREEN LENGTH		**LENGTH (ft)** 10
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
3.12	3/22/2017	2.91



SUMMARY SOIL CLASSIFICATION [1], NOTES	DEPTH (FT) [2]
Top of Riser/Top of Screen	1.2
Ground Surface	0.0
Top of filter pack	4.0
Top of screen	6.0
	8.8
EOB	

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WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-12

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 12.46 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 3/7/2017 **DATE FINISHED** 3/7/2017
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Greg Freese
SIZE AND TYPE OF BIT 3-3/4-inch diameter steel casing	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 6-inch diameter steel core barrel to remove the concrete slab cover. A 2-inch diameter steel macro-core sampler was used to recover soil samples, followed by advancement of 3-3/4–inch diameter steel casing fitted with an expendable point to support a borehole opening for installation of the PVC well. The casing was advanced to about 16 feet below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the casing The well was constructed of 10 feet of 2-inch diameter pre-pack well constructed of an outer layer of 65 mesh stainless steel screen, 20 x 40 silica sand over a 0.01-slot screen set from 8 to 18 feet bgs and about 8 feet of solid PVC riser set from 0.24 feet bgs to 8 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 4 to 16 feet bgs and the depth of the pack was measured during backfilling to ensure correct depth placement. A bentonite grout slurry was backfilled between 2 to 6 feet bgs to seal the well annulus. Filpro #2 sand was backfilled between 1 to 2 feet bgs and the well was capped with a removable J-plug and finished within a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

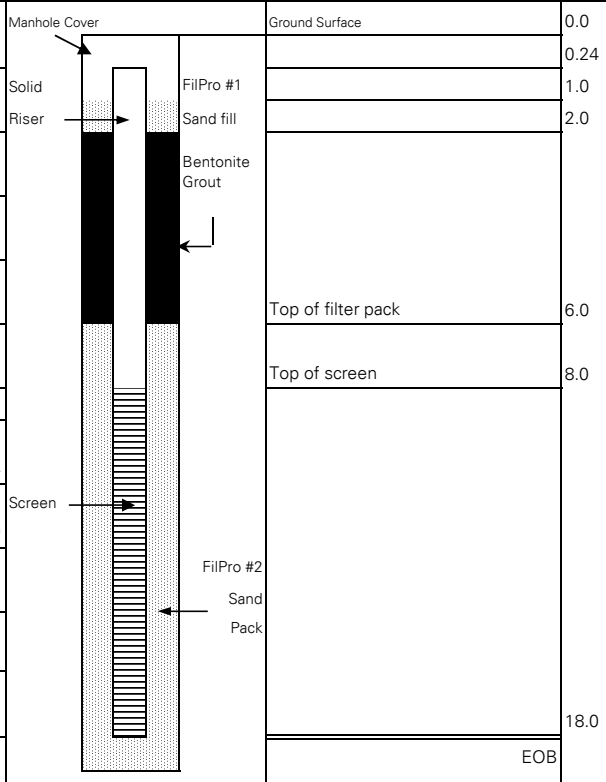
Langan surged a 1.75-inch bailer across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand
TYPE OF SCREEN Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout
BOREHOLE DIAMETER 3-3/4-inch	**TYPE OF FILTER MATERIAL** FilPro #2 Sand

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	12.22	0.24
TOP OF SEAL	10.22	2
TOP OF FILTER	6.22	6
TOP OF SCREEN	4.22	8
BOTTOM OF WELL	-5.78	18
SCREEN LENGTH		LENGTH (ft) 10
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
2.38	3/22/2017	9.84
2.63	6/23/2017	9.59



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WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-12D

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 12.43 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 4/29/2017 **DATE FINISHED** 4/29/2017
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Greg Freese
SIZE AND TYPE OF BIT 3-3/4-inch diameter steel casing	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 6-inch diameter steel core barrel to remove the concrete slab cover. A 2-inch diameter steel dual tube sampler was used to recover soil samples, followed by advancement of 3-3/4–inch diameter steel casing fitted with an expendable point to support a borehole opening for installation of the PVC well. The casing was advanced to about 25 feet below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the casing. The well was constructed of 5 foot-long 0.01-slot screen set from 20 to 25 feet bgs and about 20 feet of solid PVC riser from 0.31 to 20 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 18 to 25 feet bgs and the depth of the pack was measured during backfilling to ensure correct depth placement. A bentonite grout slurry was backfilled between 2 to 18 feet bgs to seal the well annulus. Filpro #2 sand was backfilled between 1 to 2 feet bgs and the well was capped with a removable J-plug and finished within a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

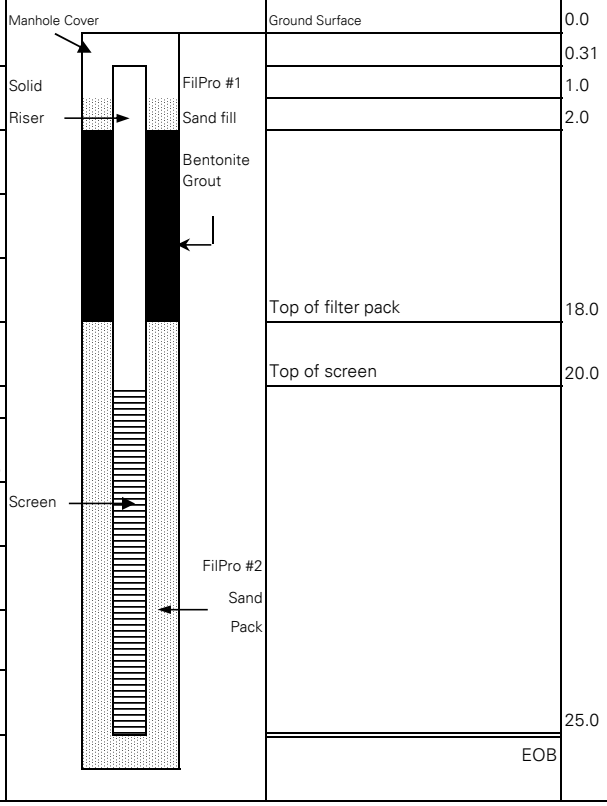
Langan surged a 1.75-inch bailer across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand
TYPE OF SCREEN Sch 40 PVC **DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout
BOREHOLE DIAMETER 3-3/4-inch	**TYPE OF FILTER MATERIAL** FilPro #2 Sand

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	12.12	0.31
TOP OF SEAL	10.12	2
TOP OF FILTER	-5.88	18
TOP OF SCREEN	-7.88	20
BOTTOM OF WELL	-12.88	25
SCREEN LENGTH		5
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
2.64	6/23/2017	9.48



SUMMARY SOIL CLASSIFICATION [1], NOTES	DEPTH (FT) [2]
Ground Surface	0.0
	0.31
	1.0
	2.0
Top of filter pack	18.0
Top of screen	20.0
	25.0
EOB	

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LANGAN

WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-15D

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 13.21 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 4/28/2017 **DATE FINISHED** 4/28/2017
DRILLING EQUIPMENT Geoprobe 7822DT	**DRILLER** Tim Kelly
SIZE AND TYPE OF BIT 3-1/4-inch steel dual tube	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 9-inch steel core barrel to remove concrete slab. A 3.25-inch diameter steel macrocore sampler was used to recover soil samples follow by advancement of 4-1/4-inch diameter steel hollow steel augers fitted with an expendable point to support a borehole opening for installation of the PVC well. The augers were advanced to about 25 below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the augers. The well was constructed of 5 feet of 0.01-slot screen set from 20 to 25 feet bgs and 20 feet of solid PVC riser from 0.5 to 13 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 18 and 25 feet and the depth of the pack was measured during backfilling to ensure correct depth placement. Bentonite grout was backfilled between 2 and 18 ft bgs. FilPro #2 sand was backfilled between 1 and 2 feet bgs and the well was capped with a removable J-plug and finished with a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

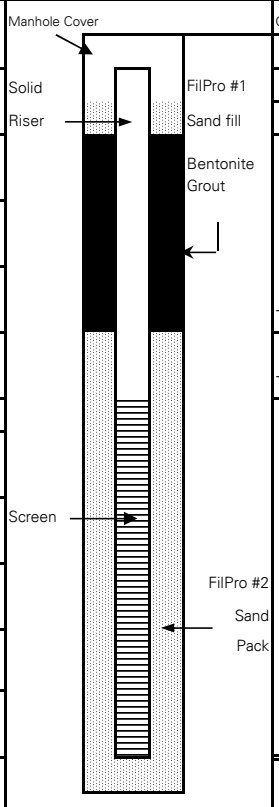
AARCO used a surge block across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand
TYPE OF SCREEN Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout
BOREHOLE DIAMETER 4-1/4-inch		**TYPE OF FILTER MATERIAL** FilPro #2 Sand

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	12.77	0.44
TOP OF SEAL	10.77	2
TOP OF FILTER	-5.23	18
TOP OF SCREEN	-7.23	20
BOTTOM OF WELL	-12.23	25
SCREEN LENGTH		5
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
2.62	6/23/2017	10.15



SUMMARY SOIL CLASSIFICATION [1], NOTES	DEPTH (FT) [2]
Ground Surface	0.0
	0.44
	1.0
	2.0
Top of filter pack	18.0
Top of screen	20.0
	25.0
EOB	

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LANGAN

WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-20S

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 13.27 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 4/27/2017 **DATE FINISHED** 4/27/2017
DRILLING EQUIPMENT Geoprobe 7822DT	**DRILLER** Tim Kelly
SIZE AND TYPE OF BIT 3-1/4-inch steel macrocore	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 9-inch steel core barrel to remove concrete slab. A 3.25-inch diameter steel dual-tube sampler was used to recover soil samples follow by advancement of 4-1/4-inch diameter steel hollow steel augers fitted with an expendable point to support a borehole opening for installation of the PVC well. The augers were advanced to about 18 below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the augers. The well was constructed of 10-feet of 0.01-slot screen set from 8 to 18 feet bgs and about 8 feet of solid PVC riser from 0.29 to 18 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 6 and 18 feet and the depth of the pack was measured during backfilling to ensure correct depth placement. Bentonite grout was backfilled between 2 and 6 ft bgs. FilPro #2 sand was backfilled between 1 and 2 feet bgs and the well was capped with a removable J-plug and finished with a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

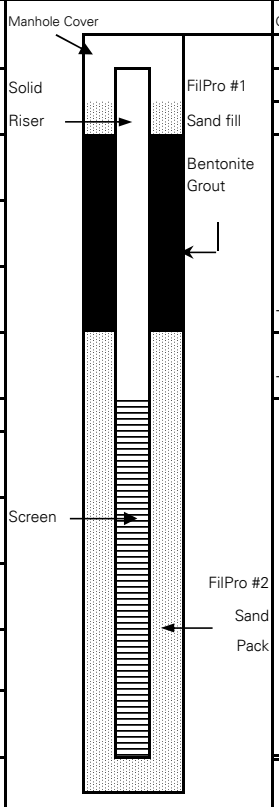
AARCO used a surge block across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand	
TYPE OF SCREEN Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout	
BOREHOLE DIAMETER 4-1/4-inch		**TYPE OF FILTER MATERIAL** FilPro #2 Sand	

	ELEVATION (ft) [3]	DEPTH (ft)
TOP OF CASING	12.98	0.29
TOP OF SEAL	10.98	2
TOP OF FILTER	6.98	6
TOP OF SCREEN	4.98	8
BOTTOM OF WELL	-5.02	18
SCREEN LENGTH		10
SLOT SIZE	0.01-inch	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER (ft) [3]
2.72	6/23/2017	2.6



SUMMARY SOIL CLASSIFICATION [1], NOTES	DEPTH (FT) [2]
Ground Surface	0.0
	0.23
	1.0
	2.0
Top of filter pack	6.0
Top of screen	8.0
	18.0
EOB	

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LANGAN

WELL CONSTRUCTION SUMMARY
473 President Street (BCP Site C224220)
MW-20D

PROJECT 473 President Street	**PROJECT NO.** 170361301
LOCATION Brooklyn, New York	**ELEVATION AND DATUM** 13.27 ft NAVD88
DRILLING AGENCY AARCO Environmental Services Corp.	**DATE STARTED** 4/27/2017 **DATE FINISHED** 4/27/2017
DRILLING EQUIPMENT Geoprobe 7822DT	**DRILLER** Tim Kelly
SIZE AND TYPE OF BIT 3-1/4-inch steel dual tube	**INSPECTORS** Veronica Zuluaga

METHOD OF INSTALLATION

AARCO used a 9-inch steel core barrel to remove concrete slab. A 3.25-inch diameter steel dual-tube sampler was used to recover soil samples follow by advancement of 4-1/4-inch diameter steel hollow steel augers fitted with an expendable point to support a borehole opening for installation of the PVC well. The augers were advanced to about 30 below grade surface (bgs) and the well was installed in the open annulus and the point was pushed out of the bottom of the augers. The well was constructed of 10-feet of 0.01-slot screen set from 20 to 30 feet bgs and about 20 feet of solid PVC riser from 0.3 to 20 feet bgs. FilPro #2 sand was used to backfill the annulus around the well between 18 and 30 feet and the depth of the pack was measured during backfilling to ensure correct depth placement. Bentonite grout was backfilled between 2 and 18 ft bgs. FilPro #2 sand was backfilled between 1 and 2 feet bgs and the well was capped with a removable J-plug and finished with a bolt-down flush-mount manhole cover set in concrete.

METHOD OF WELL DEVELOPMENT

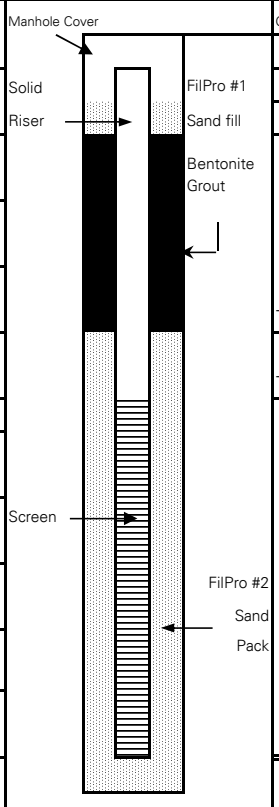
AARCO used a surge block across the well screen in 2- to 3-foot incrementes for approximately two minutes per increment. The well was purged until the water was clear. Purge water was placed in a 55-gallon drum for disposal.

TYPE OF CASING Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF BACKFILL MATERIAL** FilPro #2 Sand	
TYPE OF SCREEN Sch 40 PVC	**DIAMETER** 2-inch	**TYPE OF SEAL MATERIAL** Cetco Powdered Bentonite Grout	
BOREHOLE DIAMETER 4-1/4-inch		**TYPE OF FILTER MATERIAL** FilPro #2 Sand	

TOP OF CASING **ELEVATION (ft) [3]** 12.97	**DEPTH (ft)** 0.30	
TOP OF SEAL 10.97	**DEPTH (ft)** 2	
TOP OF FILTER -5.03	**DEPTH (ft)** 18	
TOP OF SCREEN -7.03	**DEPTH (ft)** 20	
BOTTOM OF WELL -17.03	**DEPTH (ft)** 30	
SCREEN LENGTH	**LENGTH (ft)** 10	
SLOT SIZE 0.01-inch		

GROUNDWATER ELEVATIONS

ELEVATION	**DATE**	**DEPTH TO WATER (ft) [3]**
ELEVATION	**DATE**	**DEPTH TO WATER (ft) [3]**
ELEVATION	**DATE**	**DEPTH TO WATER (ft) [3]**
ELEVATION	**DATE**	**DEPTH TO WATER (ft) [3]**
ELEVATION	**DATE**	**DEPTH TO WATER (ft) [3]**
ELEVATION	**DATE**	**DEPTH TO WATER (ft) [3]**



SUMMARY SOIL CLASSIFICATION [1], NOTES	DEPTH (FT) [2]
Ground Surface	0.0
	0.23
	1.0
	2.0
Top of filter pack	18.0
Top of screen	20.0
	30.0
EOB	

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Appendix E
Groundwater Sampling Logs

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-06	**Job No.**	170361301
Date:	3/16/2017	**Weather:**	34 F Clear	**Sampling Personnel:**	Veronica Zuluaga

Well Information

Sample ID	MW06_031617
Well Depth (ft)	18.51
Screened Interval (ft)	8-18
Casing Elevation (NAVD88)	12.97
Casing Diameter (in)	2
Depth to Water (ft)	11.05
Water Elevation (msl)	NA
Casing Volume (gal)	1.32
PID/FID Reading (ppm)	2.4

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.06
Start Purge Time	13:55
End Purge Time	14:59
Volume Purged (gal)	4

Sampling Information

Sampling Method	Low-flow
Start Sampling Time	15:35
End Sampling Time	15:50
Depth Before Sampling (ft)	11.95
Number Bottles Collected	10

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
13:55	19.31	7.18	-131.00	0.927	206.00	2.20	11.95	0.50
14:00	19.46	7.24	-142.00	0.916	38.50	2.11	11.64	1.00
14:05	19.44	7.25	-146.00	0.912	37.00	2.09	11.63	1.45
14:10	19.52	7.25	-148.00	0.914	36.90	2.10	11.39	1.60
14:15	19.49	7.26	-151.00	0.912	25.80	2.14	11.16	1.75
14:22	19.27	7.25	-150.00	0.906	28.70	2.11	11.11	1.80
14:28	19.39	7.26	-151.00	0.910	32.50	2.11	11.10	1.95
14:33	19.32	7.26	-151.00	0.912	28.70	2.07	11.11	2.00
14:38	19.42	7.27	-152.00	0.913	31.10	2.06	11.10	2.00
14:49	19.96	7.26	-141.00	0.924	28.30	2.16	12.18	3.00
14:59	19.65	7.28	-149.00	0.915	4.50	2.05	11.95	4.00

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-06D	**Job No.**	170361301
Date:	3/16/2017	**Weather:**	65 F, Partly Cloudy	**Sampling Personnel:**	Taylor Morgan

Well Information

Sample ID	MW06D_050617
Well Depth (ft)	25
Screened Interval (ft)	20-25
Casing Elevation (NAVD88)	12.79
Casing Diameter (in)	2
Depth to Water (ft)	9.98
Water Elevation (msl)	NA
Casing Volume (gal)	2.64
PID/FID Reading (ppm)	4.7

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.07
Start Purge Time	14:20
End Purge Time	15:20
Volume Purged (gal)	3.65

Sampling Information

Sampling Method	Low-flow
Start Sampling Time	15:25
End Sampling Time	15:35
Depth Before Sampling (ft)	10.06
Number Bottles Collected	5

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
14:20	17.04	7.51	23	0.409	387	2.81	10.02	0.0
14:25	16.89	7.32	5	0.404	800	1.74	9.98	0.1
14:30	16.44	7.08	-21	0.423	616	1.22	10.05	0.5
14:35	16.55	7.05	-27	0.444	357	1.12	10.05	0.65
14:40	16.77	7.11	-23	0.448	282	0.95	10.10	0.75
14:45	16.51	7.07	-34	0.456	86.9	0.93	10.03	1.0
14:50	16.59	7.06	-38	0.462	56.4	1.00	10.02	1.2
14:55	16.62	7.04	-41	0.476	29.2	0.90	10.04	1.75
15:00	16.65	7.04	-43	0.488	20.8	0.78	10.05	2.0
15:05	16.55	7.02	-43	0.489	18.0	0.85	10.04	2.4
15:10	16.59	7.03	-44	0.497	14.8	0.80	10.08	2.75
15:15	16.55	7.01	-44	0.499	11.7	0.77	10.09	3.25
15:20	16.48	7.01	-44	0.506	14.7	0.77	10.06	3.65

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-07	**Job No.**	170361301
Date:	3/22/2017	**Weather:**	38 F Clear	**Sampling Personnel:**	Veronica Zuluaga

Well Information

Sample ID	MW07_032217
Well Depth (ft)	23.14
Screened Interval (ft)	19-24
Casing Elevation (NAVD88)	13.02
Casing Diameter (in)	2
Depth to Water (ft)	10.72
Water Elevation (msl)	NA
Casing Volume (gal)	2.16
PID/FID Reading (ppm)	548

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.135
Start Purge Time	13:55
End Purge Time	15:35
Volume Purged (gal)	11

Sampling Information

Sampling Method	Low Flow
Start Sampling Time	13:15
End Sampling Time	13:30
Depth Before Sampling (ft)	14.85
Number Bottles Collected	10

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
11:51	19.75	6.80	-252.00	0.812	62.20	1.20	14.29	5.00
11:56	19.73	6.79	-209.00	0.812	55.60	1.35	14.78	5.40
12:01	19.69	6.78	-237.00	0.820	70.80	1.26	13.35	5.50
12:06	19.73	6.76	-181.00	0.810	76.00	1.80	15.40	6.50
12:11	19.64	6.78	-192.00	0.810	60.20	1.66	15.70	7.00
12:16	19.56	6.79	-214.00	0.818	63.60	1.44	15.30	7.50
12:21	19.72	6.81	-236.00	0.808	42.50	1.41	15.77	8.00
12:22	19.56	6.80	-238.00	0.815	59.40	1.44	15.80	8.50
12:27	19.65	6.79	-247.00	0.801	63.90	1.44	15.62	9.00
12:33	19.60	6.78	-250.00	0.811	43.80	1.54	16.02	9.20
12:40	19.61	6.77	-254.00	0.805	43.20	1.43	15.78	10.00
12:48	19.61	6.77	-254	0.81	43.20	1.4	15.8	10.00
12:56	19.61	6.78	-256	0.81	32.50	1.48	15.51	10.70
13:02	19.6	6.77	-254	0.81	10.75	1.40	14.91	10.90
13:11	19.77	6.75	-264	0.81	13.2	1.39	14.85	11.00

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

11:00

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-08	**Job No.**	170361301
Date:	3/16/2017	**Weather:**	34 F Clear	**Sampling Personnel:**	Veronica Zuluaga

Well Information

Sample ID	MW08_031617
Well Depth (ft)	16.3
Screened Interval (ft)	6-16
Casing Elevation (NAVD88)	11.00
Casing Diameter (in)	2
Depth to Water (ft)	9.21
Water Elevation (msl)	NA
Casing Volume (gal)	1.24
PID/FID Reading (ppm)	1.6

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.05
Start Purge Time	12:08
End Purge Time	12:30
Volume Purged (gal)	2.8

Sampling Information

Sampling Method	low flow
Start Sampling Time	12:00
End Sampling Time	12:55
Depth Before Sampling (ft)	10.04
Number Bottles Collected	20

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
11:01	16.50	7.98	94.00	1.020	380.00	2.25	11.04	0.50
11:06	16.79	8.21	10.00	0.986	511.00	2.24	10.85	0.75
11:11	17.32	7.65	-103.00	0.910	420.00	2.16	10.89	1.00
11:16	17.14	7.44	271.00	0.860	222.00	2.23	10.64	1.25
11:21	17.25	7.20	-117.00	0.804	136.00	2.20	10.09	1.50
11:26	16.92	7.20	-110.00	0.756	62.10	2.29	10.04	1.75
11:31	17.05	7.15	-112.00	0.745	42.30	2.26	9.93	1.85
11:36	16.95	7.13	-110.00	0.733	37.80	2.85	9.79	1.95
11:41	16.79	7.12	-108.00	0.719	26.90	2.28	9.76	2.05
11:46	16.67	7.09	-103.00	0.712	23.70	2.35	9.88	2.15
11:51	17.30	7.07	-99.00	0.774	22.50	2.51	9.90	2.30
11:58	17.28	7.07	-97	0.78	21.5	2.5	NA	2.5
12:03	17.32	7.07	-100	0.76	20.5	2.37	10.04	2.8

Notes/Remarks

Stablility	GWDUP01_0311617 collected
PH - ± 0.1 unit	
Specific Conductance - ± 3%	
Temperature - ± 3%	
Dissolved Oxygen - ±10% above 0.5 mg/L	
Turbidity - ± 10% above 5 NTU	
ORP/Eh - ±10 millivolts	
Maximum flow rate - <0.5 L/m or 0.13 gpm	
Maximum drawdown - <0.33 feet	

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-09	**Job No.**	170361301
Date:	3/16/2017	**Weather:**	34 F Clear	**Sampling Personnel:**	Veronica Zuluaga

Well Information

Sample ID	MW09_032217
Well Depth (ft)	16.22
Screened Interval (ft)	6-16
Casing Elevation (NAVD88)	12.91
Casing Diameter (in)	2
Depth to Water (ft)	10.34
Water Elevation (msl)	NA
Casing Volume (gal)	1.02
PID/FID Reading (ppm)	0.7

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	NA
Start Purge Time	12:08
End Purge Time	12:30
Volume Purged (gal)	2.8

Sampling Information

Sampling Method	1.75-inch bailer
Start Sampling Time	15:45
End Sampling Time	17:45
Depth Before Sampling (ft)	14.21
Number Bottles Collected	10

	Parameters							
Sample Time	**Temp (°C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
9:30	16.70	8.74	-16.00	0.376	693	3.20	16.00	0.20

Due to poor recharge, well was purged dry and sampled on 3/22 using at 1.75-inch poly bailer

Notes/Remarks

Stablility
PH - ± 0.1 unit
Specific Conductance - ± 3%
Temperature - ± 3%
Dissolved Oxygen - ±10% above 0.5 mg/L
Turbidity - ± 10% above 5 NTU
ORP/Eh - ±10 millivolts
Maximum flow rate - <0.5 L/m or 0.13 gpm
Maximum drawdown - <0.33 feet

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-10	**Job No.**	170361301
Date:	3/22/2017	**Weather:**	38 F Clear	**Sampling Personnel:**	Veronica Zuluaga

Well Information

Sample ID	MW10_032217
Well Depth (ft)	16.3
Screened Interval (ft)	0-8
Casing Elevation (NAVD88)	6.03
Casing Diameter (in)	1
Depth to Water (ft)	2.4
Water Elevation (msl)	NA
Casing Volume (gal)	1.15
PID/FID Reading (ppm)	0

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.06
Start Purge Time	13:00
End Purge Time	14:05
Volume Purged (gal)	4.15

Sampling Information

Sampling Method	Low-flow
Start Sampling Time	14:10
End Sampling Time	14:30
Depth Before Sampling (ft)	2.43
Number Bottles Collected	10

	Parameters							
Sample Time	**Temp (∘C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
13:00	14.71	6.59	75.00	1.06	112.00	0.54	2.40	0.35
*13:05	14.63	7.20	15.00	1.060	0.20	0.00	2.40	0.50
13:24	14.28	7.70	33.00	1.050	0.00	10.74	2.40	1.50
13:29	14.47	7.72	15.00	1.400	0.00	10.71	2.40	1.75
13:35	14.50	7.78	1.00	1.400	0.00	9.69	2.42	2.25
13:40	14.49	7.82	-14.00	1.390	0.00	9.18	2.42	2.50
13:45	14.46	7.84	-22.00	1.390	0.00	8.72	2.41	2.75
13:50	14.45	7.85	-28.00	1.350	0.00	8.27	2.41	3.10
13:55	14.44	7.86	-34.00	1.380	0.00	7.75	2.41	3.50
14:00	14.41	7.89	0.00	1.370	0.00	7.64	2.43	4.00
14:05	14.40	7.90	-43.00	1.370	0.00	7.10	2.43	4.15

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

* 1305 - stopped pumping, cleaned sensors on Horiba U-52, began pumping at 13:24

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-12	**Job No.**	170361301
Date:	3/16/2017	**Weather:**	34 F Clear	**Sampling Personnel:**	Veronica Zuluaga

Well Information

Sample ID	MW12_031617
Well Depth (ft)	17.65
Screened Interval (ft)	8-18
Casing Elevation (NAVD88)	12.22
Casing Diameter (in)	2
Depth to Water (ft)	10.22
Water Elevation (msl)	NA
Casing Volume (gal)	1.34
PID/FID Reading (ppm)	0.7

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.09
Start Purge Time	13:30
End Purge Time	18:43
Volume Purged (gal)	4.5

Sampling Information

Sampling Method	Low Flow
Start Sampling Time	18:50
End Sampling Time	19:00
Depth Before Sampling (ft)	10.15
Number Bottles Collected	10

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
17:54	18.32	6.52	105.00	0.977	740.00	3.58	11.29	0.75
18:01	19.02	6.90	34.00	0.955	158.00	2.45	10.93	1.60
18:06	19.04	6.85	19.00	0.959	73.00	2.36	10.80	2.15
18:11	19.14	6.83	17.00	0.934	32.30	2.42	10.53	2.50
18:17	19.15	6.81	19.00	0.934	19.90	2.48	10.53	3.00
18:21	19.21	6.80	19.00	0.924	14.40	2.74	10.57	3.80
18:26	19.25	6.80	21.00	0.936	10.50	2.74	10.57	3.50
18:31	19.28	6.79	18.00	0.935	9.30	2.54	10.53	3.80
18:37	19.25	6.74	18.00	0.930	7.60	2.52	10.53	4.50
18:43	19.18	6.79	18.00	0.928	7.40	2.53	10.15	4.50

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-12D	**Job No.**	170361301
Date:	3/16/2017	**Weather:**	65 F, Partly Cloudy	**Sampling Personnel:**	Taylor Morgan

Well Information

Sample ID	MW12D_050617
Well Depth (ft)	25.2
Screened Interval (ft)	20-25
Casing Elevation (NAVD88)	12.12
Casing Diameter (in)	2
Depth to Water (ft)	9.16
Water Elevation (msl)	NA
Casing Volume (gal)	2.80
PID/FID Reading (ppm)	8.8

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.09
Start Purge Time	9:35
End Purge Time	10:40
Volume Purged (gal)	6

Sampling Information

Sampling Method	Low-flow
Start Sampling Time	10:45
End Sampling Time	10:55
Depth Before Sampling (ft)	9.37
Number Bottles Collected	11

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
9:40	17.02	6.87	43	0.619	278	1.60	9.38	0.5
9:45	17.02	6.96	-11	0.605	100	1.17	9.42	1
9:50	17.02	6.95	-37	0.579	35.9	1.08	9.37	1.50
9:55	17.06	6.92	-53	0.569	18.9	1.01	9.36	2
10:00	17.12	6.91	-67	0.546	14.9	0.94	9.25	2.75
10:05	17.21	6.90	-77	0.565	13.5	1.00	9.34	3
10:10	17.26	6.91	-84	0.557	15.7	0.90	9.33	3.5
10:15	17.26	6.89	-89	0.555	12.2	0.86	9.30	3.75
10:20	17.28	6.88	-88	0.556	10.8	0.84	9.35	4.25
10:25	17.27	6.88	-91	0.554	10.5	0.82	9.31	4.75
10:30	17.24	6.87	-92	0.554	8.7	0.80	9.32	5
10:35	17.25	6.86	-90	0.556	8.3	0.83	9.36	5.5
10:40	17.20	6.85	-89	0.552	7.1	0.78	9.37	6

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-15D	**Job No.**	170361301
Date:	3/16/2017	**Weather:**	65 F, Partly Cloudy	**Sampling Personnel:**	Taylor Morgan

Well Information

Sample ID	MW15D_050617
Well Depth (ft)	25.2
Screened Interval (ft)	20-25
Casing Elevation (NAVD88)	12.12
Casing Diameter (in)	2
Depth to Water (ft)	9.68
Water Elevation (msl)	NA
Casing Volume (gal)	2.71
PID/FID Reading (ppm)	25.2

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.09
Start Purge Time	15:40
End Purge Time	16:45
Volume Purged (gal)	6

Sampling Information

Sampling Method	Low-flow
Start Sampling Time	16:50
End Sampling Time	17:00
Depth Before Sampling (ft)	9.98
Number Bottles Collected	5

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
15:45	18.30	7.29	-13	0.871	220	3.54	10.00	0.5
15:50	18.22	7.23	-74	0.883	58.1	1.48	10.10	1.4
15:55	18.39	7.23	-87	0.886	54.2	1.31	9.98	1.65
16:00	18.46	7.27	-105	0.886	44.7	1.14	9.90	2.1
16:05	18.58	7.28	-111	0.883	37.1	1.08	9.81	2.25
16:10	18.62	7.28	-111	0.884	43.8	1.06	9.88	2
16:15	18.68	7.20	-114	0.883	47.9	1.55	10.00	2.6
16:20	18.56	7.27	-119	0.885	32.0	1.06	10.12	3.25
16:25	18.46	7.22	-120	0.889	24.0	0.99	10.06	3.75
16:30	18.38	7.18	-121	0.883	19.6	0.95	10.07	4.5
16:35	18.31	7.17	-123	0.877	25.0	0.91	9.95	5.1
16:40	18.37	7.15	-123	0.884	21.0	0.91	10.00	5.7
16:45	18.52	7.16	-129	0.880	26.4	0.89	9.98	6

Notes/Remarks

Stablility
PH - ± 0.1 unit
Specific Conductance - ± 3%
Temperature - ± 3%
Dissolved Oxygen - ±10% above 0.5 mg/L
Turbidity - ± 10% above 5 NTU
ORP/Eh - ±10 millivolts
Maximum flow rate - <0.5 L/m or 0.13 gpm
Maximum drawdown - <0.33 feet

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-18	**Job No.**	170361301
Date:	3/22/2017	**Weather:**	38 F Clear	**Sampling Personnel:**	Veronica Zuluaga

Well Information

Sample ID	MW18_032217
Well Depth (ft)	17.65
Screened Interval (ft)	8-18
Casing Elevation (NAVD88)	12.98
Casing Diameter (in)	2
Depth to Water (ft)	10.67
Water Elevation (msl)	NA
Casing Volume (gal)	1.22
PID/FID Reading (ppm)	201

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.05
Start Purge Time	15:04
End Purge Time	18:09
Volume Purged (gal)	3.44

Sampling Information

Sampling Method	Low Flow
Start Sampling Time	18:30
End Sampling Time	19:20
Depth Before Sampling (ft)	12.25
Number Bottles Collected	10

	Parameters							
Sample Time	**Temp (∘C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
15:04	19.44	6.57	-116.00	1.89	803.00	2.45	13.20	0.50
15:12	19.96	6.56	-125.00	1.91	573.00	2.23	13.72	0.75
15:19	20.09	6.56	-129.00	1.95	499.00	2.18	14.08	1.10
15:25	20.27	6.59	-134.00	1.97	455.00	2.18	14.20	1.25
15:29	20.22	6.58	-137.00	1.96	456.00	2.33	14.52	14.52
15:36	20.45	6.55	-137.00	1.93	486.00	2.26	15.30	2.00
15:43	20.34	6.53	-135.00	1.85	*NA	NA	NA	NA
17:41	19.46	6.63	-105.00	1.67	690.00	3.92	12.27	2.60
17:50	19.49	6.62	-105.00	1.67	532.00	3.69	12.44	2.75
18:04	19.62	6.60	-103.00	1.67	411.00	2.98	12.43	2.80
18:09	19.82	6.60	-99.000	1.69	312.00	2.90	12.25	3.44

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

* Battery died, stopped pumping and started at 17:41

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-20S	**Job No.**	170361301
Date:	5/6/2017	**Weather:**	65 F, Partly Cloudy	**Sampling Personnel:**	Taylor Morgan

Well Information

Sample ID	MW20S_050617
Well Depth (ft)	16.25
Screened Interval (ft)	8-18
Casing Elevation (NAVD88)	12.97
Casing Diameter (in)	2
Depth to Water (ft)	9.72
Water Elevation (msl)	NA
Casing Volume (gal)	1.14
PID/FID Reading (ppm)	630

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.04
Start Purge Time	11:25
End Purge Time	12:25
Volume Purged (gal)	2.25

Sampling Information

Sampling Method	Low-flow
Start Sampling Time	12:30
End Sampling Time	12:40
Depth Before Sampling (ft)	9.95
Number Bottles Collected	5

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
11:25	17.37	7.13	-101	0.798	800	2.57	10.45	0.25
11:30	17.46	7.12	-94	0.823	800	1.62	10.00	0.5
11:35	17.81	7.11	-100	0.843	777	1.40	9.99	0.75
11:40	18.02	7.12	-107	0.864	746	1.09	10.03	1
11:45	18.09	7.13	-112	0.912	541	1.06	9.89	1.15
11:50	18.16	7.11	-109	0.932	318	1.02	9.94	1.25
11:55	18.28	7.10	-106	0.942	122	1.29	10.02	1.5
12:00	18.30	7.10	-102	0.932	77.8	1.18	9.98	1.65
12:05	18.34	7.10	-99	0.920	55.8	1.26	10.00	1.75
12:10	18.36	7.11	-96	0.916	46.5	1.21	9.85	1.85
12:15	18.42	7.11	-94	0.915	44.6	1.25	9.87	2
12:20	18.35	7.10	-95	0.916	33.9	1.22	9.95	2.1
12:25	18.40	7.10	-94	0.912	28.3	1.34	9.95	2.25

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site:	473 President Street	**Well#/Location:**	MW-20D	**Job No.**	170361301
Date:	3/16/2017	**Weather:**	65 F, Partly Cloudy	**Sampling Personnel:**	Taylor Morgan

Well Information

Sample ID	MW20D_050617
Well Depth (ft)	24.95
Screened Interval (ft)	20-25
Casing Elevation (NAVD88)	12.98
Casing Diameter (in)	2
Depth to Water (ft)	9.98
Water Elevation (msl)	NA
Casing Volume (gal)	2.61
PID/FID Reading (ppm)	440

Purging Information

Purging Method	Low Flow
Purging Rate (gpm)	0.07
Start Purge Time	12:50
End Purge Time	13:55
Volume Purged (gal)	4.4

Sampling Information

Sampling Method	Low-flow
Start Sampling Time	13:57
End Sampling Time	14:05
Depth Before Sampling (ft)	10.07
Number Bottles Collected	5

	Parameters							
Sample Time	**Temp (◦C)**	**pH**	**ORP (mV)**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
12:55	17.74	7.18	-72	0.864	467.00	0.94	10.05	0.75
13:00	17.87	7.18	-80	0.876	248.00	0.75	10.06	1.00
13:05	17.99	7.17	-84	0.877	82.90	0.72	10.00	1.25
13:10	18.15	7.17	-85	0.876	77.50	0.76	10.00	1.45
13:15	18.17	7.17	-86	0.877	36.40	0.76	10.04	1.60
13:20	18.18	7.17	-89	0.877	16.60	0.72	10.08	2.00
13:25	18.05	7.17	-92	0.876	14.60	1.00	10.09	2.45
13:30	18.06	7.16	-93	0.876	14.00	0.75	10.07	2.60
13:35	18.00	7.16	-95	0.877	11.60	0.70	10.06	3.10
13:40	18.01	7.16	-96	0.876	19.10	0.68	10.09	3.40
13:45	18.06	7.15	-97	0.877	14.20	0.68	10.05	3.75
13:50	18.06	7.15	-98	0.877	9.30	0.66	10.18	4.15
13:55	18.06	7.18	-100	0.877	11.10	0.77	10.07	4.40

Notes/Remarks

Stablility

PH - ± 0.1 unit

Specific Conductance - ± 3%

Temperature - ± 3%

Dissolved Oxygen - ±10% above 0.5 mg/L

Turbidity - ± 10% above 5 NTU

ORP/Eh - ±10 millivolts

Maximum flow rate - <0.5 L/m or 0.13 gpm

Maximum drawdown - <0.33 feet

Remember: Battery Connections - **RED** is **POSITIVE** and **BLACK** is **NEGATIVE**

Appendix F
Soil Vapor Construction and Sample Logs

AMBIENT AIR SAMPLING LOG SHEET

Sample Number: AA01

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
INSPECTOR: Veronica Zuluaga	**SAMPLE DATE STARTED:** 3/8/2017 **DATE FINISHED:** 3/8/2017
SAMPLER: Kyle Twombly	**TYPE OF SAMPLING DEVICE:** 6-Liter Summa Canister
POTENTIAL SAMPLE INTERFERENCES: NA	**WEATHER CONDITIONS:** Temperature: 49-61 ° F Wind: 5-10 mph NW Barometer: 29.95 Precipitation: 0

METHOD OF SAMPLING:

Sample AA01, a 6L Summa Canister fitted with a 2-hour flow control valve, was placed outside about 3 feet above sidewalk grade. The flow controller was zeroed and the valve was opened to initiate the 2-hour sample collection. The sample and flow controller were checked periodically during sampling to ensure proper operation. Cannister vacuum readings were collected every 30 minutes.

SAMPLE DETAILS	
PID BEFORE SAMPLE (PPM):	0.0
SAMPLE START DATE/TIME:	3/8/2017 12:13
SAMPLE STOP DATE/TIME:	3/8/2017 14:13
TOTAL SAMPLE TIME (MIN):	120
FLOW RATE (L/MIN):	0.05
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	0.0
CAN SERIAL NUMBER:	15529
REGULATOR SERIAL NUMBER:	4240
CAN START VACUUM PRESS. (" HG):	-29.31
CAN STOP VACUUM PRESS. (" HG):	-8.68

SAMPLE LOCATION SKETCH

See Figure 5.

Notes:

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, New York 10001-2727

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-01

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
DRILLING FIRM OR LANGAN INSTALLER: AARCO Environmental Services Corp.	**INSTALLATION DATE STARTED:** **DATE FINISHED:**
INSTALLATION FOREMAN: Greg Freese	**SAMPLE DATE STARTED:** 3/8/2017 **DATE FINISHED:** 3/8/2017
INSTALLATION EQUIPMENT: Geoprobe 6610DT	**TYPE OF SAMPLING DEVICE:** 6-Liter summa canister
INSPECTOR: Veronica Zuluaga	**SAMPLER:** Kyle Twombly
POTENTIAL SAMPLE INTERFERENCES: None Observed	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** Temperature: 49-61 ° F Wind: 5-10 mph NW Barometer: 29.95 Precipitation: 0

METHOD OF INSTALLATION AND PURGING:

Advance a 2-inch-diameter steel macrocore to 6 feet below grade surface (bgs), install the 6-inch stainless steel probe, backfill with Filpro #2 sand and seal with Cetco Powdered Bentonite Grout. Use helium shroud to perform seal test and purge for two minutes

TUBING TYPE/DIAMETER: 3/16" x 1/4" (ID X OD) Teflon lined HDPE tubing	**TYPE OF MATERIAL ABOVE SEAL:**
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 6-inch stainless steel point	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 2-inch	**FILTER PACK MATERIAL (Sand or Glass Beads):** Filpro #2 Sand

PURGE VOLUME (L):	0.0008
PURGE FLOW RATE (ML/MIN):	0.4
PID AFTER PURGE (PPM):	0.7
HELIUM TEST IN BUCKET(%):	22%
HELIUM TEST IN TUBE (PPM):	0
SAMPLE START DATE/TIME:	3/8/2017 11:30
SAMPLE STOP DATE/TIME:	3/8/2017 13:20
TOTAL SAMPLE TIME (MIN):	110
FLOW RATE (L/MIN):	0.05
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	1.3
SAMPLE MOISTURE CONTENT:	NA
CAN SERIAL NUMBER:	18296
REGULATOR SERIAL NUMBER:	3542
CAN START VACUUM PRESS. (" HG):	-29.35
CAN STOP VACUUM PRESS. (" HG):	-4.98

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)	DEPTH (FEET FROM SURFACE)	NOTES
SURFACE	0	
Top of Pack	5.5	
	6	

SAMPLE LOCATION SKETCH

See Figure 5.

NOTES

purge for 2 minutes

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-02

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
DRILLING FIRM OR LANGAN INSTALLER: AARCO Environmental Services Corp.	**INSTALLATION DATE STARTED:** **DATE FINISHED:**
INSTALLATION FOREMAN: Greg Freese	**SAMPLE DATE STARTED:** 3/8/2017 **DATE FINISHED:** 3/8/2017
INSTALLATION EQUIPMENT: Geoprobe 6610DT	**TYPE OF SAMPLING DEVICE:** 6-Liter summa canister
INSPECTOR: Veronica Zuluaga	**SAMPLER:** Kyle Twombly
POTENTIAL SAMPLE INTERFERENCES: None Observed	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** Temperature: 49-61 ° F Wind: 5-10 mph NW Barometer: 29.95 Precipitation: 0

METHOD OF INSTALLATION AND PURGING:

Advance a 2-inch-diameter steel macrocore to 5 feet below grade surface (bgs), install the 6-inch stainless steel probe, backfill with Filpro #2 sand and seal with Cetco Powdered Bentonite Grout. Use helium shroud to perform seal test and purge for two minutes

TUBING TYPE/DIAMETER: 3/16" x 1/4" (ID X OD) Teflon lined HDPE tubing	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 6-inch stainless steel point	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 2-inch	**FILTER PACK MATERIAL (Sand or Glass Beads):** Filpro #2 Sand

PURGE VOLUME (L):	0.0008
PURGE FLOW RATE (ML/MIN):	0.4
PID AFTER PURGE (PPM):	0.8
HELIUM TEST IN BUCKET(%):	25.6%
HELIUM TEST IN TUBE (PPM):	0
SAMPLE START DATE/TIME:	3/8/2017 12:00
SAMPLE STOP DATE/TIME:	3/8/2017 13:52
TOTAL SAMPLE TIME (MIN):	112
FLOW RATE (L/MIN):	0.05
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	0
SAMPLE MOISTURE CONTENT:	NA
CAN SERIAL NUMBER:	16141
REGULATOR SERIAL NUMBER:	7268
CAN START VACUUM PRESS. (" HG):	-29.03
CAN STOP VACUUM PRESS. (" HG):	-4.62

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)	DEPTH (FEET FROM SURFACE)	NOTES
SURFACE	0	
Top of Pack	4.5	
	5	

SAMPLE LOCATION SKETCH

See Figure 5.

NOTES

Purge for 2 minutes

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SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-03

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
DRILLING FIRM OR LANGAN INSTALLER: AARCO Environmental Services Corp.	**INSTALLATION DATE STARTED:** 3/8/2017 **DATE FINISHED:** 3/8/2017
INSTALLATION FOREMAN: Greg Freese	**SAMPLE DATE STARTED:** 3/9/2017 **DATE FINISHED:** 3/9/2017
INSTALLATION EQUIPMENT: Geoprobe 6610DT	**TYPE OF SAMPLING DEVICE:** 6-Liter summa canister
INSPECTOR: Veronica Zuluaga	**SAMPLER:** Kyle Twombly
POTENTIAL SAMPLE INTERFERENCES: None Observed	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** Temperature: 50-65 ° F Wind: 11-19 mph NW Barometer: 29.92 Precipitation: 0

METHOD OF INSTALLATION AND PURGING:

Advance a 2-inch-diameter steel macrocore to 5 feet below grade surface (bgs), install the 6-inch stainless steel probe, backfill with Filpro #2 sand and seal with Cetco Powdered Bentonite Grout. Use helium shroud to perform seal test and purge for two minutes

TUBING TYPE/DIAMETER: 3/16" x 1/4" (ID X OD) Teflon lined HDPE tubing	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 6-inch stainless steel point	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 2-inch	**FILTER PACK MATERIAL (Sand or Glass Beads):** Filpro #2 Sand

PURGE VOLUME (L):	0.0008
PURGE FLOW RATE (ML/MIN):	0.4
PID AFTER PURGE (PPM):	14.5
HELIUM TEST IN BUCKET(%):	19.7%
HELIUM TEST IN TUBE (PPM):	0
SAMPLE START DATE/TIME:	3/9/2017 7:36
SAMPLE STOP DATE/TIME:	3/9/2017 9:05
TOTAL SAMPLE TIME (MIN):	89
FLOW RATE (L/MIN):	0.06
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	19.8
SAMPLE MOISTURE CONTENT:	NA
CAN SERIAL NUMBER:	19529
REGULATOR SERIAL NUMBER:	Y23
CAN START VACUUM PRESS. (" HG):	-23.2
CAN STOP VACUUM PRESS. (" HG):	-4.73

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)	DEPTH (FEET FROM SURFACE)	NOTES
SURFACE	0	
Top of Pack	4.5	
	5	

SAMPLE LOCATION SKETCH

See Figure 5.

NOTES

Purge for 2 minutes

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SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-04/SVDUP01

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
DRILLING FIRM OR LANGAN INSTALLER: AARCO Environmental Services Corp.	**INSTALLATION DATE STARTED:** **DATE FINISHED:**
INSTALLATION FOREMAN: Greg Freese	**SAMPLE DATE STARTED:** 3/8/2017 **DATE FINISHED:** 3/8/2017
INSTALLATION EQUIPMENT: Geoprobe 6610DT	**TYPE OF SAMPLING DEVICE:** 6-Liter summa canister
INSPECTOR: Veronica Zuluaga	**SAMPLER:** Kyle Twombly
POTENTIAL SAMPLE INTERFERENCES: None Observed	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** Temperature: 49-61 ° F Wind: 5-10 mph NW Barometer: 29.95 Precipitation: 0

METHOD OF INSTALLATION AND PURGING:

Advance a 2-inch-diameter steel macrocore to 5 feet below grade surface (bgs), install the 6-inch stainless steel probe, backfill with Filpro #2 sand and seal with Cetco Powdered Bentonite Grout. Use helium shroud to perform seal test and purge for two minutes

TUBING TYPE/DIAMETER: 3/16" x 1/4" (ID X OD) Teflon lined HDPE tubing	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 6-inch stainless steel point	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 2-inch	**FILTER PACK MATERIAL (Sand or Glass Beads):** Filpro #2 Sand

	SVDUP01	SV-04
PURGE VOLUME (L):	0.0008	
PURGE FLOW RATE (ML/MIN):	0.4	
PID AFTER PURGE (PPM):	5.6	2
HELIUM TEST IN BUCKET(%):	19%	18.6%
HELIUM TEST IN TUBE (PPM):	5.6	2
SAMPLE START DATE/TIME:	3/8/2017 12:50	
SAMPLE STOP DATE/TIME:	3/8/2017 14:50	
TOTAL SAMPLE TIME (MIN):	120	
FLOW RATE (L/MIN):	0.05	
VOLUME OF SAMPLE (LITERS):	6	
PID AFTER SAMPLE (PPM):	0	0
SAMPLE MOISTURE CONTENT:	NA	
CAN SERIAL NUMBER:	18300	462
REGULATOR SERIAL NUMBER:	7416	7360
CAN START VACUUM PRESS. (" HG):	-29.13	-29.18
CAN STOP VACUUM PRESS. (" HG):	-5.3	-5.42

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)	DEPTH (FEET FROM SURFACE)	NOTES
SURFACE	0	
Top of Pack	4.5	
	5	

SAMPLE LOCATION SKETCH

See Figure 5.

NOTES

Purge for 2 minutes

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-05

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
DRILLING FIRM OR LANGAN INSTALLER: AARCO Environmental Services Corp.	**INSTALLATION DATE STARTED:** **DATE FINISHED:**
INSTALLATION FOREMAN: Greg Freese	**SAMPLE DATE STARTED:** 3/10/2017 **DATE FINISHED:** 3/10/2017
INSTALLATION EQUIPMENT: Geoprobe 6610DT	**TYPE OF SAMPLING DEVICE:** 6-Liter summa canister
INSPECTOR: Veronica Zuluaga	**SAMPLER:** Kyle Twombly
POTENTIAL SAMPLE INTERFERENCES: None Observed	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** Temperature: 25-50 ° F Wind:0-10 mph ESE Barometer: 29.95 Precipitation: 0.19

METHOD OF INSTALLATION AND PURGING:

Advance a 2-inch-diameter steel macrocore to 5 feet below grade surface (bgs), install the 6-inch stainless steel probe, backfill with Filpro #2 sand and seal with Cetco Powdered Bentonite Grout. Use helium shroud to perform seal test and purge for two minutes

TUBING TYPE/DIAMETER: 3/16" x 1/4" (ID X OD) Teflon lined HDPE tubing	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: 6-inch stainless steel point	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 2-inch	**FILTER PACK MATERIAL (Sand or Glass Beads):** Filpro #2 Sand

PURGE VOLUME (L):	0.0008
PURGE FLOW RATE (ML/MIN):	0.4
PID AFTER PURGE (PPM):	0.1
HELIUM TEST IN BUCKET(%):	16.4%
HELIUM TEST IN TUBE (PPM):	0
SAMPLE START DATE/TIME:	3/10/2017 10:00
SAMPLE STOP DATE/TIME:	3/10/2017 11:42
TOTAL SAMPLE TIME (MIN):	102
FLOW RATE (L/MIN):	0.06
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	0
SAMPLE MOISTURE CONTENT:	NA
CAN SERIAL NUMBER:	18316
REGULATOR SERIAL NUMBER:	Y48
CAN START VACUUM PRESS. (" HG):	-26.5
CAN STOP VACUUM PRESS. (" HG):	-4.81

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)	DEPTH (FEET FROM SURFACE)	NOTES
SURFACE	0	
Top of Pack	4.5	
	5	

SAMPLE LOCATION SKETCH

See Figure 5.

NOTES

Purge for 2 minutes

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AMBIENT AIR SAMPLING LOG SHEET

Sample Number: AA02

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
INSPECTOR: Kyle Twombly	**SAMPLE DATE STARTED:** 3/28/2018 **DATE FINISHED:** 3/28/2018
SAMPLER: Kyle Twombly	**TYPE OF SAMPLING DEVICE:** 2.7-Liter Summa Canister
POTENTIAL SAMPLE INTERFERENCES: NA	**WEATHER CONDITIONS:** Temperature: 35-40 ° F Wind: 5-10 mph SW Barometer: 30.08 in Precipitation: 0.03 in

METHOD OF SAMPLING:

Sample AA02, a 2.7-L Summa Canister fitted with a 8-hour flow control valve, was placed outside about 3 feet above sidewalk grade. The flow controller was zeroed and the valve was opened to initiate the 8-hour sample collection. The sample and flow controller were checked periodically during sampling to ensure proper operation. Cannister vacuum readings were collected about every 60 minutes.

SAMPLE DETAILS		SAMPLE LOCATION SKETCH
PID BEFORE SAMPLE (PPM):	0.0	See Figure 5.
SAMPLE START DATE/TIME:	3/28/2018 8:20	
SAMPLE STOP DATE/TIME:	3/28/2018 16:20	
TOTAL SAMPLE TIME (MIN):	480	
FLOW RATE (L/MIN):	0.005	
VOLUME OF SAMPLE (LITERS):	2.7	
PID AFTER SAMPLE (PPM):	0.0	
CAN SERIAL NUMBER:	2339	
REGULATOR SERIAL NUMBER:	0645	
CAN START VACUUM PRESS. (" HG):	-30.10	
CAN STOP VACUUM PRESS. (" HG):	-9.22	

Notes:

AMBIENT AIR SAMPLING LOG SHEET

Sample Number: IA01

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
INSPECTOR: Kyle Twombly	**SAMPLE DATE STARTED:** 3/28/2018 **DATE FINISHED:** 3/28/2018
SAMPLER: Kyle Twombly	**TYPE OF SAMPLING DEVICE:** 2.7-Liter Summa Canister
POTENTIAL SAMPLE INTERFERENCES: NA	**WEATHER CONDITIONS:** Temperature: 35-40 ° F Wind: 5-10 mph SW Barometer: 30.08 in Precipitation: 0.03 in

METHOD OF SAMPLING:

Sample IA01, a 2.7-L Summa Canister fitted with a 8-hour flow control valve, was placed indoors about 3 feet above grade. The flow controller was zeroed and the valve was opened to initiate the 8-hour sample collection. The sample and flow controller were checked periodically during sampling to ensure proper operation. Cannister vacuum readings were collected about every 60 minutes.

SAMPLE DETAILS	
PID BEFORE SAMPLE (PPM):	0.0
SAMPLE START DATE/TIME:	3/28/2018 8:15
SAMPLE STOP DATE/TIME:	3/28/2018 16:15
TOTAL SAMPLE TIME (MIN):	480
FLOW RATE (L/MIN):	0.005
VOLUME OF SAMPLE (LITERS):	2.7
PID AFTER SAMPLE (PPM):	0.0
CAN SERIAL NUMBER:	515
REGULATOR SERIAL NUMBER:	0400
CAN START VACUUM PRESS. (" HG):	-30.27
CAN STOP VACUUM PRESS. (" HG):	-4.84

SAMPLE LOCATION SKETCH

See Figure 5.

Notes:

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AMBIENT AIR SAMPLING LOG SHEET

Sample Number: IA02

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
INSPECTOR: Kyle Twombly	**SAMPLE DATE STARTED:** 3/28/2018 **DATE FINISHED:** 3/28/2018
SAMPLER: Kyle Twombly	**TYPE OF SAMPLING DEVICE:** 2.7-Liter Summa Canister
POTENTIAL SAMPLE INTERFERENCES: NA	**WEATHER CONDITIONS:** Temperature: 35-40 ° F Wind: 5-10 mph SW Barometer: 30.08 in Precipitation: 0.03 in

METHOD OF SAMPLING:

Sample IA02, a 2.7-L Summa Canister fitted with a 8-hour flow control valve, was placed indoors about 3 feet above grade. The flow controller was zeroed and the valve was opened to initiate the 8-hour sample collection. The sample and flow controller were checked periodically during sampling to ensure proper operation. Cannister vacuum readings were collected about every 60 minutes.

SAMPLE DETAILS	
PID BEFORE SAMPLE (PPM):	0.0
SAMPLE START DATE/TIME:	3/28/2018 8:12
SAMPLE STOP DATE/TIME:	3/28/2018 16:17
TOTAL SAMPLE TIME (MIN):	485
FLOW RATE (L/MIN):	0.005
VOLUME OF SAMPLE (LITERS):	2.7
PID AFTER SAMPLE (PPM):	0.0
CAN SERIAL NUMBER:	134
REGULATOR SERIAL NUMBER:	0398
CAN START VACUUM PRESS. (" HG):	-30.13
CAN STOP VACUUM PRESS. (" HG):	-7.83

SAMPLE LOCATION SKETCH

See Figure 5.

Notes:

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AMBIENT AIR SAMPLING LOG SHEET

Sample Number: IA03

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
INSPECTOR: Kyle Twombly	**SAMPLE DATE STARTED:** 3/28/2018 **DATE FINISHED:** 3/28/2018
SAMPLER: Kyle Twombly	**TYPE OF SAMPLING DEVICE:** 2.7-Liter Summa Canister
POTENTIAL SAMPLE INTERFERENCES: NA	**WEATHER CONDITIONS:** Temperature: 35-40 ° F Wind: 5-10 mph SW Barometer: 30.08 in Precipitation: 0.03 in

METHOD OF SAMPLING:

Sample IA03, a 2.7-L Summa Canister fitted with a 8-hour flow control valve, was placed indoors about 3 feet above grade. The flow controller was zeroed and the valve was opened to initiate the 8-hour sample collection. The sample and flow controller were checked periodically during sampling to ensure proper operation. Cannister vacuum readings were collected about every 60 minutes.

SAMPLE DETAILS	
PID BEFORE SAMPLE (PPM):	0.0
SAMPLE START DATE/TIME:	3/28/2018 8:09
SAMPLE STOP DATE/TIME:	3/28/2018 16:10
TOTAL SAMPLE TIME (MIN):	481
FLOW RATE (L/MIN):	0.005
VOLUME OF SAMPLE (LITERS):	2.7
PID AFTER SAMPLE (PPM):	0.0
CAN SERIAL NUMBER:	505
REGULATOR SERIAL NUMBER:	0038
CAN START VACUUM PRESS. (" HG):	-30.06
CAN STOP VACUUM PRESS. (" HG):	-4.7

SAMPLE LOCATION SKETCH

See Figure 5.

Notes:

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AMBIENT AIR SAMPLING LOG SHEET

Sample Number: IA04

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
INSPECTOR: Kyle Twombly	**SAMPLE DATE STARTED:** 3/28/2018 **DATE FINISHED:** 3/28/2018
SAMPLER: Kyle Twombly	**TYPE OF SAMPLING DEVICE:** 2.7-Liter Summa Canister
POTENTIAL SAMPLE INTERFERENCES: NA	**WEATHER CONDITIONS:** Temperature: 35-40 ° F Wind: 5-10 mph SW Barometer: 30.08 in Precipitation: 0.03 in

METHOD OF SAMPLING:

Sample IA04, a 2.7-L Summa Canister fitted with a 8-hour flow control valve, was placed indoors about 3 feet above grade. The flow controller was zeroed and the valve was opened to initiate the 8-hour sample collection. The sample and flow controller were checked periodically during sampling to ensure proper operation. Cannister vacuum readings were collected about every 60 minutes.

SAMPLE DETAILS	
PID BEFORE SAMPLE (PPM):	0.0
SAMPLE START DATE/TIME:	3/28/2018 8:10
SAMPLE STOP DATE/TIME:	3/28/2018 16:12
TOTAL SAMPLE TIME (MIN):	482
FLOW RATE (L/MIN):	0.005
VOLUME OF SAMPLE (LITERS):	2.7
PID AFTER SAMPLE (PPM):	0.0
CAN SERIAL NUMBER:	1745
REGULATOR SERIAL NUMBER:	0410
CAN START VACUUM PRESS. (" HG):	-30.28
CAN STOP VACUUM PRESS. (" HG):	-7.35

SAMPLE LOCATION SKETCH

See Figure 5.

Notes:

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AMBIENT AIR SAMPLING LOG SHEET

Sample Number: IA05

PROJECT: 473 President Street	**PROJECT NO.:** 170361301
LOCATION: Brooklyn, NY	**SURFACE ELEVATION AND DATUM:** NA
INSPECTOR: Kyle Twombly	**SAMPLE DATE STARTED:** 3/28/2018 **DATE FINISHED:** 3/28/2018
SAMPLER: Kyle Twombly	**TYPE OF SAMPLING DEVICE:** 2.7-Liter Summa Canister
POTENTIAL SAMPLE INTERFERENCES: NA	**WEATHER CONDITIONS:** Temperature: 35-40 ° F Wind: 5-10 mph SW Barometer: 30.08 in Precipitation: 0.03 in

METHOD OF SAMPLING:

Sample IA05, a 2.7-L Summa Canister fitted with a 8-hour flow control valve, was placed indoors about 3 feet above grade. The flow controller was zeroed and the valve was opened to initiate the 8-hour sample collection. The sample and flow controller were checked periodically during sampling to ensure proper operation. Cannister vacuum readings were collected about every 60 minutes.

SAMPLE DETAILS	
PID BEFORE SAMPLE (PPM):	0.0
SAMPLE START DATE/TIME:	3/28/2018 8:10
SAMPLE STOP DATE/TIME:	3/28/2018 16:12
TOTAL SAMPLE TIME (MIN):	482
FLOW RATE (L/MIN):	0.005
VOLUME OF SAMPLE (LITERS):	2.7
PID AFTER SAMPLE (PPM):	0.0
CAN SERIAL NUMBER:	1745
REGULATOR SERIAL NUMBER:	0410
CAN START VACUUM PRESS. (" HG):	-30.28
CAN STOP VACUUM PRESS. (" HG):	-7.35

SAMPLE LOCATION SKETCH

See Figure 5.

Notes:

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21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, New York 10001-2727

Appendix G
Data Usability Summary Reports

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Paul McMahon, Langan Project Engineer

From: Emily Strake, Langan Senior Project Chemist/Risk Assessor

Date: May 16, 2017

Re: Data Usability Summary Report
For 473 President Street
Groundwater Samples Collected March 2017
Langan Project No.: 170361301

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of groundwater samples collected in March 2017 by Langan Engineering and Environmental Services ("Langan") at the 473 President Street site ("the Site"). The samples were analyzed by York Analytical (NYSDOH ELAP registration # 10854) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, metals and mercury (Hg), cyanide (CN) and hexavalent chromium (CrVI) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D and 8270D with SIM
- Pesticides by SW-846 Method 8081B
- Dissolved Metals by Methods SW-846 6010C and 6020A
- Mercury by SW-846 Method 7473
- Cyanide by SW-846 Method 9010
- Hexavalent Chromium by SW-846 Method 7196A

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

TABLE 1: SAMPLE SUMMARY

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
17C0878	17C0878-01	MW18_032217 18:30	03/22/2017	VOCs, SVOCs, Pesticides, Metals, Hg, CN
17C0878	17C0878-02	MW18_032217 19:20	03/22/2017	CrVI
17C0618	17C0618-01	MW08_031617	03/16/2017	VOCs, SVOCs, Pesticides, Metals, Hg, CN, CrVI
17C0618	17C0618-02	MW06_031617	03/16/2017	VOCs, SVOCs, Pesticides, Metals, Hg, CN, CrVI

SDG	Lab Sample ID	Client Sample ID	Sample Date	Analytical Parameters
17C0618	17C0618-03	MW12_031617	03/16/2017	VOCs, SVOCs, Pesticides, Metals, Hg, CN, CrVI
17C0618	17C0618-04	GWDUP01_031617	03/16/2017	VOCs, SVOCs, Pesticides, Metals, Hg, CN, CrVI
17C0618	17C0618-05	GWFB01_031617	03/16/2017	VOCs, SVOCs, Pesticides
17C0618	17C0618-06	GWTB01_031617	03/16/2017	VOCs
17C0850	17C0850-01	GWFB02_032217	03/22/2017	Metals, Hg, CN, CrVI
17C0850	17C0850-02	MW07_032217	03/22/2017	VOCs, SVOCs, Pesticides, Metals, Hg, CN, CrVI
17C0850	17C0850-03	MW10_032217	03/22/2017	VOCs, SVOCs, Pesticides, Metals, Hg, CN, CrVI
17C0850	17C0850-04	MW09_032217	03/22/2017	VOCs, SVOCs, Pesticides, Metals, Hg, CN, CrVI

Validation Overview

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Rev 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Rev 1), USEPA Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Rev 1), USEPA Region II SOP #HW-3b, "ICP-MS Data Validation" (September 2016, Rev 1), USEPA Region II SOP #HW3c, "Mercury and Cyanide Data Validation," (September 2016, Rev 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Superfund Organic Methods Data Review" (USEPA-540R-2016-002, September 2016), and the "National Functional Guidelines for Inorganic Superfund Data Review" (USEPA-540R-2016-001, September 2016).

Validation includes review of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. Items subject to review in this memorandum include holding times, sample preservation, sample extraction and digestion, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, target compound identification and quantification, chromatograms, overall system performance, serial dilutions, dual column performance, field duplicate, field blank and trip blank sample results.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

R – The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

J – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.

UJ – The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.

U – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

NJ – The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

TABLE 2: VALIDATOR-APPLIED QUALIFICATION

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
MW18_032217 18:30	SW6010B	LEAD	7439-92-1	J
MW18_032217 18:30	SW6010B	COPPER	7440-50-8	J
MW18_032217 18:30	SW6020	ANTIMONY	7440-36-0	UJ
MW18_032217 18:30	SW6020	SELENIUM	7782-49-2	UJ
MW18_032217 18:30	SW8260B	1,4-DIOXANE (P-DIOXANE)	123-91-1	UJ
MW18_032217 18:30	SW8260B	TETRACHLOROETHYLENE(PCE)	127-18-4	UJ
MW18_032217 18:30	SW8260B	BROMOMETHANE	74-83-9	UJ
MW18_032217 18:30	SW8260B	CHLOROETHANE	75-00-3	UJ
MW18_032217 18:30	SW8260B	VINYL CHLORIDE	75-01-4	J
MW18_032217 18:30	SW8260B	TRICHLOROFLUOROMETHANE	75-69-4	UJ
MW18_032217 18:30	SW8260B	DICHLORODIFLUOROMETHANE	75-71-8	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
MW18_032217 18:30	SW8260B	1,2,3-TRICHLOROBENZENE	87-61-6	UJ
MW18_032217 18:30	SW8260B	HEXACHLOROBUTADIENE	87-68-3	UJ
MW18_032217 18:30	SW8270C	4-NITROPHENOL	100-02-7	UJ
MW18_032217 18:30	SW8270C	BENZALDEHYDE	100-52-7	UJ
MW18_032217 18:30	SW8270C	PHENOL	108-95-2	UJ
MW18_032217 18:30	SW8270C	BIS(2-CHLOROETHOXY) METHANE	111-91-1	UJ
MW18_032217 18:30	SW8270C	2,4-DINITROPHENOL	51-28-5	UJ
MW18_032217 18:30	SW8270C	N-NITROSODI-N-PROPYLAMINE	621-64-7	UJ
MW18_032217 18:30	SW8270C	BENZOIC ACID	65-85-0	UJ
MW18_032217 18:30	SW8270C	HEXACHLOROCYCLOPENTADIENE	77-47-4	UJ
MW18_032217 18:30	SW8270C	2-METHYLPHENOL (O-CRESOL)	95-48-7	UJ
MW18_032217 18:30	SW8270C	ACETOPHENONE	98-86-2	UJ
MW18_032217 18:30	SW8270C	3- AND 4- METHYLPHENOL (TOTAL)	MEPH3MEPH4	UJ
GWDUP01_031617	SW6010B	Copper	7440-50-8	J
GWDUP01_031617	SW7196A	Chromium, Hexavalent	18540-29-9	UJ
GWDUP01_031617	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ
GWDUP01_031617	SW8260B	Tetrachloroethylene (PCE)	127-18-4	J
GWDUP01_031617	SW8260B	Acetone	67-64-1	U (2.9)
GWDUP01_031617	SW8260B	Bromomethane	74-83-9	U (0.5)
GWDUP01_031617	SW8260B	Chloromethane	74-87-3	UJ
GWDUP01_031617	SW8270C	Benzaldehyde	100-52-7	UJ
GWDUP01_031617	SW8270C	Benzoic Acid	65-85-0	UJ
GWFB01_031617	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ
GWFB01_031617	SW8260B	Tetrachloroethylene (PCE)	127-18-4	UJ
GWFB01_031617	SW8260B	Bromomethane	74-83-9	J
GWFB01_031617	SW8260B	Chloromethane	74-87-3	UJ
GWFB01_031617	SW8270C	Benzaldehyde	100-52-7	UJ
GWFB01_031617	SW8270C	Benzoic Acid	65-85-0	UJ
GWTB01_031617	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
GWTB01_031617	SW8260B	Tetrachloroethylene (PCE)	127-18-4	UJ
GWTB01_031617	SW8260B	Bromomethane	74-83-9	UJ
GWTB01_031617	SW8260B	Chloromethane	74-87-3	UJ
MW06_031617	SW6010B	Copper	7440-50-8	J
MW06_031617	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ
MW06_031617	SW8260B	Tetrachloroethylene (PCE)	127-18-4	UJ
MW06_031617	SW8260B	Bromomethane	74-83-9	UJ
MW06_031617	SW8260B	Chloromethane	74-87-3	UJ
MW06_031617	SW8270C	Benzaldehyde	100-52-7	UJ
MW06_031617	SW8270C	Benzoic Acid	65-85-0	UJ
MW08_031617	SW6010B	Copper	7440-50-8	J
MW08_031617	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ
MW08_031617	SW8260B	Tetrachloroethylene (PCE)	127-18-4	J
MW08_031617	SW8260B	Acetone	67-64-1	U (2.4)
MW08_031617	SW8260B	Bromomethane	74-83-9	U (0.5)
MW08_031617	SW8260B	Chloromethane	74-87-3	J
MW08_031617	SW8270C	Benzaldehyde	100-52-7	UJ
MW08_031617	SW8270C	Benzoic Acid	65-85-0	UJ
MW12_031617	SW6010B	Copper	7440-50-8	J
MW12_031617	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ
MW12_031617	SW8260B	Tetrachloroethylene (PCE)	127-18-4	J
MW12_031617	SW8260B	Bromomethane	74-83-9	U (0.5)
MW12_031617	SW8260B	Chloromethane	74-87-3	UJ
MW12_031617	SW8270C	Benzaldehyde	100-52-7	UJ
MW12_031617	SW8270C	Benzoic Acid	65-85-0	UJ
GWDUP01_031617	SW8270C	Pyrene	129-00-0	J
GWDUP01_031617	SW8270C	Benzo(G,H,I)Perylene	191-24-2	J
GWDUP01_031617	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	J
GWDUP01_031617	SW8270C	Benzo(B)Fluoranthene	205-99-2	J
GWDUP01_031617	SW8270C	Fluoranthene	206-44-0	J
GWDUP01_031617	SW8270C	Benzo(K)Fluoranthene	207-08-9	J
GWDUP01_031617	SW8270C	Chrysene	218-01-9	J

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
GWDUP01_031617	SW8270C	Benzo(A)Pyrene	50-32-8	J
GWDUP01_031617	SW8270C	Benzo(A)Anthracene	56-55-3	J
GWDUP01_031617	SW8270C	Acenaphthene	83-32-9	UJ
GWDUP01_031617	SW8270C	Phenanthrene	85-01-8	J
MW08_031617	SW8270C	Pyrene	129-00-0	J
MW08_031617	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
MW08_031617	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
MW08_031617	SW8270C	Benzo(B)Fluoranthene	205-99-2	UJ
MW08_031617	SW8270C	Fluoranthene	206-44-0	J
MW08_031617	SW8270C	Benzo(K)Fluoranthene	207-08-9	J
MW08_031617	SW8270C	Chrysene	218-01-9	J
MW08_031617	SW8270C	Benzo(A)Pyrene	50-32-8	J
MW08_031617	SW8270C	Benzo(A)Anthracene	56-55-3	J
MW08_031617	SW8270C	Acenaphthene	83-32-9	J
MW08_031617	SW8270C	Phenanthrene	85-01-8	J
GWFB02_032217	SW6010B	Copper	7440-50-8	J
MW07_032217	SW6010B	Copper	7440-50-8	U (0.00634)
MW07_032217	SW6010B	Zinc	7440-66-6	U (0.0193)
MW07_032217	SW8081B	Heptachlor Epoxide	1024-57-3	UJ
MW07_032217	SW8081B	Aldrin	309-00-2	UJ
MW07_032217	SW8081B	Alpha Bhc (Alpha Hexachlorocyclohexane)	319-84-6	UJ
MW07_032217	SW8081B	Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	UJ
MW07_032217	SW8081B	Delta BHC (Delta Hexachlorocyclohexane)	319-86-8	UJ
MW07_032217	SW8081B	cis-Chlordane	5103-71-9	UJ
MW07_032217	SW8081B	gamma-Chlordane	5566-34-7	UJ
MW07_032217	SW8081B	Chlordane	57-74-9	UJ
MW07_032217	SW8081B	Gamma Bhc (Lindane)	58-89-9	UJ
MW07_032217	SW8081B	Heptachlor	76-44-8	UJ
MW07_032217	SW8260B	1,2,4-Trichlorobenzene	120-82-1	UJ
MW07_032217	SW8260B	Bromomethane	74-83-9	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
MW07_032217	SW8260B	Dichlorodifluoromethane	75-71-8	UJ
MW07_032217	SW8260B	1,2,3-Trichlorobenzene	87-61-6	UJ
MW07_032217	SW8260B	1,2,4-Trimethylbenzene	95-63-6	J
MW07_032217	SW8260B	1,2,3-Trichloropropane	96-18-4	UJ
MW07_032217	SW8270C	4-Nitrophenol	100-02-7	UJ
MW07_032217	SW8270C	Benzaldehyde	100-52-7	UJ
MW07_032217	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
MW07_032217	SW8270C	Phenol	108-95-2	UJ
MW07_032217	SW8270C	Benzoic Acid	65-85-0	UJ
MW07_032217	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
MW07_032217	SW8270C	N-Nitrosodiphenylamine	86-30-6	UJ
MW07_032217	SW8270C	3,3'-Dichlorobenzidine	91-94-1	UJ
MW07_032217	SW8270C	2-Methylphenol (O-Cresol)	95-48-7	UJ
MW07_032217	SW8270C	Acetophenone	98-86-2	UJ
MW07_032217	SW8270C	3- And 4- Methylphenol (Total)	MEPH3MEPH4	UJ
MW07_032217	SW8270C	N-Nitrosodimethylamine	62-75-9	UJ
MW09_032217	SW6010B	Copper	7440-50-8	U (0.00959)
MW09_032217	SW6010B	Zinc	7440-66-6	U (0.0181)
MW09_032217	SW8081B	Heptachlor Epoxide	1024-57-3	UJ
MW09_032217	SW8081B	Aldrin	309-00-2	UJ
MW09_032217	SW8081B	Alpha Bhc (Alpha Hexachlorocyclohexane)	319-84-6	UJ
MW09_032217	SW8081B	Beta Bhc (Beta Hexachlorocyclohexane)	319-85-7	UJ
MW09_032217	SW8081B	Delta BHC (Delta Hexachlorocyclohexane)	319-86-8	UJ
MW09_032217	SW8081B	cis-Chlordane	5103-71-9	UJ
MW09_032217	SW8081B	gamma-Chlordane	5566-34-7	UJ
MW09_032217	SW8081B	Chlordane	57-74-9	UJ
MW09_032217	SW8081B	Gamma Bhc (Lindane)	58-89-9	UJ
MW09_032217	SW8081B	Heptachlor	76-44-8	UJ
MW09_032217	SW8260B	1,2,4-Trichlorobenzene	120-82-1	UJ
MW09_032217	SW8260B	Bromomethane	74-83-9	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
MW09_032217	SW8260B	Dichlorodifluoromethane	75-71-8	UJ
MW09_032217	SW8260B	1,2,3-Trichlorobenzene	87-61-6	UJ
MW09_032217	SW8260B	1,2,4-Trimethylbenzene	95-63-6	UJ
MW09_032217	SW8260B	1,2,3-Trichloropropane	96-18-4	UJ
MW09_032217	SW8270C	4-Nitrophenol	100-02-7	UJ
MW09_032217	SW8270C	Benzaldehyde	100-52-7	UJ
MW09_032217	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
MW09_032217	SW8270C	Phenol	108-95-2	UJ
MW09_032217	SW8270C	Benzoic Acid	65-85-0	UJ
MW09_032217	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
MW09_032217	SW8270C	N-Nitrosodiphenylamine	86-30-6	UJ
MW09_032217	SW8270C	3,3'-Dichlorobenzidine	91-94-1	UJ
MW09_032217	SW8270C	2-Methylphenol (O-Cresol)	95-48-7	UJ
MW09_032217	SW8270C	Acetophenone	98-86-2	UJ
MW09_032217	SW8270C	3- And 4- Methylphenol (Total)	MEPH3MEPH4	UJ
MW09_032217	SW8270C	N-Nitrosodimethylamine	62-75-9	UJ
MW10_032217	SW6010B	Iron	7439-89-6	U (0.221)
MW10_032217	SW6010B	Copper	7440-50-8	U (0.0105)
MW10_032217	SW6010B	Zinc	7440-66-6	U (0.0180)
MW10_032217	SW8260B	1,2,4-Trichlorobenzene	120-82-1	UJ
MW10_032217	SW8260B	Bromomethane	74-83-9	UJ
MW10_032217	SW8260B	Dichlorodifluoromethane	75-71-8	UJ
MW10_032217	SW8260B	1,2,3-Trichlorobenzene	87-61-6	UJ
MW10_032217	SW8260B	1,2,4-Trimethylbenzene	95-63-6	UJ
MW10_032217	SW8260B	1,2,3-Trichloropropane	96-18-4	UJ
MW10_032217	SW8270C	4-Nitrophenol	100-02-7	UJ
MW10_032217	SW8270C	Benzaldehyde	100-52-7	UJ
MW10_032217	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
MW10_032217	SW8270C	Phenol	108-95-2	UJ
MW10_032217	SW8270C	Benzoic Acid	65-85-0	UJ
MW10_032217	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
MW10_032217	SW8270C	N-Nitrosodiphenylamine	86-30-6	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
MW10_032217	SW8270C	3,3'-Dichlorobenzidine	91-94-1	UJ
MW10_032217	SW8270C	2-Methylphenol (O-Cresol)	95-48-7	UJ
MW10_032217	SW8270C	Acetophenone	98-86-2	UJ
MW10_032217	SW8270C	3- And 4- Methylphenol (Total)	MEPH3MEPH4	UJ
MW10_032217	SW8270C	N-Nitrosodimethylamine	62-75-9	UJ

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by SW-846 Method 8260C:

LCS/LCSD BC71342 displayed recoveries outside of control limits for bromomethane (25.9% and 30.3%), chloroethane (161% and 157%), and vinyl chloride (171% and 155%). The associated sample results are qualified as estimated.

Second-source calibration verification Y7C2913 displayed a %D greater than the control limit for dichlorodifluoromethane at 32.6%. The associated sample result is qualified as "UJ."

The continuing calibration analyzed on 3/30/17 at 04:47 displayed %Ds greater than the control limit for 1,2,3-trichlorobenzene (33.5%), 1,4-dioxane, (45.8%), bromomethane (84.6%), chloroethane (47.1%), dichlorodifluoromethane (30.3%), hexachlorobutadiene (23.7%), PCE (32.9%), trichlorofluoromethane (26.3%) and vinyl chloride (56.4%). The associated sample results are qualified as estimated.

Field blank sample GWFB01_031617 displayed positive detections for acetone (2.9 ug/L) and bromomethane (0.38 ug/L). The associated sample results are qualified as "U" at the higher of the sample concentration and the reporting limit.

LCS/LCSD BC70988 displayed recoveries less than the lower control limit for bromomethane at 22.8% and 27.6%. The associated sample results are qualified as estimated.

The initial calibration analyzed on VOA No. 8 displayed a RSD greater than the control limit for PCE. The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/22/17 at 21:04 displayed %Ds greater than the control limit for 1,4-dioxane at 49.5%, bromomethane at 85.3%, and chloromethane at 43.8%. The associated sample results are qualified as estimated.

Second source calibration verification sample Y7C2913 displayed a %D greater than the control limit for dichlorodifluoromethane at 32.6%. The associated sample results are qualified as "UJ."

The continuing calibration analyzed on 3/28/17 at 16:53 displayed %Ds greater than the control limit for bromomethane at 33%, dichlorodifluoromethane at 35.3%, 1,2,3-trichlorobenzene at 37.6%, 1,2,3-trichloropropane at 43.8%, 1,2,4-trichlorobenzene at 25.5%, and 1,2,4-trimethylbenzene at 22.2%. The associated sample results are qualified as estimated.

SVOCs by SW-846 Method 8270D and 8720D with SIM:

The continuing calibration analyzed on 3/30/17 at 7:33 displayed %Ds greater than the control limit for 2,4-dinitrophenol (21.5%), 2-methylphenol (26.2%), 3&4-methylphenols (24.5%), 4-nitrophenol (46.3%), acetophenone (32.3%), benzaldehyde (49.3%), bis(2-chloroethoxy)methane (27.4%), hexachlorocyclopentadiene (53.3%), n-nitroso-di-n-propylamine (33.7%) and phenol (28.6%). The associated sample results are qualified as estimated.

LCS/LCSD BC70952 did not recover (i.e., 0%) for benzaldehyde and benzoic acid. The associated sample results are qualified as estimated. In addition, the recovery of 2,3,4,6-tetrachlorophenol was greater than the upper control limit at 193%. The associated sample results were non-detect; qualification is not necessary.

LCS/LCSD BC71312 did not recover for benzoic acid and displayed a recovery less than the control limit for acetophenone at 39.4%. The associated sample results are qualified as "UJ." In addition, the LCS/LCSD displayed recoveries and RPDs greater than the control limit for 4-nitrophenol, benzaldehyde, caprolactam, biphenyl and 2,3,4,6-tetrachlorophenol. The associated sample results were non-detect; qualification is not necessary.

The continuing calibration analyzed on 3/30/17 at 07:33 displayed %Ds greater than the control limit for 2-methylphenol at 26%, 3&4-methylphenols at 25.3%, 3,3'-dichlorobenzidine at 28.2%, 4-nitrophenol at 46.3%, acetophenone at 32.2%, benzaldehyde at 49.3%, benzoic acid at 36.6%, bis(2-chloroisopropyl)ether at 32.5%, hexachlorocyclopentadiene at 57.2%, n-

nitrosodimethylamine at 31.4%, n-nitrosodiphenylamine at 33.6% and phenol at 28.5%. The associated sample results are qualified as estimated.

Pesticides by SW-846 Method 8081B:

Samples MW07_032217 and MW09_032217 displayed recoveries less thant he lower control limit for TCMX on the primary and secondary chromatography columns. The associated sample results for early-eluting compounds are qualified as "UJ."

Metals by SW-846 Methods 6010C and 6020A:

CRDL standard Y7C3002-CRL1 displayed recoveries greater than the upper control limit for dissolved copper and lead at 149% and 145%, respectively. The associated sample results are qualified as estimated.

The initial and continuing calibration verifications analyzed in conjunction with sequence Y7E0911 displayed recoveries less than the lower control limit for dissolved selenium and antimony. The associated sample results were non-detect and are qualified as "UJ."

CRDL standard Y7C2201-CRL1 displayed a recovery greater than the upper control limit for dissolved copper at 142%. The associated sample results are qualified as estimated.

Field blank sample GWFB02_032217 displayed positive detections for dissolved calcium (0.0582 mg/L), copper (0.00895 mg/L), iron (0.0287 mg/L), sodium (0.193 mg/L) and zinc (0.0205 mg/L). The associated positive detections are qualified as non-detect.

CRDL standard Y7C2501-CRL1 displayed a recovery greater than the upper control limit for dissolved copper at 150%. The associated sample results are qualified as estimated.

Hexavalent Chromium by SW-846 Method 7196A:

Sample GWDUP01_031617 was analyzed 12 hours outside of the holding time window. The associated sample result is qualified as "UJ."

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by SW-846 Method 8260C:

Method blank sample BC71342 displayed positive detections for 1,2,3-trichlorobenzene, acetone and toluene. The associated sample results were either non-detect or orders of magnitude greater than the blank amount; qualification is not necessary.

MS sample MW06_031617 displayed recoveries less than the lower control limit for bromomethane at 28.1% and greater than the upper control limit for methyl acetate at 668%/679%, acrolein at 199%. Data is not qualified on the basis of MS/SD recoveries alone.

The initial calibration analyzed on VOA No. 8 displayed a response factor less than the lower control limit for 1,4-dioxane. 1,4-Dioxane is considered a poor-performer; on the basis of professional judgment, qualification is not necessary.

Method blank sample BC71235 displayed a positive detection for 1,2,3-trichlorobenzene. The associated sample results were either non-detect or orders of magnitude greater than the blank amount; qualification is not necessary.

SVOCs by SW-846 Method 8270D and 8720D with SIM:

Sample MW18_032217 did not recover for surrogate phenol-d5. The sample was analyzed at a 20X dilution and the surrogate was diluted out; qualification is not necessary.

Sample MW06_031617 displayed recoveries greater than the control limit for 2-fluorobiphenyl and 2,4,6-tribromophenol. The remaining four acid and base-neutral extractable surrogates recovered within control; qualification is not necessary.

Sample MW12_031617 displayed recoveries greater than the control limit for 2-fluorobiphenyl and 2,4,6-tribromophenol. The remaining four acid and base-neutral extractable surrogates recovered within control; qualification is not necessary.

Sample GWFB01_031617 displayed a recovery greater than the control limit for 2,4,6-tribromophenol. The remaining two acid extractable surrogates recovered within control; qualification is not necessary.

MS/SD sample MW06_031617 displayed recoveries less than the lower control limit for caprolactam at 16.8%/19.5%, naphthalene at 22.7%/23.1%, and recoveries greater than the upper control limit for n-nitrosodiphenylamine at 121%/131% and benzyl butyl phthalate at 130%. In addition, the MS/SD RPDs for phenol and benzyl alcohol were greater than the control limit. Data is not qualified on the basis of MS/SD recoveries or RPDs alone.

Sample MW07_032217 did not recover for surrogate phenol-d5 in the reanalysis. Only naphthalene was reported which is not affected by acid-extractable surrogate recoveries; qualification is not necessary.

Method blank sample BC71312 displayed a positive detection for bis(2-ethylhexyl)phthalate at 0.61 ug/L. The associated positive detection is greater than the RL; qualification is not necessary.

Pesticides by SW-846 Method 8081B:

LCS/LCSD BC71312 displayed recoveries greater than the control limit for 2,3,4,6-tetrachlorophenol and did not recover (i.e., 0%) for benzoic acid. The LCSD recovery for acetophenone was less than the lower control limit at 39.4%. In addition, the LCS/LCSD RPDs for 4-nitrphenol and benzaldehyde were greater than the control limit. The associated sample results for benzoic acid, caprolactam, and acetophenone are qualified as "UJ."

Samples MW06_031617 and GWDUP01_031617 displayed surrogate retention time shift greater than the control limit for TCMX on the primary and secondary chromatography columns. On the basis of professional judgment, qualification is not required.

Sample MW08_031617 displayed surrogate retention time shift greater than the control limit for DCB on the primary and secondary chromatography columns. On the basis of professional judgment, qualification is not required.

MS sample MW06_031617 displayed recoveries greater than the upper control limit for gamma-chlordane. In addition, the majority of RPDs were greater than the control limit (i.e., 20%). Data is not qualified on the basis of MS recoveries alone.

Metals by SW-846 Methods 6010C and 6020A:

ICP interference check sample Y7E0911 displayed a recovery less than the lower control limit for dissolved selenium at 70.3%. The associated sample result was previously qualified; no further action is necessary.

COMMENTS:

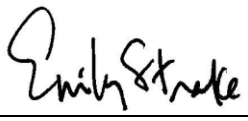
One field duplicate and parent sample pair was collected and analyzed for all parameters. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±1X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 35%. The following constituents did not meet the precision criteria:

- MW08_031617 and GWDUP01_031617: (pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, fluoranthene, benzo(k)fluoranthene, chrysene, benzo(a)pyrene, benzo(a)anthracene, acenaphthene, phenanthrene).

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All of the sample hold times were met and data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:



Emily Strake, CEP
Senior Project Chemist/Risk Assessor

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Paul McMahon, Langan Project Engineer

From: Emily Strake, Langan Senior Project Chemist/Risk Assessor

Date: May 23, 2017

Re: Data Usability Summary Report
For 473 President Street
Groundwater Samples Collected May 2017
Langan Project No.: 170361301

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of groundwater samples collected in May 2017 by Langan Engineering and Environmental Services ("Langan") at the 473 President Street site ("the Site"). The samples were analyzed by Alpha Analytical (NYSDOH ELAP registration # 11148) for volatile organic compounds (VOCs), sulfate, ammonia, nitrate, and phosphorus by the methods specified below.

- VOCs by SW-846 Method 8260C
- Sulfate by SW-846 Method 9038
- Ammonia, Nitrogen by SM 4500NH3-BH
- Nitrite, Nitrite Nitrogen by SM 4500 NO3-F
- Phosphorus by SM 4500P-E

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

TABLE 1: SAMPLE SUMMARY

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
L1714721	L1714721-01	MW06D_050617	05/06/17	VOCs, Phosphorus, Nitrate, Sulfate, Ammonia
L1714721	L1714721-02	MW12D_050617	05/06/17	VOCs, Phosphorus, Nitrate, Sulfate, Ammonia
L1714721	L1714721-03	MW20S_050617	05/06/17	VOCs, Phosphorus, Nitrate, Sulfate, Ammonia
L1714721	L1714721-04	MW20D_050617	05/06/17	VOCs, Phosphorus, Nitrate, Sulfate, Ammonia
L1714721	L1714721-05	MW15D_050617	05/06/17	VOCs, Phosphorus, Nitrate, Sulfate, Ammonia
L1714721	L1714721-06	GWTB01_050617	05/06/17	VOCs

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
L1714721	L1714721-07	GWFB01_050617	05/06/17	VOCs
L1714721	L1714721-08	GWDUP01_050617	05/06/17	VOCs

Validation Overview

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Rev 1), and the USEPA Contract Laboratory Program "National Functional Guidelines for Superfund Organic Methods Data Review" (USEPA-540R-2016-002, September 2016).

Validation includes review of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. Items subject to review in this memorandum include holding times, sample preservation, sample preparation, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, target compound identification and quantification, chromatograms, field duplicate, field blank and trip blank sample results and overall system performance,.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- **R –** The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
- **J –** The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- **UJ –** The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
- **U –** The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
- **NJ –** The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

TABLE 2: VALIDATOR-APPLIED QUALIFICATION

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
MW06D_050617	SW8260C	Chloromethane	74-87-3	UJ
MW06D_050617	SW8260C	Dichlorodifluoromethane	75-71-8	UJ
MW06D_050617	SW8260C	Xylenes	1330-20-7	U (2.5)
MW06D_050617	SW8260C	m,p-Xylene	179601-23-1	U (2.5)
MW06D_050617	SM4500-NH3H	Nitrogen, Ammonia (As N)	7664-41-7	J
MW06D_050617	SM4500-P-E	Phosphorus	7723-14-0	J
MW12D_050617	SW8260C	Chloromethane	74-87-3	UJ
MW12D_050617	SW8260C	Dichlorodifluoromethane	75-71-8	UJ
MW12D_050617	SW8260C	Vinyl Chloride	75-01-4	UJ
MW12D_050617	SM4500-NH3H	Nitrogen, Ammonia (As N)	7664-41-7	J
MW12D_050617	SM4500-P-E	Phosphorus	7723-14-0	J
MW20S_050617	SW8260C	Trans-1,4-Dichloro-2-Butene	110-57-6	UJ
MW20S_050617	SM4500-NH3H	Nitrogen, Ammonia (As N)	7664-41-7	J
MW20S_050617	SM4500-P-E	Phosphorus	7723-14-0	J
MW20D_050617	SW8260C	Trans-1,4-Dichloro-2-Butene	110-57-6	UJ
MW20D_050617	SM4500-NH3H	Nitrogen, Ammonia (As N)	7664-41-7	J
MW20D_050617	SM4500-P-E	Phosphorus	7723-14-0	J
MW15D_050617	SW8260C	Trans-1,4-Dichloro-2-Butene	110-57-6	UJ
MW15D_050617	SM4500-NH3H	Nitrogen, Ammonia (As N)	7664-41-7	J
MW15D_050617	SM4500-P-E	Phosphorus	7723-14-0	J
GWTB01_050617	SW8260C	Chloromethane	74-87-3	UJ
GWTB01_050617	SW8260C	Dichlorodifluoromethane	75-71-8	UJ
GWTB01_050617	SW8260C	Vinyl Chloride	75-01-4	UJ
GWFB01_050617	SW8260C	Chloromethane	74-87-3	UJ
GWFB01_050617	SW8260C	Dichlorodifluoromethane	75-71-8	UJ
GWFB01_050617	SW8260C	Vinyl Chloride	75-01-4	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
GWDUP01_050617	SW8260C	Chloromethane	74-87-3	UJ
GWDUP01_050617	SW8260C	Dichlorodifluoromethane	75-71-8	UJ
GWDUP01_050617	SW8260C	Vinyl Chloride	75-01-4	UJ

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by SW-846 Method 8260C:

Field blank sample GWFB01_050617 displayed positive detections for 1,2,4-trimethylbenzene at 0.82 ug/L and m,p-xylenes at 0.74 ug/L. The associated positive detections are qualified as "U" at the reporting limit.

LCS/LCSD WG1003008 displayed recoveries less than the lower control limit for chloromethane at 60% and dichlorodifluoromethane at 35% and 31%. The associated sample results were non-detect and area qualified as "UJ."

LCS/LCSD WG1003414 displayed a recovery less than the lower control limit for trans-1,4-dichloro-2-butene at 68%. The associated sample results were non-detect and are qualified as "UJ."

The continuing calibration analyzed on 5/12/17 at 09:58 displayed %Ds greater than the control limit for dichlorodifluoromethane at 52.9%, chloromethane at 66.5% and vinyl chloride at 38.9%. The associated sample results are qualified as estimated.

Ammonia by SM4500-NH3H:

Laboratory duplicate sample MW12D_050617 displayed a RPD greater than the control limit at 28%. The associated positive sample results are qualified as estimated.

Phosphate by Method SM4500-P-E:

Laboratory duplicate sample MW06D_050617 displayed a RPD greater than the control limit at 18%. The associated sample results are qualified as estimated.

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by SW-846 Method 8260C:

LCS/LCSD WG1003071 displayed recoveries greater than the upper control limit for chloromethane, vinyl chloride, dichlorodifluoromethane, and a RPD greater than the control limit for carbon disulfide. The associated sample results were non-detect; qualification is not necessary.

MS/SD sample MW12D_050617 displayed recoveries and RPDs greater than the control limit for methylene chloride, chloroform, bromodichloromethane, 1,1,2,2-tetrachloroethane, chloromethane, bromomethane, vinyl chloride, 1,2,3-trichloropropane, acrylonitrile, dichlorodifluoromethane, vinyl acetate, 4-methyl-2-pentanone, hexachlorobutadiene, naphthalene, 1,4-dioxane, ethyl ether, and trans-1,4-dichloro-2-butene. In addition, the recovery of tert-butylbenzene was less than the lower control limit at 68%. Data is not qualified on the basis of MS/SD recoveries or RPDs alone.

The continuing calibration analyzed on 5/12/17 at 08:12 displayed %Ds greater than the control limit for dichlorodifluoromethane at 65.1%, and chloromethane at 34.9%. The associated sample results were previously qualified; no further action is necessary.

Phosphate by Method SM4500-P-E:

Method blank sample WG1001958 displayed a positive detection for phosphate at 0.009 mg/L. The associated sample results were orders of magnitude greater than the blank amount; qualification is not required.

COMMENTS:

One field duplicate and parent sample pair was collected and analyzed for all parameters. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±1X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 35%. The following constituents did not meet the precision criteria:

- MW12D_050617 and GWDUP01_050617: none.

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All of the sample hold times were met and data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:

Emily Strake, CEP
Senior Project Chemist/Risk Assessor

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Paul McMahon, Langan Project Engineer

From: Emily Strake, Langan Senior Project Chemist/Risk Assessor

Date: May 16, 2017

Re: Data Usability Summary Report
For 473 President Street
Soil Samples Collected March 2017
Langan Project No.: 170361301

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in March 2017 by Langan Engineering and Environmental Services ("Langan") at the 473 President Street site ("the Site"). The samples were analyzed by York Analytical (NYSDOH ELAP registration # 10854) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, metals including mercury (Hg), cyanide (CN) and hexavalent chromium (CrVI) by the methods specified below.

- VOCs by SW-846 Method 8260C
- SVOCs by SW-846 Method 8270D
- Pesticides by SW-846 Method 8081B
- Total Metals by Method SW-846 6010C
- Mercury by SW-846 Method 7473 and 7471A
- Cyanide by SW-846 Method 9012B
- Hexavalent Chromium by SW-846 Method 7196A
- Percent Moisture by SM2540G

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

TABLE 1: SAMPLE SUMMARY

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
17C0418	17C0418-01	SB10_6-7	03/09/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0418	17C0418-02	SB10_9-10	03/09/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0418	17C0418-03	SB16_1-2	03/09/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0418	17C0418-04	SB16_9-11	03/09/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0418	17C0418-05	SB10_1-2	03/09/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0418	17C0418-06	SB16_14-15	03/09/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0278	17C0278-01	SB07_4-5	03/07/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0278	17C0278-02	SB07_13-14	03/07/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0278	17C0278-03	SB07_23-24	03/07/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0278	17C0278-04	DUP01_030717	03/07/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-01	SB13_1-2	03/06/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-02	SB13_9-10	03/06/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-03	SB06_2-3	03/06/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-04	SB06_9-10	03/06/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-05	SB06_14-15	03/06/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-06	SB08_1-2	03/06/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-07	SB08_7-8	03/06/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-08	SB08_8-9	03/06/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0226	17C0226-09	TB01_030617	03/06/2017	VOCs
17C0343	17C0343-01	SOFB01_030817	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI

SDG	Lab Sample ID	Client Sample ID	Sample Date	Analytical Parameters
17C0343	17C0343-02	SB17_1-2	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-03	SB17_15-16	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-04	SB17_7-8	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-05	SB15_1-2	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-06	SB15_7-8	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-07	SB15_10-11	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-08	SB14_1-2	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-09	SB14_10-11	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-10	SB09_10-11	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-11	SB09_1-2	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-12	SB12_1-2	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0343	17C0343-13	SB12_9-10	03/08/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0464	17C0464-01	SB19_10-11	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0464	17C0464-02	SB19_20-21	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0464	17C0464-03	SB11_15-16	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0464	17C0464-04	SB11_2-4	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0464	17C0464-05	SB18_10-11	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0464	17C0464-06	SB18_23-24	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0464	17C0464-07	SB19_17-18	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M
17C0464	17C0464-08	SOTB01_031017	03/10/2017	VOCs

SDG	Lab Sample ID	Client Sample ID	Sample Date	Analytical Parameters
17C0464	17C0464-9	SOFB01_031017	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI
17C0464	17C0464-10	DUP02_031017	03/10/2017	VOCs, SVOCs, Pesticides, Metals, CN, CrVI, %M

Validation Overview

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Rev 1), USEPA Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Rev 1), USEPA Region II SOP #HW-37A, "Pesticide Data Validation" (October 2016, Rev 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Rev 1), USEPA Region II SOP #HW3c, "Mercury and Cyanide Data Validation," (September 2016, Rev 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Superfund Organic Methods Data Review" (USEPA-540R-2016-002, September 2016), and the "National Functional Guidelines for Inorganic Superfund Data Review" (USEPA-540R-2016-001, September 2016).

Validation includes review of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. Items subject to review in this memorandum include holding times, sample preservation, sample extraction and digestion, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, target compound identification and quantification, chromatograms, overall system performance, serial dilutions, dual column performance, field duplicate, field blank and trip blank sample results.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

R – The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

J – The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.

UJ – The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.

U – The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.

NJ – The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

TABLE 2: VALIDATOR-APPLIED QUALIFICATION

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
DUP01_030717	SW6010B	Silver	7440-22-4	UJ
DUP01_030717	SW8260B	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	J
DUP01_030717	SW8260B	Cyclohexane	110-82-7	J
DUP01_030717	SW8260B	Cis-1,2-Dichloroethylene	156-59-2	J
DUP01_030717	SW8260B	1,2,4-Trimethylbenzene	95-63-6	J
DUP01_030717	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB07_13-14	SW6010B	Silver	7440-22-4	UJ
SB07_13-14	SW8260B	Cyclohexane	110-82-7	J
SB07_13-14	SW8260B	Benzene	71-43-2	J
SB07_13-14	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB07_23-24	SW6010B	Manganese	7439-96-5	J
SB07_23-24	SW6010B	Silver	7440-22-4	UJ
SB07_23-24	SW7196A	Chromium, Hexavalent	18540-29-9	UJ
SB07_23-24	SW8260B	N-Propylbenzene	103-65-1	J
SB07_23-24	SW8260B	1,2-Dichloroethane	107-06-2	UJ
SB07_23-24	SW8260B	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB07_23-24	SW8260B	Cis-1,2-Dichloroethylene	156-59-2	J
SB07_23-24	SW8260B	1,1,1-Trichloroethane	71-55-6	UJ
SB07_23-24	SW8260B	Cyclohexane	110-82-7	J
SB07_23-24	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB07_4-5	SW6010B	Silver	7440-22-4	UJ
SB07_4-5	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB06_14-15	SW8081B	Endosulfan Sulfate	1031-07-8	UJ
SB06_14-15	SW8081B	Beta Endosulfan	33213-65-9	UJ
SB06_14-15	SW8081B	P,P'-DDT	50-29-3	UJ
SB06_14-15	SW8081B	Endrin Ketone	53494-70-5	UJ
SB06_14-15	SW8081B	Dieldrin	60-57-1	UJ
SB06_14-15	SW8081B	Endrin	72-20-8	UJ
SB06_14-15	SW8081B	Methoxychlor	72-43-5	UJ
SB06_14-15	SW8081B	P,P'-DDD	72-54-8	UJ
SB06_14-15	SW8081B	P,P'-DDE	72-55-9	UJ
SB06_14-15	SW8081B	Endrin Aldehyde	7421-93-4	UJ
SB06_14-15	SW8081B	Alpha Endosulfan	959-98-8	UJ
SB06_14-15	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB06_14-15	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB06_14-15	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB06_14-15	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB06_14-15	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB06_14-15	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB06_2-3	SW8260B	Acetone	67-64-1	U (0.018)
SB06_2-3	SW8270C	Benzo(G,H,I)Perylene	191-24-2	J
SB06_2-3	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	J
SB06_2-3	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB06_2-3	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB06_2-3	SW8270C	Dibenz(A,H)Anthracene	53-70-3	J
SB06_2-3	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB06_2-3	SW8270C	Carbazole	86-74-8	J
SB06_9-10	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB06_9-10	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB06_9-10	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB06_9-10	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB06_9-10	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB06_9-10	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB08_1-2	SW6010B	Selenium	7782-49-2	J
SB08_1-2	SW8260B	Dibromochloromethane	124-48-1	UJ
SB08_1-2	SW8260B	Tetrachloroethylene (PCE)	127-18-4	UJ
SB08_1-2	SW8260B	Cis-1,2-Dichloroethylene	156-59-2	UJ
SB08_1-2	SW8260B	Trans-1,2-Dichloroethene	156-60-5	UJ
SB08_1-2	SW8260B	Chloroform	67-66-3	UJ
SB08_1-2	SW8260B	1,1,1-Trichloroethane	71-55-6	UJ
SB08_1-2	SW8260B	1,1-Dichloroethene	75-35-4	UJ
SB08_1-2	SW8260B	Dichlorodifluoromethane	75-71-8	UJ
SB08_1-2	SW8260B	Methyl Ethyl Ketone (2-Butanone)	78-93-3	UJ
SB08_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB08_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB08_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB08_1-2	SW8270C	Benzo(G,H,I)Perylene	191-24-2	J
SB08_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	J
SB08_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	J
SB08_1-2	SW8270C	Carbazole	86-74-8	J
SB08_7-8	SW8260B	Acetone	67-64-1	U (0.0082)
SB08_7-8	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB08_7-8	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB08_7-8	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB08_7-8	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB08_7-8	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB08_7-8	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB08_8-9	SW6010B	Copper	7440-50-8	J
SB08_8-9	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB08_8-9	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB08_8-9	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB08_8-9	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB08_8-9	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB08_8-9	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB13_1-2	SW8260B	Acetone	67-64-1	U (0.0095)
SB13_1-2	SW8270C	Benzo(G,H,I)Perylene	191-24-2	J
SB13_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	J
SB13_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB13_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB13_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	J
SB13_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB13_9-10	SW8260B	Acetone	67-64-1	U (0.0067)
SB13_9-10	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB13_9-10	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB13_9-10	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB13_9-10	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB13_9-10	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB13_9-10	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
TB01_030617	SW8260B	Bromomethane	74-83-9	UJ
TB01_030617	SW8260B	Chloromethane	74-87-3	UJ
TB01_030617	SW8260B	Hexachlorobutadiene	87-68-3	UJ
SB10_1-2	SW6010B	Silver	7440-22-4	UJ
SB10_1-2	SW6010B	Selenium	7782-49-2	UJ
SB10_1-2	SW8260B	Ethylbenzene	100-41-4	R
SB10_1-2	SW8260B	Styrene	100-42-5	R
SB10_1-2	SW8260B	Cis-1,3-Dichloropropene	10061-01-5	R
SB10_1-2	SW8260B	Trans-1,3-Dichloropropene	10061-02-6	R
SB10_1-2	SW8260B	N-Propylbenzene	103-65-1	R
SB10_1-2	SW8260B	N-Butylbenzene	104-51-8	R
SB10_1-2	SW8260B	1,4-Dichlorobenzene	106-46-7	R
SB10_1-2	SW8260B	1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	R

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB10_1-2	SW8260B	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	R
SB10_1-2	SW8260B	1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	R
SB10_1-2	SW8260B	Methylcyclohexane	108-87-2	R
SB10_1-2	SW8260B	Toluene	108-88-3	R
SB10_1-2	SW8260B	Chlorobenzene	108-90-7	R
SB10_1-2	SW8260B	1,2,4-Trichlorobenzene	120-82-1	R
SB10_1-2	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	R
SB10_1-2	SW8260B	Dibromochloromethane	124-48-1	R
SB10_1-2	SW8260B	Tetrachloroethylene (PCE)	127-18-4	R
SB10_1-2	SW8260B	Sec-Butylbenzene	135-98-8	R
SB10_1-2	SW8260B	m,p-Xylene	179601-23-1	R
SB10_1-2	SW8260B	1,3-Dichlorobenzene	541-73-1	R
SB10_1-2	SW8260B	2-Hexanone	591-78-6	R
SB10_1-2	SW8260B	1,1,1,2-Tetrachloroethane	630-20-6	R
SB10_1-2	SW8260B	Bromoform	75-25-2	R
SB10_1-2	SW8260B	Bromodichloromethane	75-27-4	R
SB10_1-2	SW8260B	1,2-Dichloropropane	78-87-5	R
SB10_1-2	SW8260B	1,1,2-Trichloroethane	79-00-5	R
SB10_1-2	SW8260B	Trichloroethylene (TCE)	79-01-6	J
SB10_1-2	SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	R
SB10_1-2	SW8260B	1,2,3-Trichlorobenzene	87-61-6	R
SB10_1-2	SW8260B	Hexachlorobutadiene	87-68-3	R
SB10_1-2	SW8260B	O-Xylene (1,2-Dimethylbenzene)	95-47-6	R
SB10_1-2	SW8260B	1,2-Dichlorobenzene	95-50-1	R
SB10_1-2	SW8260B	1,2,4-Trimethylbenzene	95-63-6	R
SB10_1-2	SW8260B	1,2-Dibromo-3-Chloropropane	96-12-8	R
SB10_1-2	SW8260B	1,2,3-Trichloropropane	96-18-4	R
SB10_1-2	SW8260B	T-Butylbenzene	98-06-6	R
SB10_1-2	SW8260B	Isopropylbenzene (Cumene)	98-82-8	R

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB10_1-2	SW8260B	P-Cymene (P-Isopropyltoluene)	CYMP	R
SB10_1-2	SW8260B	Xylenes, Total	XYLENES	R
SB10_1-2	SW8270C	4-Chloroaniline	106-47-8	UJ
SB10_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB10_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB10_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB10_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB10_1-2	SW8270C	Benzoic Acid	65-85-0	UJ
SB10_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB10_6-7	SW6010B	Silver	7440-22-4	UJ
SB10_6-7	SW6010B	Selenium	7782-49-2	UJ
SB10_6-7	SW8260B	Ethylbenzene	100-41-4	UJ
SB10_6-7	SW8260B	Styrene	100-42-5	UJ
SB10_6-7	SW8260B	Cis-1,3-Dichloropropene	10061-01-5	UJ
SB10_6-7	SW8260B	Trans-1,3-Dichloropropene	10061-02-6	UJ
SB10_6-7	SW8260B	N-Propylbenzene	103-65-1	UJ
SB10_6-7	SW8260B	N-Butylbenzene	104-51-8	UJ
SB10_6-7	SW8260B	1,4-Dichlorobenzene	106-46-7	UJ
SB10_6-7	SW8260B	1,2-Dibromoethane (Ethylene Dibromide)	106-93-4	UJ
SB10_6-7	SW8260B	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-10-1	UJ
SB10_6-7	SW8260B	1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	UJ
SB10_6-7	SW8260B	Methylcyclohexane	108-87-2	J
SB10_6-7	SW8260B	Toluene	108-88-3	UJ
SB10_6-7	SW8260B	Chlorobenzene	108-90-7	UJ
SB10_6-7	SW8260B	1,2,4-Trichlorobenzene	120-82-1	UJ
SB10_6-7	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ
SB10_6-7	SW8260B	Dibromochloromethane	124-48-1	UJ
SB10_6-7	SW8260B	Tetrachloroethylene (PCE)	127-18-4	UJ
SB10_6-7	SW8260B	Sec-Butylbenzene	135-98-8	UJ
SB10_6-7	SW8260B	m,p-Xylene	179601-23-1	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB10_6-7	SW8260B	1,3-Dichlorobenzene	541-73-1	UJ
SB10_6-7	SW8260B	2-Hexanone	591-78-6	UJ
SB10_6-7	SW8260B	1,1,1,2-Tetrachloroethane	630-20-6	UJ
SB10_6-7	SW8260B	Bromoform	75-25-2	UJ
SB10_6-7	SW8260B	Bromodichloromethane	75-27-4	UJ
SB10_6-7	SW8260B	1,2-Dichloropropane	78-87-5	UJ
SB10_6-7	SW8260B	1,1,2-Trichloroethane	79-00-5	UJ
SB10_6-7	SW8260B	Trichloroethylene (TCE)	79-01-6	UJ
SB10_6-7	SW8260B	Methyl Acetate	79-20-9	UJ
SB10_6-7	SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	UJ
SB10_6-7	SW8260B	1,2,3-Trichlorobenzene	87-61-6	UJ
SB10_6-7	SW8260B	Hexachlorobutadiene	87-68-3	UJ
SB10_6-7	SW8260B	O-Xylene (1,2-Dimethylbenzene)	95-47-6	UJ
SB10_6-7	SW8260B	1,2-Dichlorobenzene	95-50-1	UJ
SB10_6-7	SW8260B	1,2,4-Trimethylbenzene	95-63-6	UJ
SB10_6-7	SW8260B	1,2-Dibromo-3-Chloropropane	96-12-8	UJ
SB10_6-7	SW8260B	1,2,3-Trichloropropane	96-18-4	UJ
SB10_6-7	SW8260B	T-Butylbenzene	98-06-6	UJ
SB10_6-7	SW8260B	Isopropylbenzene (Cumene)	98-82-8	UJ
SB10_6-7	SW8260B	P-Cymene (P-Isopropyltoluene)	CYMP	UJ
SB10_6-7	SW8260B	Xylenes, Total	XYLENES	UJ
SB10_6-7	SW8270C	Benzaldehyde	100-52-7	UJ
SB10_6-7	SW8270C	4-Chloroaniline	106-47-8	UJ
SB10_6-7	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB10_6-7	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB10_6-7	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB10_6-7	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB10_6-7	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB10_6-7	SW8270C	Benzoic Acid	65-85-0	UJ
SB10_6-7	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB10_6-7	SW8270C	Benzidine	92-87-5	UJ
SB10_6-7	SW8270C	3-Nitroaniline	99-09-2	UJ
SB10_9-10	SW6010B	Silver	7440-22-4	UJ
SB10_9-10	SW6010B	Selenium	7782-49-2	UJ
SB10_9-10	SW8270C	4-Chloroaniline	106-47-8	UJ
SB10_9-10	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB10_9-10	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB10_9-10	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB10_9-10	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB10_9-10	SW8270C	Benzoic Acid	65-85-0	UJ
SB10_9-10	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB16_1-2	SW6010B	Silver	7440-22-4	UJ
SB16_1-2	SW6010B	Selenium	7782-49-2	J
SB16_1-2	SW8270C	4-Chloroaniline	106-47-8	UJ
SB16_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB16_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB16_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB16_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB16_1-2	SW8270C	Benzoic Acid	65-85-0	UJ
SB16_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB16_14-15	SW6010B	Silver	7440-22-4	UJ
SB16_14-15	SW6010B	Selenium	7782-49-2	J
SB16_14-15	SW8270C	4-Chloroaniline	106-47-8	UJ
SB16_14-15	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB16_14-15	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB16_14-15	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB16_14-15	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB16_14-15	SW8270C	Benzoic Acid	65-85-0	UJ
SB16_14-15	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB16_9-11	SW6010B	Silver	7440-22-4	UJ
SB16_9-11	SW8270C	4-Chloroaniline	106-47-8	UJ
SB16_9-11	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB16_9-11	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB16_9-11	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB16_9-11	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB16_9-11	SW8270C	Benzoic Acid	65-85-0	UJ
SB16_9-11	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB09_10-11	SW8270C	4-Chloroaniline	106-47-8	UJ
SB09_10-11	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB09_10-11	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB09_10-11	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB09_10-11	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB09_10-11	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB09_10-11	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB09_10-11	SW8270C	Benzidine	92-87-5	UJ
SB09_10-11	SW8270C	3-Nitroaniline	99-09-2	UJ
SB09_1-2	SW8270C	4-Chloroaniline	106-47-8	UJ
SB09_1-2	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB09_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB09_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB09_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB09_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB09_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB09_1-2	SW8270C	Benzidine	92-87-5	UJ
SB09_1-2	SW8270C	3-Nitroaniline	99-09-2	UJ
SB12_1-2	SW8270C	4-Chloroaniline	106-47-8	UJ
SB12_1-2	SW8270C	Benzo(G,H,I)Perylene	191-24-2	J
SB12_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	J
SB12_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB12_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB12_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	J
SB12_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB12_1-2	SW8270C	Carbazole	86-74-8	J
SB12_1-2	SW8270C	Benzidine	92-87-5	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB12_1-2	SW8270C	3-Nitroaniline	99-09-2	UJ
SB12_9-10	SW8260B	Acetone	67-64-1	U (0.0094)
SB12_9-10	SW8270C	4-Chloroaniline	106-47-8	UJ
SB12_9-10	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB12_9-10	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB12_9-10	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB12_9-10	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB12_9-10	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB12_9-10	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB12_9-10	SW8270C	Benzidine	92-87-5	UJ
SB12_9-10	SW8270C	3-Nitroaniline	99-09-2	UJ
SB14_10-11	SW8270C	4-Chloroaniline	106-47-8	UJ
SB14_10-11	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB14_10-11	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB14_10-11	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB14_10-11	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB14_10-11	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB14_10-11	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB14_10-11	SW8270C	Benzidine	92-87-5	UJ
SB14_10-11	SW8270C	3-Nitroaniline	99-09-2	UJ
SB14_1-2	SW8270C	4-Chloroaniline	106-47-8	UJ
SB14_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB14_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB14_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	J
SB14_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB14_1-2	SW8270C	Benzidine	92-87-5	UJ
SB14_1-2	SW8270C	3-Nitroaniline	99-09-2	UJ
SB14_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	J
SB14_1-2	SW8270C	Carbazole	86-74-8	J
SB15_10-11	SW7196A	Chromium, Hexavalent	18540-29-9	UJ
SB15_10-11	SW8260B	Acetone	67-64-1	U (0.0089)
SB15_10-11	SW8270C	4-Chloroaniline	106-47-8	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB15_10-11	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB15_10-11	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB15_10-11	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB15_10-11	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB15_10-11	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB15_10-11	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB15_10-11	SW8270C	Benzidine	92-87-5	UJ
SB15_10-11	SW8270C	3-Nitroaniline	99-09-2	UJ
SB15_1-2	SW8260B	Acetone	67-64-1	U (0.0089)
SB15_1-2	SW8270C	4-Chloroaniline	106-47-8	UJ
SB15_1-2	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB15_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB15_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB15_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB15_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB15_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB15_1-2	SW8270C	Benzidine	92-87-5	UJ
SB15_1-2	SW8270C	3-Nitroaniline	99-09-2	UJ
SB15_7-8	SW8270C	4-Chloroaniline	106-47-8	UJ
SB15_7-8	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB15_7-8	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB15_7-8	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB15_7-8	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB15_7-8	SW8270C	Benzoic Acid	65-85-0	UJ
SB15_7-8	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB15_7-8	SW8270C	Benzidine	92-87-5	UJ
SB15_7-8	SW8270C	3-Nitroaniline	99-09-2	UJ
SB17_1-2	SW8260B	Acetone	67-64-1	U (0.008)
SB17_1-2	SW8270C	4-Chloroaniline	106-47-8	UJ
SB17_1-2	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB17_1-2	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB17_1-2	SW8270C	2,4-Dinitrophenol	51-28-5	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB17_1-2	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB17_1-2	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB17_1-2	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB17_1-2	SW8270C	Benzidine	92-87-5	UJ
SB17_1-2	SW8270C	3-Nitroaniline	99-09-2	UJ
SB17_15-16	SW8270C	4-Chloroaniline	106-47-8	UJ
SB17_15-16	SW8270C	Benzo(G,H,I)Perylene	191-24-2	UJ
SB17_15-16	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	UJ
SB17_15-16	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB17_15-16	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB17_15-16	SW8270C	Dibenz(A,H)Anthracene	53-70-3	UJ
SB17_15-16	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB17_15-16	SW8270C	Benzidine	92-87-5	UJ
SB17_15-16	SW8270C	3-Nitroaniline	99-09-2	UJ
SB17_7-8	SW8260B	Acetone	67-64-1	U (0.0088)
SB17_7-8	SW8270C	4-Chloroaniline	106-47-8	UJ
SB17_7-8	SW8270C	2,4-Dinitrophenol	51-28-5	UJ
SB17_7-8	SW8270C	4,6-Dinitro-2-Methylphenol	534-52-1	UJ
SB17_7-8	SW8270C	Dibenz(A,H)Anthracene	53-70-3	J
SB17_7-8	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB17_7-8	SW8270C	Carbazole	86-74-8	J
SB17_7-8	SW8270C	Benzidine	92-87-5	UJ
SB17_7-8	SW8270C	3-Nitroaniline	99-09-2	UJ
SB17_7-8	SW8270C	Indeno(1,2,3-C,D)Pyrene	193-39-5	J
SOFB01_030817	SW6010B	Aluminum	7429-90-5	UJ
SOFB01_030817	SW6010B	Copper	7440-50-8	J
SOFB01_030817	SW8260B	1,2-Dichloroethane	107-06-2	UJ
SOFB01_030817	SW8270C	Pentachlorophenol	87-86-5	UJ
DUP02_031017	SW6010B	Silver	7440-22-4	UJ
DUP02_031017	SW8260B	Ethylbenzene	100-41-4	J
DUP02_031017	SW8260B	1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	J
DUP02_031017	SW8260B	Methylcyclohexane	108-87-2	J

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
DUP02_031017	SW8260B	Cyclohexane	110-82-7	J
DUP02_031017	SW8260B	Tetrachloroethylene (PCE)	127-18-4	J
DUP02_031017	SW8260B	m,p-Xylene	179601-23-1	J
DUP02_031017	SW8260B	Acetone	67-64-1	U (0.0086)
DUP02_031017	SW8260B	O-Xylene (1,2-Dimethylbenzene)	95-47-6	J
DUP02_031017	SW8260B	1,2,4-Trimethylbenzene	95-63-6	J
DUP02_031017	SW8260B	Isopropylbenzene (Cumene)	98-82-8	J
DUP02_031017	SW8260B	P-Cymene (P-Isopropyltoluene)	CYMP	J
DUP02_031017	SW8260B	Xylenes, Total	XYLENES	J
DUP02_031017	SW8270C	Benzaldehyde	100-52-7	UJ
DUP02_031017	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
DUP02_031017	SW8270C	Phenol	108-95-2	UJ
DUP02_031017	SW8270C	Aniline	62-53-3	UJ
DUP02_031017	SW8270C	Hexachloroethane	67-72-1	UJ
DUP02_031017	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
DUP02_031017	SW8270C	Pentachlorophenol	87-86-5	UJ
DUP02_031017	SW8270C	1,2,4,5-Tetrachlorobenzene	95-94-3	UJ
SB11_15-16	SW6010B	Silver	7440-22-4	UJ
SB11_15-16	SW8270C	Benzaldehyde	100-52-7	UJ
SB11_15-16	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
SB11_15-16	SW8270C	Phenol	108-95-2	UJ
SB11_15-16	SW8270C	Aniline	62-53-3	UJ
SB11_15-16	SW8270C	Hexachloroethane	67-72-1	UJ
SB11_15-16	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB11_15-16	SW8270C	Pentachlorophenol	87-86-5	UJ
SB11_15-16	SW8270C	1,2,4,5-Tetrachlorobenzene	95-94-3	UJ
SB11_2-4	SW6010B	Silver	7440-22-4	UJ
SB11_2-4	SW8260B	Acetone	67-64-1	U (0.0088)
SB11_2-4	SW8270C	Carbazole	86-74-8	J
SB11_2-4	SW8270C	Benzaldehyde	100-52-7	UJ
SB11_2-4	SW8270C	Hexachloroethane	67-72-1	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB11_2-4	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB11_2-4	SW8270C	Pentachlorophenol	87-86-5	UJ
SB18_10-11	SW6010B	Silver	7440-22-4	UJ
SB18_10-11	SW8270C	Benzaldehyde	100-52-7	UJ
SB18_10-11	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
SB18_10-11	SW8270C	Phenol	108-95-2	UJ
SB18_10-11	SW8270C	Aniline	62-53-3	UJ
SB18_10-11	SW8270C	Hexachloroethane	67-72-1	UJ
SB18_10-11	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB18_10-11	SW8270C	Pentachlorophenol	87-86-5	UJ
SB18_10-11	SW8270C	1,2,4,5-Tetrachlorobenzene	95-94-3	UJ
SB18_23-24	SW6010B	Silver	7440-22-4	UJ
SB18_23-24	SW8260B	Acetone	67-64-1	U (0.0055)
SB18_23-24	SW8270C	Benzaldehyde	100-52-7	UJ
SB18_23-24	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
SB18_23-24	SW8270C	Phenol	108-95-2	UJ
SB18_23-24	SW8270C	Aniline	62-53-3	UJ
SB18_23-24	SW8270C	Hexachloroethane	67-72-1	UJ
SB18_23-24	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB18_23-24	SW8270C	Pentachlorophenol	87-86-5	UJ
SB18_23-24	SW8270C	1,2,4,5-Tetrachlorobenzene	95-94-3	UJ
SB19_10-11	SW6010B	Silver	7440-22-4	UJ
SB19_10-11	SW8270C	Benzaldehyde	100-52-7	UJ
SB19_10-11	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
SB19_10-11	SW8270C	Phenol	108-95-2	UJ
SB19_10-11	SW8270C	Aniline	62-53-3	UJ
SB19_10-11	SW8270C	Hexachloroethane	67-72-1	UJ
SB19_10-11	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB19_10-11	SW8270C	Pentachlorophenol	87-86-5	UJ
SB19_10-11	SW8270C	1,2,4,5-Tetrachlorobenzene	95-94-3	UJ
SB19_17-18	SW8270C	Benzaldehyde	100-52-7	UJ
SB19_17-18	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB19_17-18	SW8270C	Phenol	108-95-2	UJ
SB19_17-18	SW8270C	Aniline	62-53-3	UJ
SB19_17-18	SW8270C	Hexachloroethane	67-72-1	UJ
SB19_17-18	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB19_17-18	SW8270C	Pentachlorophenol	87-86-5	UJ
SB19_17-18	SW8270C	1,2,4,5-Tetrachlorobenzene	95-94-3	UJ
SB19_20-21	SW6010B	Silver	7440-22-4	UJ
SB19_20-21	SW8260B	Methylcyclohexane	108-87-2	J
SB19_20-21	SW8270C	Benzaldehyde	100-52-7	UJ
SB19_20-21	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
SB19_20-21	SW8270C	Phenol	108-95-2	UJ
SB19_20-21	SW8270C	Aniline	62-53-3	UJ
SB19_20-21	SW8270C	Hexachloroethane	67-72-1	UJ
SB19_20-21	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SB19_20-21	SW8270C	Pentachlorophenol	87-86-5	UJ
SB19_20-21	SW8270C	1,2,4,5-Tetrachlorobenzene	95-94-3	UJ
SOFB01_031017	SW6010B	Zinc	7440-66-6	J
SOFB01_031017	SW6010B	Calcium	7440-70-2	J
SOFB01_031017	SW8260B	1,2,4-Trichlorobenzene	120-82-1	UJ
SOFB01_031017	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ
SOFB01_031017	SW8260B	1,2,3-Trichlorobenzene	87-61-6	UJ
SOFB01_031017	SW8270C	Hexachloroethane	67-72-1	UJ
SOFB01_031017	SW8270C	Pentachlorophenol	87-86-5	UJ
SOFB01_031017	SW8270C	Bis(2-Chloroisopropyl) Ether	108-60-1	UJ
SOFB01_031017	SW8270C	Phenol	108-95-2	UJ
SOFB01_031017	SW8270C	Aniline	62-53-3	UJ
SOFB01_031017	SW8270C	Benzoic Acid	65-85-0	UJ
SOFB01_031017	SW8270C	Hexachlorocyclopentadiene	77-47-4	UJ
SOFB01_031017	SW8270C	1,2,4,5-Tetrachlorobenzene	95-94-3	UJ
SOTB01_031017	SW8260B	1,2,4-Trichlorobenzene	120-82-1	UJ
SOTB01_031017	SW8260B	1,4-Dioxane (P-Dioxane)	123-91-1	UJ
SOTB01_031017	SW8260B	1,2,3-Trichlorobenzene	87-61-6	UJ

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. The following major deficiencies were identified.

VOCs by SW-846 Method 8260C:

Sample SB10_1-2 displayed internal standard area counts less than the rejection threshold for chlorobenzene-d5 at 19% and 1,2-dichlorobenzene-d4 at 11%. The associated non-detect sample results are qualified as rejected and positive detections are qualified as estimated.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by SW-846 Method 8260C:

Sample SB07_13-14 displayed an internal standard area count greater than the upper control limit for fluorobenzene at 624%. The associated positive detections are qualified as "J-".

Sample SB07_23-24 displayed an internal standard area count greater than the upper control limit for fluorobenzene at 562%. The reanalysis recovered at 211%. The associated positive detections are qualified as "J-".

Sample DUP-01 displayed an internal standard area count greater than the upper control limit for fluorobenzene at 595%. The reanalysis recovered within control. The associated positive detections are qualified as "J-".

The continuing calibration analyzed on 3/9/17 at 10:13 displayed %Ds greater than the control limit for 1,1,1-trichloroethane at 20.4% and 1,2-dichloroethane at 25.7%. The associated sample results are qualified as estimated.

Samples DUP01_030717 and SB07_23-24 displayed concentrations greater than the range of the instrument calibration for 1,2,4-trimethylbenzene and n-propylbenzene, respectively. The associated sample results are qualified as "J".

Acetone was detected in trip blank sample TB01_030617 at a concentration of 1.4 ug/L. The associated positive detections are qualified as "U" at the reporting limit.

The initial calibration analyzed on VOA No. 8 displayed a RSD greater than the control limit for hexachlorobutadiene at 27.17%. The associated sample result is qualified as estimated.

The continuing calibration analyzed on 3/9/17 at 08:27 displayed %Ds greater than the control limit for bromomethane at 36.7% and chloromethane at 55.8%. The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/9/17 at 09:03 displayed %Ds greater than the control limit for 1,1,1-trichloroethane at 29.3%, 1,1-dichloroethane at 22.5%, 2-butanone at 43.1%, chloroform at 26.1%, cis-1,2-dichloroethene at 29%, dibromochloromethane at 26.9%, dichlorodifluoromethane at 47.3%, PCE at 41.3% and trans-1,2-dichloroethene at 25.1%. The associated sample results are qualified as estimated.

Sample SB10_6-7 displayed a surrogate recovery greater than the upper control limit for toluene-d8 at 139% and a recovery less than the lower control limit for p-bromofluorobenzene at 46.2%. The associated sample results are qualified as estimated.

Sample SB10_6-7 displayed an internal standard area count less than lower control limit for chlorobenzene-d5 at 36%. The associated sample results are qualified as estimated.

Field blank sample SOFB01_030817 displayed a positive detection for acetone at 1.3 ug/L. The associated positive detections are qualified as "U" at the reporting limit.

Method blank sample BC70534 displayed a positive detection for bromomethane at 0.78 mg/kg. The associated sample results were non-detect; qualification is not necessary.

The continuing calibration analyzed on 3/13/17 at 11:20 displayed a %D greater than the control limit for 1,2-dichloroethane at 25.1%. The associated field blank sample result is qualified a "UJ."

Field blank sample SOFB01_031017 displayed a positive detection for acetone at 1.9 ug/L. The associated positive detections are qualified as "U" at the reporting limit.

The continuing calibration analyzed on 3/17/17 at 14:33 displayed %Ds greater than the control limit for 1,2,4-trichlorobenzene (39.4%), 1,4-dioxane (70.4%) and 1,2,3-trichlorobenzene (68.4%). The associated sample results are qualified as estimated.

SVOCs by SW-846 Method 8270D and 8270D with SIM:

The initial calibration analyzed on instrument BNA#6 displayed a RSD greater than the control limit for hexachlorocyclopentadiene at 57.9%. The associated sample results are qualified as "UJ."

LCS/LCSD BC70405 displayed recoveries greater than the control limit for 3-nitroanilne (130%, 132%), carbazole (228%, 201%), dibenz(a,h)anthracene (162%, 149%), and hexachlorocyclopentadiene (135%). The associated positive sample results are qualified as "J."

The continuing calibration analyzed on 3/9/17 at 16:06 displayed %Ds greater than the control limit for 2,4-dinitrophenol at 185%, 4,6-dinitro-2-methylphenol at 176%, benzo(g,h,i)perylene at 44.8%, dibenz(a,h)anthracene at 64.8%, hexachlorocyclopentadiene at 134%, and indeno(1,2,3-cd)pyrene at 57.8%. The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/17/17 at 08:46 displayed %Ds greater than the control limit for 2,4-dinitrophenol at 82.6%, 3-nitroaniline at 31.2%, 4,6-dinitro-2-methylphenol at 156%, 4-chloroaniline at 44.6%, benzidine at 46.8%, benzo(g,h,i)perylene at 23.8%, dibenz(a,h)anthracene at 62.6%, hexachlorocyclopentadiene at 53.9%, and indeno(1,2,3-cd)pyrene at 52.3%. The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/16/17 at 14:54 displayed %Ds greater than the control limit for 2,4-dinitrophenol at 143%, 4,6-dinitro-2-methylphenol at 188%, 4-chloroaniline at 38.3%, benzaldehyde at 38.4%, benzidine at 54.9%, benzo(g,h,i)perylene at 37.3%, benzoic acid at 37.8%, dibenz(a,h)anthracene at 66%, hexachlorocyclopentadiene at 89%, and indeno(1,2,3-cd)pyrene at 56.9%. The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/17/17 at 15:39 displayed %Ds greater than the control limit for 2,4-dinitrophenol at 121%, 4,6-dinitro-2-methylphenol at 171%, 4-chloroaniline at 43.7%, benzoic acid at 34.4%, dibenz(a,h)anthracene at 54.3%, hexachlorocyclopentadiene at 74.4%, and indeno(1,2,3-cd)pyrene at 44.5%. The associated sample results are qualified as estimated.

LCS BC70597 displayed recoveries greater than the upper control limit for 4,6-dinitro-2-methylphenol at 221% and 229%, and carbazole at 180% and 186%. The associated positive detections are qualified as "J."

The continuing calibration analyzed on 3/15/17 at 16:24 displayed %Ds greater than the control limit for 2,4-dinitrophenol at 158%, 3-nitroaniline at 36.8%, 4,6-dinitro-2-methylphenol at 174%, 4-chloroaniline at 49%, benzidine at 35.4%, benzo(g,h,i)perylene at 32.2%, dibenz(a,h)anthracene at 65.9%, hexachlorocyclopentadiene at 112%, and indeno(1,2,3-cd)pyrene at 56.9%. The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/15/17 at 16:24 displayed %Ds greater than the control limit for 2,4-dinitrophenol at 82.6%, 3-nitroaniline at 31.2%, 4,6-dinitro-2-methylphenol at 156%,

4-chloroaniline at 44.6%, benzidine at 46.8%, benzoic acid at 44.1%, dibenz(a,h)anthracene at 62.6%, hexachlorocyclopentadiene at 53.9%, and indeno(1,2,3-cd)pyrene at 52.3%. The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/16/17 at 8:45 displayed a %D greater than the control limit for pentachlorophenol at 44.4%. The associated sample result is qualified as "UJ."

LCS/LCSD BC70798 did not recover for benzaldehyde. The associated sample results are qualified as "UJ."

Second source calibration verification Y17B035 displayed a %D greater than the control limit with a positive bias for carbazole. The associated positive detection is qualified as "J." In addition, the %Ds for hexachlorocyclopentadiene and pentachlorophenol were greater than the control limit with a negative bias. The associated sample results are qualified as "UJ."

The continuing calibration analyzed on 3/17/17 at 08:17 displayed %Ds greater than the control limit for hexachlorocyclopentadiene (62.2%), hexachloroethane (66.6%), pentachlorophenol (41.9%), and carbazole (47%). The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/20/17 at 14:28 displayed %Ds greater than the control limit for bis(2-chloroisopropyl)ether at 45.3% and phenol at 33.9%. The associated sample results are qualified as estimated.

The continuing calibration analyzed on 3/21/17 at 08:42 displayed %Ds greater than the control limit for hexachlorobutadiene at 36.8%, hexachlorocyclopentadiene at 63.7%, pentachlorophenol at 43.5%, bis(2-chloroisopropyl)ether at 66.4%, aniline at 57.9%, and 1,2,4,5-tetrachlorobenzene at 40%. The associated sample results are qualified as estimated.

LCS/LCSD BC70684 did not recover for benzoic acid. The associated field blank sample results are qualified as "UJ."

Pesticides by SW-846 Method 8081B:

Sample SB08_1-2 displayed surrogate recoveries less than the lower control limit for TCMX at 29.1% and 22.2% on the primary and secondary chromatography columns, respectively. The associated sample results for early-eluters are qualified as estimated.

Sample SB06_14-15 displayed surrogate recoveries less than the lower control limit for DCB at 29.7% and 25.5% on the primary and secondary chromatography columns, respectively. The associated sample results for late eluters are qualified as estimated.

Hexavalent Chromium by SW-846 7196A:

MS sample SB07_23-24 displayed a recovery less than the lower control limit at 66%. The associated sample result is qualified as "UJ."

MS sample SB15_10-11 did not recover (i.e., 0%). The associated sample result is qualified as "UJ."

Metals by SW-846 Method 6010C:

MS/SD sample SB07_23-24 displayed recoveries outside of control limits for manganese and silver. The associated sample results are qualified as estimated.

SRM BC70369 displayed a recovery less than the lower control limit for silver at 6.21%. The associated sample results are qualified as "UJ."

CRDL standard Y7C0805 displayed recoveries greater than the control limit for copper and selenium, and recoveries less than the lower control limit for zinc and aluminum. The associated sample results reported near or at the reporting limit are qualified as estimated.

SRM BC70497 displayed a recovery less than the lower control limit for silver at 31%. The associated sample results are qualified as "UJ."

CRDL standard Y7C1302 displayed a recovery greater than the control limit for copper recoveries less than the lower control limit for selenium and aluminum. The associated sample results reported near or at the reporting limit are qualified as estimated.

CRDL standard Y7C1009 displayed recoveries greater than the control limit for copper and lead and a recovery less than the lower control limit for aluminum. The associated sample results reported near or at the reporting limit are qualified as estimated.

MS sample SB19_20-21 displayed a recovery less than the lower control limit for silver at 46.3%. The associated sample results are qualified as "UJ."

Laboratory duplicate sample FB01_031017 displayed RPDs greater than the control limit for calcium at 41.3% and zinc at 28.6%. The associated sample result is qualified as "J."

SRM BC70705 displayed a recovery less than the lower control limit for silver at 62%. The associated sample results are qualified as "UJ."

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by SW-846 Method 8260C:

MS/SD sample SB07_23-24 displayed recoveries outside of control limits for 1,1,2-trichloroethane, 1,2,3-trichloropropane, 2-hexanone, 4-methyl-2-pentanone, bromodichloromethane, cyclohexane, methyl acetate, methylcyclohexane, o-xylene, TBA, 1,2,4-trichlorobenzene, 1,2,4-trimethylbenzene, 1,2-dibromo-3-chloropropane, and 1,3,5-trimethylbenzene. In addition, the MS/SD RPDs were greater than the control limit for 1,2,3-trichloropropane, 1,2,4-trichlorobenzene, 1,2-dibromo-3-chloropropane, chloroethane, and cyclohexane. Data is not qualified on the basis of MS/SD recoveries or RPDs alone.

Method blank sample BC70483 displayed a positive detection for 1,2,3-trichlorobenzene at 0.0031 mg/kg. The associated sample result was non-detect; qualification is not necessary.

Method blank sample BC70534 displayed a positive detection for bromomethane at 0.78 mg/kg. The associated sample results were non-detect; qualification is not necessary.

Sample SB07_13-14 displayed surrogate recoveries outside of control limits for 1,2-dichloroethane-d4 (17.1%) and toluene-d8 (166%). The sample was analyzed at a 200X dilution; qualification is not necessary. The reanalysis for methylcyclohexane performed at a 2,000X dilution also recovered below the lower control limit for 1,2-dichloroethane-d4; qualification is not necessary.

Sample SB07_23-24 displayed surrogate recoveries outside of control limits for 1,2-dichloroethane-d4 (18.2%) and toluene-d8 (138%). The sample was analyzed at a 100X dilution; qualification is not necessary. The reanalysis for reanalysis performed at a 200X and 1,000X dilutions also recovered outside of control limits for 1,2-dichloroethane-d4 and toluene-d8; qualification is not necessary.

Sample DUP01_030717 displayed surrogate recoveries outside of control limits for 1,2-dichloroethane-d4 (18.4%) and toluene-d8 (138%). The sample was analyzed at a 200X dilution; qualification is not necessary.

LCS/LCSD BC70338 displayed a recovery greater than the upper control limit for 1,2,3-trichloropropane. The associated sample results were non-detect; qualification is not necessary.

LCS/LCSD BC70415 displayed a recovery greater than the upper control limit for cis-1,2-dichloroethene. The associated sample results were non-detect; qualification is not necessary.

LCS/LCSD BC70418 displayed a recovery greater than the upper control limit for 1,2,3-trichloropropane. The associated sample results were non-detect; qualification is not necessary.

Method blank sample BC70338 displayed a positive detection for 1,2,3-trichlorobenzene. The associated sample results were non-detect; qualification is not necessary.

Method blank sample BC70418 displayed a positive detection for bromomethane. The associated sample results were non-detect; qualification is not necessary.

Second source calibration verification Y7C0203 displayed a %D greater than the control limit with a positive bias for bromomethane at 41.8%. The associated sample results were non-detect; qualification is not required.

Sample SB10_1-2 displayed a surrogate recovery greater than the upper control limit for toluene-d8 at 156%. The remaining two volatile surrogates recovered within control. On the basis of professional judgment, qualification is not necessary.

LCS/LCSD BC70677 displayed a recovery greater than the upper control limit for TBA. The associated sample results were non-detect; qualification is not necessary.

MS/SD sample SB19_20-21 displayed recoveries outside of control limits for 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichlrooethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, benzene, bromochloromethane, bromodichloromethane, carbon tetrachloride, chloroform, cis-1,2-dichloroethene, dichlorodifluoromethane, MTBE, methylcyclohexane, TCE and trichlorofluoromethane. In addition, the majority of MS/SD RPDs were greater than the control limit. Data is not qualified on the basis of MS/SD recoveries or RPDs alone.

LCS/LCSD BC70877 displayed a RPD greater than the control limit for 1,4-dioxane. The associated field and trip blank sample results were non-detect; qualification is not necessary.

Method blank sample BC70821 displayed a positive detection for 1,2,3-trichlorobenzene. The associated sample results were non-detect; qualification is not necessary.

Method blank sample BC70877 displayed positive detections for 1,2,3-trichlorobenzene, hexachlorobutadiene and 1,2,4-trichlorobenzene. The associated sample results were non-detect; qualification is not necessary.

Second-source calibration verification standard Y17A097 displayed a %D greater than the control limit with a positive bias for acetone. The associated sample results were previously qualified; no further action is necessary.

Second-source calibration verification standard Y17B141 displayed a %D greater than the control limit with a positive bias for bromomethane. The associated sample results were non-detect; qualification is not necessary.

SVOCs by SW-846 Method 8270D and 8270D with SIM:

LCS/LCSD BC70598 displayed a recovery greater than the control limit for 2,3,4,6-tetrachlorophenol at 200%. The associated sample results were non-detect; qualification is not necessary.

Sample DUP01_030717 displayed a surrogate recovery greater than the upper control limit for nitrobenzene-d5. The remaining two BN surrogates recovered within control; on the basis of professional judgment, qualification is not necessary.

MS/SD sample SB07_23-24 displayed recoveries outside of control limits for 2,4-dinitrotoluene, 2-methylphenol, acetophenone, benzaldehyde, bis(2-chloroethoxy)methane, hexachlorocyclopentadiene, hexachloroethane and naphthalene. In addition, the MS/SD RPDs for 2,4,5-trichlorophenol, 2-chlorophenol, benzoic acid, and n-nitroso-di-n-propylamine were greater than the control limit. Data is not qualified on the basis of MS/SD recoveries or RPDs alone.

MS sample SB13_1-2 displayed recoveries outside of control limits for 2,3,4,6-tetrachlorophenol, 2,4,6-trichlorophenol, 2,4-dinitrophenol, 3-nitroaniline, 4,6-dinitro-2-methylphenol, benzoic acid, carbazole, and pentachlorophenol. Data is not qualified on the basis of MS recoveries alone.

Second source calibration verification Y17A029 displayed %Ds greater than the control limit with positive biases for 3-nitroaniline, 4,6-dinitro-2-methylphenol, 4-chloroaniline, aniline, and carbazole. The associated sample results were either non-detect or previously qualified; no further action is necessary.

LCS/LCSD BC70691 displayed recoveries greater than the upper control limit for 4,6-dinitro-2-methylphenol and carbazole. In addition, the LCS/LCSD RPD for aniline and 4-chloroaniline were greater than the control limit. The associated sample results were non-detect; qualification is not necessary.

Second source calibration verification Y7C0708 displayed %Ds greater than the control limit with positive biases for 3-nitroaniline, 4,6-dinitro-2-methylphenol, 4-chloroaniline, aniline, and carbazole. The associated sample results were non-detect; qualification is not necessary.

LCS/LCSD BC70712 displayed recoveries greater than the upper control limit for 4,6-dinitro-2-methylphenol at 249% and carbazole at 191%. The associated sample results were non-detect; qualification is not necessary.

Sample SOFB01_030817 displayed a surrogate recovery greater than the upper control limit for 2,4,6-tribromophenol. The associated sample results were non-detect; qualification is not required.

Second source calibration verification Y17A029 displayed %Ds greater than the control limit with positive biases for 3-nitroaniline, 4,6-dinitrophenol, 4-chloroaniline, aniline, and carbazole. The associated sample results were either previously qualified or were non-detect; no further action is necessary.

Sample SB19_10-11 displayed a surrogate recovery greater than the upper control limit for 2,4,6-tribromophenol at 111%. The remaining two acid extractable surrogates recovered within control. On the basis of professional judgment, qualification is not necessary.

Sample SB11_2-4 displayed a surrogate recovery greater than the upper control limit for Nitrobenzene-d5 at 116%. The remaining two base/neutral extractable surrogates recovered within control. On the basis of professional judgment, qualification is not necessary.

MS/SD sample SB19_20-21 displayed recoveries greater than the upper control limit for 2,3,4,6-tetrachlorphenol. In addition, LCS/LCSD BC70798 recovered above the control limit for 2,3,4,6-tetrachlorphenol. The associated sample results were non-detect; qualification is not necessary.

Pesticides by SW-846 Method 8081B:

MS/SD sample SB07_23-24 displayed recoveries less than the lower control limits for 4,4'-DDT and methoxychlor on the primary and secondary chromatography columns. Data is not qualified on the basis of MS/SD recoveries alone.

The instrument performance check sample (Y7D2013-PEM1) displayed an endrin breakdown greater than 20 % at 20.49%. The associated sample results were non-detect for endrin, endrin aldehyde and endrin ketone.

Sample SB06_2-3 displayed a recovery less than the lower control limit for DCB at 2.5%. The associated sample results were reported from the primary column; qualification is not necessary.

MS/SD sample DUP02_031017 displayed RPDs greater than the control limit for 4,4'-DDE, aldrin, alpha-BHC, gamma-BHC, gamma-chlordane, heptachlor and delta-BHC. Data is not qualified on the basis of MS/SD recoveries alone.

Metals by SW-846 Method 6010C:

ICP serial dilution sample SB07_23-24 displayed %Ds greater than the control limit for copper, nickel and sodium. The sample concentrations were less than 50X the MDL; qualification is not necessary.

Preparation blank sample BC70434-BLK1 displayed positive detections for aluminum and iron. The associated sample results were orders of magnitude greater than the blank amount; qualification is not necessary.

Preparation blank sample Y7C0805 displayed a positive detection for aluminum at 5.16 mg/kg. The associated sample results were orders of magnitude greater than the blank amount; qualification is not necessary.

Field blank sample SOFB01_030817 displayed positive detections for iron, magnesium, manganese, potassium, sodium, chromium, copper, zinc and calcium. The associated sample results were orders of magnitude greater than the blank amount; qualification is not necessary.

Continuing calibration blanks associated with sequences Y7C1004 and Y7C1009 displayed low level positive detections for copper, antimony, and sodium. The associated sample results were orders of magnitude greater than the blanks mount or not bracketed by the blank; qualification is not necessary.

CRDL Standard Y7C1004 displayed recoveries outside of control imits for copper, lead and aluminum. The associated sample results were orders of magnitude greater than the reporting limit; qualification is not necessary.

Field blank sample SOFB01_030817 displayed positive detections for iron, sodium, nickel, copper, zinc and calcium. The associated sample results were orders of magnitude greater than the blank amount; qualification is not necessary.

Field blank sample SOFB01_031017 was used as a batch MS. Field blank volume is not used to interpret matrix effects.

ICP serial dilution sample SOFB01_031017 displayed %Ds greater than the control limit for calcium, iron, nickel, zinc and sodium. The initial sample concentrations were less than 50X the MDL; qualification is not necessary.

ICP serial dilution sample SB19_20-21 displayed %Ds greater than the control limit for copper, nickel, sodium and zinc. The initial sample concentrations were less than 50X the MDL; qualification is not necessary.

COMMENTS:

Two field duplicate and parent sample pairs were collected and analyzed for all parameters. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±2X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 50%. The following constituents did not meet the precision criteria:

- DUP01_030717 and SB07_23-24: 4-methyl-2-pentanone and cis-1,2-dichloroethene
- DUP02_031017 and SB19_20-21: ethylbenzene, 1,3,5-trimethylbenzene, methylcyclohexane, cyclohexane, PCE, m,p-xylenes, o-xylenes, total xylenes, cymene, cumene, and 1,2,4-trimethylbenzene.

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All of the sample hold times were met and data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 99%.

Signed:

Emily Strake, CEP
Senior Project Chemist/Risk Assessor

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Paul McMahon, Langan Project Engineer

From: Emily Strake, Langan Senior Project Chemist/Risk Assessor

Date: May 22, 2017

Re: Data Usability Summary Report
For 473 President Street
Soil Samples Collected April 2017
Langan Project No.: 170361301

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of soil samples collected in April 2017 by Langan Engineering and Environmental Services ("Langan") at the 473 President Street site ("the Site"). The samples were analyzed by Alpha Analytical (NYSDOH ELAP registration # 11148) for volatile organic compounds (VOCs), metals, ammonia, nitrate, nitrite, chemical oxygen demand (COD), total organic carbon (TOC), sulfate, phosphorus, alkalinity, biological oxygen demand (BOD), grain size and percent moisture by the methods specified below. Biological oxygen demand (BOD) and alkalinity were subcontracted to EnviroTest Laboratories Inc. of Newburgh, New York.

- VOCs by SW-846 Method 8260C
- Total Metals by Method SW-846 6010C
- Ammonia, Nitrogen by SM 4500NH3-BH
- Nitrite, Nitrite Nitrogen by SM 4500 NO3-F
- Chemical Oxygen Demand by SM 5220D(M)
- Total Organic Carbon by Lloyd Kahn
- Sulfate by SW-846 Method 9038
- Phosphorus by SM4500P-E(M)
- Alkalinity by SM2320B-97
- BOD by SM20 SM 5210B-01
- Grain Size by ASTM D422
- Percent Moisture by SM2540G

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

TABLE 1: SAMPLE SUMMARY

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
L1713789	L1713789-01	SB12D_20-25	04/29/17	Alkalinity, Phosphate, TOC, BOD, COD, Manganese, Nitrate, Nitrite, Ammonia, Iron, Grain Size, %M
L1713789	L1713789-02	SB12D_23-25	04/29/17	VOCs, %M
L1713775	L1713775-01	SB15D_23-25	04/28/17	VOCs, %M
L1713775	L1713775-02	SB15D_20-25	04/28/17	Alkalinity, Phosphate, TOC, BOD, COD, Manganese, Nitrate, Nitrite, Ammonia, Iron, Grain Size, %M
L1713775	L1713775-03	SB06D_23-25	04/28/17	VOCs, %M
L1713775	L1713775-04	SODUP01_042817	04/28/17	VOCs, %M
L1713775	L1713775-05	SB06D_20-25	04/28/17	Alkalinity, Phosphate, TOC, BOD, COD, Manganese, Nitrate, Nitrite, Ammonia, Iron, Grain Size, %M
L1713501	L1713501-01	SB20D_0-2	04/27/17	VOCs, %M
L1713501	L1713501-02	SB20D_17-19	04/27/17	VOCs, %M
L1713501	L1713501-03	SB20D_23-25	04/27/17	VOCs, %M
L1713501	L1713501-04	SB20D_30-32	04/27/17	VOCs, %M
L1713501	L1713501-05	SB20D_20-30	04/27/17	Alkalinity, Phosphate, TOC, BOD, COD, Manganese, Nitrate, Nitrite, Ammonia, Iron, Grain Size, %M
L1713501	L1713501-06	SB20D_14-19	04/27/17	Alkalinity, Phosphate, TOC, BOD, COD, Manganese, Nitrate, Nitrite, Ammonia, Iron, Grain Size, %M
L1713501	L1713501-07	TB01_042717	04/27/17	VOCs

Validation Overview

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-34A, "Trace Volatile Data Validation" (September 2016, Rev 1), USEPA Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Rev 1), the USEPA Contract Laboratory Program "National Functional Guidelines for Superfund Organic Methods Data Review" (USEPA-540R-2016-002, September 2016), and the "National Functional Guidelines for Inorganic Superfund Data Review" (USEPA-540R-2016-001, September 2016).

Validation includes review of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. Items subject to review in this memorandum include holding times, sample preservation, sample extraction and digestion, instrument tuning, instrument calibration,

laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, matrix spike/spike duplicate recoveries, target compound identification and quantification, chromatograms, overall system performance, serial dilutions, field duplicate, and trip blank sample results.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- **R –** The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
- **J –** The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- **UJ –** The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
- **U –** The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
- **NJ –** The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

TABLE 2: VALIDATOR-APPLIED QUALIFICATION

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB12D_20-25	NH3	Nitrogen, Ammonia	7664-41-7	U (9.4)
SB20D_30-32	SW8260C	Bromomethane	74-83-9	U (110)
SB20D_20-30	6010C	Iron	7439-89-6	J
SB20D_20-30	6010C	Manganese	7439-96-5	J
SB20D_20-30	D422	Coarse Sand	COARSESAND	J
SB20D_20-30	SM4500-NH3H	Nitrogen, Ammonia (As N)	7664-41-7	J

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SB20D_14-19	6010C	Iron	7439-89-6	J
SB20D_14-19	6010C	Manganese	7439-96-5	J
SB20D_14-19	D422	Coarse Sand	COARSESAND	J
SB20D_14-19	SM4500-NH3H	Nitrogen, Ammonia (As N)	7664-41-7	J
TB01_042717	SW8260C	Bromomethane	74-83-9	UJ
TB01_042717	SW8260C	Trans-1,4-Dichloro-2-Butene	110-57-6	UJ
SB06D_23-25	SW8260C	Trichloroethylene (TCE)	79-01-6	J
SODUP01_042817	SW8260C	Trichloroethylene (TCE)	79-01-6	J

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by SW-846 Method 8260C:

LCS/LCSD WG1000777 displayed recoveries less than the lower control limit for trans-1,4-dichloro-2-butene at 36% and 33%, respectively. The associated trip blank sample result is qualified as "UJ."

Method blank sample WG1000201-5 displayed a positive detection for bromomethane at19 ug/kg. The associated sample result is qualified as "U" at the reporting limit.

The continuing calibration analyzed on 5/5/17 at 08:12 displayed a %D greater than the control limit for bromomethane at 45.8%. The associated trip blank sample result is qualified as "UJ."

Nitrogen, Ammonia by SM 4500NH3-BH:

Method blank sample WG999803 displayed a positive detection at 2.2 mg/kg. The associated positive detection is qualified as "U" at the reporting limit.

Laboratory duplicate sample SB20D-20-30 displayed a RPD greater than the control limit at 42%. The associated sample results are qualified as "J."

Metals by SW-846 Method 6010C:

ICP serial dilution sample SB20D_20-30 displayed %Ds greater than the control limit for total iron and manganese at 29% and 25%, respectively. The associated sample results are qualified as "J."

Grain Size by ASTM D422:

Laboratory duplicate sample SB20D_20-30 displayed a RPD greater than the control limit for coarse sand at 40%. The associated sample results are qualified as "J."

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by SW-846 Method 8260C:

LCS/LCSD WG1001182 displayed a recovery and RPD greater than the control limit for carbon disulfide. The associated sample results were non-detect; qualification is not necessary.

MS/SD sample SB06D_23-25 displayed a recovery greater than the upper control limit for carbon tetrachloride at 133%. The associated sample results were non-detect; qualification is not necessary.

Sample SB20D_23-25 displayed a surrogate recovery greater than the upper control limit for 4-bromofluorobenzene at 208%. The remaining three volatile surrogates recovered within control. On the basis of professional judgment, qualification is not necessary.

Method blank sample WG1000200-5 displayed a positive detection for bromomethane. The associated sample results were non-detect; qualification is not necessary.

Method blank sample WG1000201-5 displayed a positive detection for bromomethane. The associated sample results were non-detect; qualification is not necessary.

Metals by SW-846 Method 6010C:

CRI check standard R963639 displayed recoveries greater than the upper control limit for iron and manganese. The associated sample concentrations were orders of magnitude greater than the reporting limits; qualification is not necessary.

Continuing calibration blank R963639-25 and R963639-33 displayed positive detections for total iron at 0.0094 mg/L and 0.0366 mg/L, respectively. The associated concentration was orders of magnitude greater than the blank amount; qualification is not necessary.

MS sample WG999655-3 displayed a recovery greater than the upper control limit for total iron at 2,040%. The sample concentration was greater than 4X the spiked amount; qualification is not necessary.

Total manganese was detected in preparation blank sample WG999647 at a concentration of 0.13 mg/kg. The associated sample results were orders of magnitude greater than the blank amount; qualification is not necessary.

CRI check standard R963599 displayed recoveries greater than the upper control limit for iron and manganese. The associated sample concentrations were orders of magnitude greater than the reporting limits; qualification is not necessary.

CRI check standard R963228 displayed recoveries greater than the upper control limit for iron and manganese. The associated sample concentrations were orders of magnitude greater than the reporting limits; qualification is not necessary.

MS sample WG999647-3 displayed a recovery less than the lower control limit for manganese at 26%. The spiked volume did not originate from the site; qualification is not necessary.

Laboratory duplicate sample WG999647-4 displayed a RPD greater than the control limit for manganese at 39%. The duplicate volume did not originate from the site; qualification is not necessary.

Method blank sample WG999506 displayed positive detections for total iron and manganese. The associated sample results were orders of magnitude greater than the blank amounts; qualification is not necessary.

Grain Size by ASTM D422:

The laboratory duplicate sample displayed a RPD greater than the control limit for coarse sand at 86%. The associated sample results were within ± 5X the RL. On the basis of professional judgment, qualification is not necessary.

COMMENTS:

One field duplicate and parent sample pair was collected and analyzed for VOCs. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than

±2X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 50%. The following constituents did not meet the precision criteria:

- SODUP01_042817 and SB06D_23-25: trichloroethene

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All of the sample hold times were met and data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:

Emily Strake, CEP
Senior Project Chemist/Risk Assessor

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Paul McMahon, Langan Project Engineer

From: Emily Strake, Langan Senior Project Chemist/Risk Assessor

Date: May 16, 2017

Re: Data Usability Summary Report
For 473 President Street
Ambient Air and Soil Gas Samples Collected March 2017
Langan Project No.: 170361301

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of ambient air and soil gas samples collected in March 2017 by Langan Engineering and Environmental Services ("Langan") at 473 President Street site ("the Site"). The samples were analyzed by York Analytical (NYSDOH ELAP registration # 10854) for volatile organic compounds (VOCs) using the analytical method specified below.

- Full List VOCs by EPA Compendium Method TO-15 (1/1999)

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

TABLE 1: SAMPLE SUMMARY

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
17C0424	17C0424-01	SV03-030917	03/09/2017	VOCs
17C0463	17C0463-01	SV05_031017	03/10/2017	VOCs
17C0348	17C0348-01	SV01_030817	03/08/2017	VOCs
17C0348	17C0348-02	SV02_030817	03/08/2017	VOCs
17C0348	17C0348-03	SV04_030817	03/08/2017	VOCs
17C0348	17C0348-04	DUP01_030817	03/08/2017	VOCs
17C0348	17C0348-05	AA01_030817	03/08/2017	VOCs

VALIDATION OVERVIEW

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-31, "Validating Volatile Organic Analysis of Ambient Air in Canister by Method TO-15" (September 2016, Revision 6) and the specifics of the method.

Validation includes reconstruction of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the

originator. Items subject to review in this memorandum include holding times, canister certification, canister pressure, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, internal standard area counts, target compound identification and quantification, and overall system performance.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- **R –** The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
- **J –** The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- **UJ –** The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
- **U –** The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
- **NJ –** The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

TABLE 2: VALIDATOR-APPLIED QUALIFICATION

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
AA01_030817	TO15	Propylene	115-07-1	UJ
DUP01_030817	TO15	Propylene	115-07-1	UJ
DUP01_030817	TO15	Acetone	67-64-1	J
DUP01_030817	TO15	Methyl Ethyl Ketone (2-Butanone)	78-93-3	J
SV01_030817	TO15	Propylene	115-07-1	UJ

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SV02_030817	TO15	1,3-Butadiene	106-99-0	R
SV02_030817	TO15	1,2-Dichloroethane	107-06-2	R
SV02_030817	TO15	Acrylonitrile	107-13-1	R
SV02_030817	TO15	Vinyl Acetate	108-05-4	R
SV02_030817	TO15	Tetrahydrofuran	109-99-9	R
SV02_030817	TO15	Cyclohexane	110-82-7	R
SV02_030817	TO15	Propylene	115-07-1	R
SV02_030817	TO15	Ethyl Acetate	141-78-6	R
SV02_030817	TO15	Cis-1,2-Dichloroethylene	156-59-2	R
SV02_030817	TO15	Trans-1,2-Dichloroethene	156-60-5	R
SV02_030817	TO15	Carbon Tetrachloride	56-23-5	R
SV02_030817	TO15	Vinyl Bromide	593-60-2	R
SV02_030817	TO15	Isopropanol	67-63-0	R
SV02_030817	TO15	Acetone	67-64-1	J
SV02_030817	TO15	Chloroform	67-66-3	R
SV02_030817	TO15	Benzene	71-43-2	J
SV02_030817	TO15	1,1,1-Trichloroethane	71-55-6	R
SV02_030817	TO15	Bromomethane	74-83-9	R
SV02_030817	TO15	Chloromethane	74-87-3	R
SV02_030817	TO15	Chloroethane	75-00-3	R
SV02_030817	TO15	Vinyl Chloride	75-01-4	R
SV02_030817	TO15	Methylene Chloride	75-09-2	R
SV02_030817	TO15	Carbon Disulfide	75-15-0	J
SV02_030817	TO15	1,1-Dichloroethane	75-34-3	R
SV02_030817	TO15	1,1-Dichloroethene	75-35-4	R
SV02_030817	TO15	Trichlorofluoromethane	75-69-4	R
SV02_030817	TO15	Dichlorodifluoromethane	75-71-8	R
SV02_030817	TO15	1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	R
SV02_030817	TO15	1,2-Dichlorotetrafluoroethane	76-14-2	R
SV02_030817	TO15	Methyl Ethyl Ketone (2-Butanone)	78-93-3	R

Client Sample ID	*Analysis*	*Analyte*	*CAS #*	*Validator Qualifier*
SV04_030817	TO15	Propylene	115-07-1	UJ
SV04_030817	TO15	Acetone	67-64-1	J
SV04_030817	TO15	Methyl Ethyl Ketone (2-Butanone)	78-93-3	J

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. The section below describes the major deficiencies that were identified.

VOCs by USEPA TO-15:

Sample SV02_030817 displayed an internal standard area count less than the lower control limit for bromochloromethane at 28%. The associated positive detections for compounds quantitated by bromochloromethane are qualified as "J" and non-detect results are rejected.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by USEPA TO-15:

The continuing calibration verification analyzed on 3/9/17 at 11:00 displayed %Ds greater than the control limit with positive biases for 1,3-butadiene (33.2%) and chloromethane (46.7%). The associated positive detection for chloromethane is qualified as "J." In addition, the calibration verification displayed a %D greater than the control limit with a negative bias for propylene at 38.4%. The associated sample results are qualified as estimated.

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by USEPA TO-15:

The continuing calibration verification analyzed on 3/13/17 at 15:01 displayed a %D greater than the control limit with a positive bias for vinyl acetate at 31.2%. The associated sample result was non-detect; qualification is not necessary.

The continuing calibration verification analyzed on 3/15/17 at 10:54 displayed %Ds greater than the control limit with positive biases for 1,2-dichlorotetrafluoroethane, 1,3-butadiene, and chloromethane. Only trichloroethene was reported from the associated analysis; qualification is not necessary.

COMMENTS:

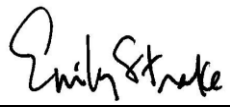
One field duplicate and parent sample pair was collected and analyzed for VOCs. For results less than 5X the RL, analytes meet the precision criteria if the absolute difference is less than ±1X the RL. For results greater than 5X the RL, analytes meet the precision criteria if the RPD is less than or equal to 35%. The following constituents did not meet the precision criteria:

- DUP01_030817 and SV04_030817: acetone, 2-butanone

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All sample hold times were met and the data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 94%.

Signed:



Emily Strake, CEP
Senior Project Chemist/Risk Assessor

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Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Paul McMahon, Langan Project Engineer, P.E.

From: Emily Strake, Langan Senior Project Chemist/Risk Assessor

Date: April 17, 2018

Re: Data Usability Summary Report
For 473 President Street
Brooklyn, New York
Air Samples Collected March 2018
Langan Project No.: 170361301

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of canister air samples collected March 28, 2018 by Langan Engineering and Environmental Services ("Langan") at 473 President Street located in Brooklyn, New York. The samples were analyzed by Alpha Analytical Laboratories, Inc. located in Westborough, Massachusetts (NYSDOH ELAP registration # 11148) for volatile organic compounds (VOCs) using the analytical methods specified below.

- VOCs by USEPA Method TO-15 and TO-15 Selective Ion Monitoring (SIM)

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

TABLE 1: SAMPLE SUMMARY

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
L1810650	L1810650-01	IA01_032818	3/28/2018	VOCs
L1810650	L1810650-02	IA02_032818	3/28/2018	VOCs
L1810650	L1810650-03	IA03_032818	3/28/2018	VOCs
L1810650	L1810650-04	IA04_032818	3/28/2018	VOCs
L1810650	L1810650-05	IA05_032818	3/28/2018	VOCs
L1810650	L1810650-06	AA02_032818	3/28/2018	VOCs
L1810650	L1810650-07	UNUSED CAN #513	NA	Not Analyzed

VALIDATION OVERVIEW

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-31, "Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15" (September 2016, Revision 6), the USEPA Contract Laboratory

Program "National Functional Guidelines for Organic Superfund Methods Data Review" (USEPA-540-R-2017-002, January 2017) and the specifics of the methods employed.

Validation includes evaluation of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. Items subject to review in this memorandum include holding times, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, laboratory duplicates, target compound identification and quantification, chromatograms, and overall system performance.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- **R –** The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
- **J –** The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- **UJ –** The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
- **U –** The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
- **NJ –** The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items subject to review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

TABLE 2: VALIDATOR-APPLIED QUALIFICATION

Project Sample ID	*Analysis*	*Analyte*	*CAS No.*	*Validator Qualifier*
IA01_032818	TO15	1,2,4-Trimethylbenzene	95-63-6	J
IA01_032818	TO15	Acetone	67-64-1	J
IA01_032818	TO15	Benzyl Chloride	100-44-7	UJ
IA01_032818	TO15	Bromoform	75-25-2	UJ

Project Sample ID	*Analysis*	*Analyte*	*CAS No.*	*Validator Qualifier*
IA01_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA01_032818	TO15	Isopropanol	67-63-0	J
IA01_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	J
IA02_032818	TO15	1,2,4-Trimethylbenzene	95-63-6	J
IA02_032818	TO15	Acetone	67-64-1	J
IA02_032818	TO15	Benzyl Chloride	100-44-7	UJ
IA02_032818	TO15	Bromoform	75-25-2	UJ
IA02_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA02_032818	TO15	Isopropanol	67-63-0	J
IA02_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	J
IA03_032818	TO15	Acetone	67-64-1	J
IA03_032818	TO15	Bromoform	75-25-2	UJ
IA03_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA03_032818	TO15	Isopropanol	67-63-0	J
IA03_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	J
IA04_032818	TO15	1,2,4-Trimethylbenzene	95-63-6	J
IA04_032818	TO15	Acetone	67-64-1	J
IA04_032818	TO15	Benzyl Chloride	100-44-7	UJ
IA04_032818	TO15	Bromoform	75-25-2	UJ
IA04_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA04_032818	TO15	Isopropanol	67-63-0	J
IA04_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	J
IA05_032818	TO15	1,2,4-Trimethylbenzene	95-63-6	J
IA05_032818	TO15	Acetone	67-64-1	J
IA05_032818	TO15	Benzyl Chloride	100-44-7	UJ
IA05_032818	TO15	Bromoform	75-25-2	UJ
IA05_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA05_032818	TO15	Isopropanol	67-63-0	J
IA05_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	UJ
AA02_032818	TO15	Acetone	67-64-1	J
AA02_032818	TO15	Benzyl Chloride	100-44-7	UJ
AA02_032818	TO15	Bromoform	75-25-2	UJ

Project Sample ID	*Analysis*	*Analyte*	*CAS No.*	*Validator Qualifier*
AA02_032818	TO15	Dibromochloromethane	124-48-1	UJ
AA02_032818	TO15	Isopropanol	67-63-0	UJ
AA02_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	UJ

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by USEPA Method TO-15:

The peaks for acetone in samples IA01_032818, IA02_032818, IA03_032818, IA04_032818, IA05_032818 and AA02_032818 co-eluted with a non-target peak. The associated results are qualified as "J" based on potential indeterminate bias.

The initial calibration (ICAL) analyzed for instrument AIRLAB17 exhibited a relative standard deviation (RSD) greater than the upper control limit (i.e. 30%) for isopropyl alcohol (32.82%). The associated results in samples IA01_032818, IA02_032818, IA03_032818, IA04_032818, IA05_032818 and AA02_032818 are qualified as "J" or "UJ" based on potential indeterminate bias.

VOCs by USEPA Method TO-15 (SIM)

The initial calibration verification (ICV) analyzed on 3/3/2018 at 12:51 p.m. exhibited a percent difference (%D) greater than the control limit for cis-1,2-dichloroethene (-38.3%). The associated results in samples IA01_032818, IA02_032818, IA03_032818, IA04_032818, IA05_032818 and AA02_032818 are qualified as "J" or "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 4/2/2018 at 12:42 exhibited %Ds greater than the control limit for dibromochloromethane (35.5%), bromoform (41%) and benzyl

chloride (30.4%). The associated results in samples IA01_032818, IA02_032818, IA04_032818, IA05_032818 and AA02_032818 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 4/3/2018 at 13:24 exhibited %Ds greater than the control limit for dibromochloromethane (33.1%) and bromoform (36%). The associated results in sample IA03_032818 are qualified as "UJ" based on potential indeterminate bias.

The laboratory control sample (LCS) for batch WG1102773 exhibited percent recoveries greater than the upper control limit for 1,2,4-trimethylbenzene. The associated results in samples IA01_032818, IA02_032818, IA04_032818 and IA05_032818 are qualified as "J" based on potential high bias.

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by USEPA Method TO-15:

The ICAL analyzed for instrument AIRLAB17 exhibited an RSD greater than the upper control limit for isopropyl alcohol (30.62%). This compound was not reported for SIM analysis; no qualification is necessary.

The CCV analyzed on 4/2/2018 at 13:18 exhibited %Ds greater than the control limit for dibromochloromethane (45.6%), bromoform (47.8%), 4-ethyltoluene (35.1%), 1,2,4-trimethylbenzene (32.1%) and benzyl chloride (38.2%). These compounds were not reported for SIM analysis; no qualification is necessary.

The CCV analyzed on 4/3/2018 at 14:00 exhibited %Ds greater than the control limit for t-butyl alcohol (-30.5%), dibromochloromethane (41.4%), bromoform (44.9%), 4-ethyltoluene (34.7%), 1,2,4-trimethylbenzene (30.1%) and benzyl chloride (33.8%). These compounds were not reported for SIM analysis; no qualification is necessary.

The LCS for batch WG1102770 exhibited percent recoveries greater than the upper control limit for dibromochloromethane (136%) and bromoform (141%). The associated results are non-detections; no qualification is necessary.

The LCS for batch WG1103162 exhibited percent recoveries greater than the upper control limit for dibromochloromethane (133%) and bromoform (136%). The associated results are non-detections; no qualification is necessary.

The LCS for batch WG1102773 exhibited percent recoveries greater than the upper control limit for dibromochloromethane, bromoform, 4-ethyltoluene and benzyl chloride. The associated results are non-detections; no qualification is necessary.

The LCS for batch WG1103163 exhibited percent recoveries greater than the upper control limit for dibromochloromethane, bromoform, 4-ethyltoluene and benzyl chloride. The associated results are non-detections; no qualification is necessary.

COMMENTS:

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All laboratory data packages met ASP Category B requirements and all sample holding times were met.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:

Emily Strake, CEP
Senior Project Chemist/Risk Assessor

LANGAN
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Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Paul McMahon, Langan Project Engineer, P.E.

From: Emily Strake, Langan Senior Project Chemist/Risk Assessor

Date: April 25, 2018

Re: Data Usability Summary Report
For 473 President Street
Brooklyn, New York
Air Samples Collected March 2018
Langan Project No.: 170361301

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of canister air samples collected March 28, 2018 by Langan Engineering and Environmental Services ("Langan") at 473 President Street located in Brooklyn, New York. The samples were analyzed by Alpha Analytical Laboratories, Inc. located in Westborough, Massachusetts (NYSDOH ELAP registration # 11148) for volatile organic compounds (VOCs) using the analytical methods specified below.

- VOCs by USEPA Method TO-15 and TO-15 Selective Ion Monitoring (SIM)

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

TABLE 1: SAMPLE SUMMARY

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
L1810650	L1810650-01	IA01_032818	3/28/2018	VOCs
L1810650	L1810650-02	IA02_032818	3/28/2018	VOCs
L1810650	L1810650-03	IA03_032818	3/28/2018	VOCs
L1810650	L1810650-04	IA04_032818	3/28/2018	VOCs
L1810650	L1810650-05	IA05_032818	3/28/2018	VOCs
L1810650	L1810650-06	AA02_032818	3/28/2018	VOCs
L1810650	L1810650-07	UNUSED CAN #513	NA	Not Analyzed

VALIDATION OVERVIEW

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-31, "Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15" (September 2016, Revision 6), the USEPA Contract Laboratory

Program "National Functional Guidelines for Organic Superfund Methods Data Review" (USEPA-540-R-2017-002, January 2017) and the specifics of the methods employed.

Validation includes evaluation of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. Items subject to review in this memorandum include holding times, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, system monitoring compounds, internal standard area counts, laboratory duplicates, target compound identification and quantification, chromatograms, and overall system performance.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- **R –** The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
- **J –** The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- **UJ –** The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
- **U –** The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
- **NJ –** The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items subject to review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

TABLE 2: VALIDATOR-APPLIED QUALIFICATION

Project Sample ID	*Analysis*	*Analyte*	*CAS No.*	*Validator Qualifier*
IA01_032818	TO15	1,2,4-Trimethylbenzene	95-63-6	J
IA01_032818	TO15	Acetone	67-64-1	J
IA01_032818	TO15	Benzyl Chloride	100-44-7	UJ
IA01_032818	TO15	Bromoform	75-25-2	UJ

Project Sample ID	*Analysis*	*Analyte*	*CAS No.*	*Validator Qualifier*
IA01_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA01_032818	TO15	Isopropanol	67-63-0	J
IA01_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	J
IA02_032818	TO15	1,2,4-Trimethylbenzene	95-63-6	J
IA02_032818	TO15	Acetone	67-64-1	J
IA02_032818	TO15	Benzyl Chloride	100-44-7	UJ
IA02_032818	TO15	Bromoform	75-25-2	UJ
IA02_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA02_032818	TO15	Isopropanol	67-63-0	J
IA02_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	J
IA03_032818	TO15	Acetone	67-64-1	J
IA03_032818	TO15	Bromoform	75-25-2	UJ
IA03_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA03_032818	TO15	Isopropanol	67-63-0	J
IA03_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	J
IA04_032818	TO15	1,2,4-Trimethylbenzene	95-63-6	J
IA04_032818	TO15	Acetone	67-64-1	J
IA04_032818	TO15	Benzyl Chloride	100-44-7	UJ
IA04_032818	TO15	Bromoform	75-25-2	UJ
IA04_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA04_032818	TO15	Isopropanol	67-63-0	J
IA04_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	J
IA05_032818	TO15	1,2,4-Trimethylbenzene	95-63-6	J
IA05_032818	TO15	Acetone	67-64-1	J
IA05_032818	TO15	Benzyl Chloride	100-44-7	UJ
IA05_032818	TO15	Bromoform	75-25-2	UJ
IA05_032818	TO15	Dibromochloromethane	124-48-1	UJ
IA05_032818	TO15	Isopropanol	67-63-0	J
IA05_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	UJ
AA02_032818	TO15	Acetone	67-64-1	J
AA02_032818	TO15	Benzyl Chloride	100-44-7	UJ
AA02_032818	TO15	Bromoform	75-25-2	UJ

Project Sample ID	*Analysis*	*Analyte*	*CAS No.*	*Validator Qualifier*
AA02_032818	TO15	Dibromochloromethane	124-48-1	UJ
AA02_032818	TO15	Isopropanol	67-63-0	UJ
AA02_032818	TO15 SIM	Cis-1,2-Dichloroethylene	156-59-2	UJ

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by USEPA Method TO-15:

The peaks for acetone in samples IA01_032818, IA02_032818, IA03_032818, IA04_032818, IA05_032818 and AA02_032818 co-eluted with a non-target peak. The associated results are qualified as "J" based on potential indeterminate bias.

The initial calibration (ICAL) analyzed for instrument AIRLAB17 exhibited a relative standard deviation (RSD) greater than the upper control limit (i.e. 30%) for isopropyl alcohol (32.82%). The associated results in samples IA01_032818, IA02_032818, IA03_032818, IA04_032818, IA05_032818 and AA02_032818 are qualified as "J" or "UJ" based on potential indeterminate bias.

VOCs by USEPA Method TO-15 (SIM)

The initial calibration verification (ICV) analyzed on 3/3/2018 at 12:51 p.m. exhibited a percent difference (%D) greater than the control limit for cis-1,2-dichloroethene (-38.3%). The associated results in samples IA01_032818, IA02_032818, IA03_032818, IA04_032818, IA05_032818 and AA02_032818 are qualified as "J" or "UJ" based on potential indeterminate bias.

The continuing calibration verification (CCV) analyzed on 4/2/2018 at 12:42 exhibited %Ds greater than the control limit for dibromochloromethane (35.5%), bromoform (41%) and benzyl

chloride (30.4%). The associated results in samples IA01_032818, IA02_032818, IA04_032818, IA05_032818 and AA02_032818 are qualified as "UJ" based on potential indeterminate bias.

The CCV analyzed on 4/3/2018 at 13:24 exhibited %Ds greater than the control limit for dibromochloromethane (33.1%) and bromoform (36%). The associated results in sample IA03_032818 are qualified as "UJ" based on potential indeterminate bias.

The laboratory control sample (LCS) for batch WG1102773 exhibited percent recoveries greater than the upper control limit for 1,2,4-trimethylbenzene. The associated results in samples IA01_032818, IA02_032818, IA04_032818 and IA05_032818 are qualified as "J" based on potential high bias.

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by USEPA Method TO-15:

The ICAL analyzed for instrument AIRLAB17 exhibited an RSD greater than the upper control limit for isopropyl alcohol (30.62%). This compound was not reported for SIM analysis; no qualification is necessary.

The CCV analyzed on 4/2/2018 at 13:18 exhibited %Ds greater than the control limit for dibromochloromethane (45.6%), bromoform (47.8%), 4-ethyltoluene (35.1%), 1,2,4-trimethylbenzene (32.1%) and benzyl chloride (38.2%). These compounds were not reported for SIM analysis; no qualification is necessary.

The CCV analyzed on 4/3/2018 at 14:00 exhibited %Ds greater than the control limit for t-butyl alcohol (-30.5%), dibromochloromethane (41.4%), bromoform (44.9%), 4-ethyltoluene (34.7%), 1,2,4-trimethylbenzene (30.1%) and benzyl chloride (33.8%). These compounds were not reported for SIM analysis; no qualification is necessary.

The LCS for batch WG1102770 exhibited percent recoveries greater than the upper control limit for dibromochloromethane (136%) and bromoform (141%). The associated results are non-detections; no qualification is necessary.

The LCS for batch WG1103162 exhibited percent recoveries greater than the upper control limit for dibromochloromethane (133%) and bromoform (136%). The associated results are non-detections; no qualification is necessary.

The LCS for batch WG1102773 exhibited percent recoveries greater than the upper control limit for dibromochloromethane, bromoform, 4-ethyltoluene and benzyl chloride. The associated results are non-detections; no qualification is necessary.

The LCS for batch WG1103163 exhibited percent recoveries greater than the upper control limit for dibromochloromethane, bromoform, 4-ethyltoluene and benzyl chloride. The associated results are non-detections; no qualification is necessary.

COMMENTS:

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All laboratory data packages met ASP Category B requirements and all sample holding times were met.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:

Emily Strake, CEP
Senior Project Chemist/Risk Assessor

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501
Mailing Address: P.O. Box 1569 Doylestown, PA 18901

To: Veronica Zuluaga, Langan Senior Staff Engineer

From: Emily Strake, Langan Senior Project Chemist

Date: March 7, 2019

Re: Data Usability Summary Report
For 473 President Street
Air Samples Collected in August through December 2018
Langan Project No.: 170519402

This memorandum presents the findings of an analytical data validation of the data generated from the analysis of air samples collected in August through December 2018 by Langan Engineering and Environmental Services ("Langan") at the 473 President Street site ("the Site"). The samples were analyzed by Alpha Analytical Laboratories (NYSDOH NELAC registration # 11148) for volatile organic compounds (VOCs) by the methods specified below.

- VOCs by USEPA Method TO-15 and TO-15 SIM

Table 1, below, summarizes the laboratory and client sample identification numbers, sample collection dates, and analytical parameters subject to review.

TABLE 1: SAMPLE SUMMARY

SDG	*Lab Sample ID*	*Client Sample ID*	*Sample Date*	*Analytical Parameters*
L1832566	L1832566-01	IA06_081718	8/17/2018	VOCs
L1832566	L1832566-02	IA07_081718	8/17/2018	VOCs
L1832566	L1832566-03	AA02_081718	8/17/2018	VOCs
L1835562	L1835562-01	AA01_090718	9/7/2018	VOCs
L1835562	L1835562-02	IA06_090718	9/7/2018	VOCs
L1835562	L1835562-03	IA07_090718	9/7/2018	VOCs
L1852832	L1852832-01	IA06_122018	12/20/2018	VOCs
L1852832	L1852832-02	IA07_122018	12/20/2018	VOCs
L1852832	L1852832-03	AA02_122018	12/20/2018	VOCs

Validation Overview

This data validation was performed in accordance with USEPA Region II Standard Operating Procedure (SOP) #HW-31, "Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15" (September 2016, Revision 6), and the USEPA Contract Laboratory Program "National Functional Guidelines for Organic Superfund Methods Data Review" (EPA-540-R-2017-002, January 2017) and the specifics of the methods employed.

Validation includes review of the analytical data to verify that data are easily traceable and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator. Items subject to review in this memorandum include holding times, sample preservation, instrument tuning, instrument calibration, laboratory blanks, laboratory control samples, internal standard area counts, target compound identification and quantification, chromatograms, and overall system performance.

As a result of the review process, the following qualifiers may be assigned to the data in accordance with the USEPA's guidelines and best professional judgment:

- **R –** The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
- **J –** The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- **UJ –** The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise.
- **U –** The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the RL or the sample concentration for results impacted by blank contamination.
- **NJ –** The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

If any validation qualifiers are assigned these qualifiers should supersede any laboratory-applied qualifiers. Data that is not qualified as a result of this data validation is considered acceptable on the basis of the items specified for review. Data that is qualified as "R" are not sufficiently valid and technically supportable to be used for data interpretation. Data that is otherwise qualified due to minor data quality anomalies are usable, as qualified.

TABLE 2: VALIDATOR-APPLIED QUALIFICATION

Client Sample ID	*Analysis*	*CAS #*	*Analyte*	*Validator Qualifier*
AA01_090718	TO15	67-64-1	ACETONE	J
AA02_081718	TO15	67-64-1	ACETONE	J
AA02_122018	TO15	120-82-1	1,2,4-TRICHLOROBENZENE	UJ
AA02_122018	TO15	67-64-1	ACETONE	J
AA02_122018	TO15	87-68-3	HEXACHLOROBUTADIENE	UJ
IA06_081718	TO15	67-64-1	ACETONE	J
IA06_090718	TO15	67-64-1	ACETONE	J
IA06_122018	TO15	120-82-1	1,2,4-TRICHLOROBENZENE	UJ
IA06_122018	TO15	75-71-8	DICHLORODIFLUOROMETHANE	J
IA06_122018	TO15	87-68-3	HEXACHLOROBUTADIENE	UJ
IA07_081718	TO15	67-64-1	ACETONE	J
IA07_090718	TO15	67-64-1	ACETONE	J
IA07_122018	TO15	120-82-1	1,2,4-TRICHLOROBENZENE	UJ
IA07_122018	TO15	87-68-3	HEXACHLOROBUTADIENE	UJ

MAJOR DEFICIENCIES:

Major deficiencies include those that grossly impact data quality and necessitate the rejection of results. No major deficiencies were identified.

MINOR DEFICIENCIES:

Minor deficiencies include anomalies that directly impact data quality and necessitate qualification, but do not result in unusable data. The section below describes the minor deficiencies that were identified.

VOCs by USEPA Methods TO-15 and TO-15 SIM:

L1832566

Samples IA06_081718, IA07_081718, AA02_081718 exhibited co-elution of a non-target peak with acetone. The associated results are qualified as "J" based on potential indeterminate bias.

L1835562

Samples AA01_090718, IA06_090718, and IA07_090718 exhibited co-elution of a non-target peak with acetone. The associated results are qualified as "J" based on potential indeterminate bias.

L1852832

The laboratory duplicate and parent sample (IA06_122018) exhibited a RPD above the control limit for dichlorodifluoromethane (35%). The associated results are qualified as "J" based on potential indeterminate bias.

The CCV analyzed on 12/28/2018 at 13:56 exhibited a %D above the control limit for 1,2,4-trichlorobenzene (-38.9%) and hexachlorobutadiene (-38%). The associated results in sample IA06_122018, IA07_122018, and AA02_122018 are qualified as "UJ" based on potential indeterminate bias.

Sample AA02_122018 exhibited co-elution of a non-target peak with acetone. The associated result is qualified as "J" based on potential indeterminate bias.

OTHER DEFICIENCIES:

Other deficiencies include anomalies that do not directly impact data quality and do not necessitate qualification. The section below describes the other deficiencies that were identified.

VOCs by USEPA Methods TO-15 and TO-15 SIM:

L1852832

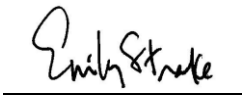
The LCS for batch WG1193664 exhibited a percent recovery above the UCL for 1,2,4-trichlorobenzene (139%) and hexachlorobutadiene (138%). The associated results are non-detections. No qualification is necessary.

COMMENTS:

On the basis of this evaluation, the laboratory appears to have followed the specified analytical methods with the exception of errors discussed above. If a given fraction is not mentioned above, that means that all specified criteria were met for that parameter. All of the data packages met ASP Category B requirements.

All data are considered usable, as qualified. In addition, completeness, defined as the percentage of analytical results that are judged to be valid, is 100%.

Signed:



Emily Strake, CEP
Senior Project Chemist

Appendix I
Fish and Wildlife Resources Impact Analysis and Decision Key

Appendix 3C Fish and Wildlife Resources Impact Analysis Decision Key		If YES Go to:	If NO Go to:
1.	Is the site or area of concern a discharge or spill event?	13	2
2.	Is the site or area of concern a point source of contamination to the groundwater which will be prevented from discharging to surface water? Soil contamination is not widespread, or if widespread, is confined under buildings and paved areas.	13	3
3.	Is the site and all adjacent property a developed area with buildings, paved surfaces and little or no vegetation?	4	9
4.	Does the site contain habitat of an endangered, threatened or special concern species?	Section 3.10.1	5
5.	Has the contamination gone off-site?	6	14
6.	Is there any discharge or erosion of contamination to surface water or the potential for discharge or erosion of contamination?	7	14
7.	Are the site contaminants PCBs, pesticides or other persistent, bioaccumulable substances?	Section 3.10.1	8
8.	Does contamination exist at concentrations that could exceed ecological impact SCGs or be toxic to aquatic life if discharged to surface water?	Section 3.10.1	14
9.	Does the site or any adjacent or downgradient property contain any of the following resources? i. Any endangered, threatened or special concern species or rare plants or their habitat ii. Any DEC designated significant habitats or rare NYS Ecological Communities iii. Tidal or freshwater wetlands iv. Stream, creek or river v. Pond, lake, lagoon vi. Drainage ditch or channel vii. Other surface water feature viii. Other marine or freshwater habitat ix. Forest x. Grassland or grassy field xi. Parkland or woodland xii. Shrubby area xiii. Urban wildlife habitat xiv. Other terrestrial habitat	11	10
10.	Is the lack of resources due to the contamination?	3.10.1	14
11.	Is the contamination a localized source which has not migrated and will not migrate from the source to impact any on-site or off-site resources?	14	12
12.	Does the site have widespread surface soil contamination that is not confined under and around buildings or paved areas?	Section 3.10.1	12
13.	Does the contamination at the site or area of concern have the potential to migrate to, erode into or otherwise impact any on-site or off-site habitat of endangered, threatened or special concern species or other fish and wildlife resource? (See #9 for list of potential resources. Contact DEC for information regarding endangered species.)	Section 3.10.1	14
14.	No Fish and Wildlife Resources Impact Analysis needed. ✓		