LANGAN

Technical Memorandum

Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
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To: Shaun Bollers – NYSDEC

From: Jason Hayes, P.E. - Langan

Info: 27-01 Jackson Avenue LLC
Brian Gochenaur, Kimberly Del Col, Mimi Raygorodetsky - Langan

Date: January 23, 2020

Re: Off-Site In-Situ Treatment Remedial Design Plan
27-01 Jackson Avenue (the "site")
Long Island City, New York
NYSBCP Site Number C241209
Langan Project No.: 170472002

This remedial design plan presents an in-situ groundwater treatment strategy to remediate residual petroleum-related volatile organic compound (VOC) impacts to soil and groundwater beneath the southern- and western-adjoining sidewalks (the "off-site treatment area") of 27-01 Jackson Avenue in the Long Island City neighborhood of Queens, New York (the "site"). The sidewalks are currently active, but will be closed prior to and during construction. A site location plan is provided as Figure 1 and a site layout map, illustrating the off-site petroleum-impacted areas, is provided as Figure 2.

This document supplements the Remedial Action Work Plan (RAWP), which describes the implementation of a short-term in-situ soil and groundwater treatment technology via injection points beneath the site's southern- and western-adjoining sidewalks to reduce petroleum-related VOCs in soil and groundwater.

This technical memorandum is organized as follows:

- Section 1.0 - Site Background
- Section 2.0 - In-Situ Remedial Technology Options and Description
- Section 3.0 - Supplemental Investigation
- Section 4.0 - Remedy Selection and Implementation
- Section 5.0 - Monitoring
- Section 6.0 - Certification

1.0 SITE BACKGROUND

Based on the October 2017 Supplemental Investigation Report prepared by Advanced Cleanup Technologies, Inc. (ACT), the stratigraphy beneath the sidewalk consists of fine- to medium-grained sand underlain by brown fine silty and clayey sand. The top of bedrock ranges from about 19 to 45 feet below grade surface (bgs) across the site. The bedrock surface is irregular and generally slopes downward from the east to west.

Groundwater was determined to generally flow west but appears partially influenced by ongoing dewatering activities for the southern adjoining subway tunnel, as evidenced by a low point in the groundwater table in the southwestern corner of the site. This low point is causing a secondary flow direction to the south on that part of the site. Underground utilities and other subsurface structures may locally influence the direction of groundwater flow. The groundwater contour map from the Remedial Investigation Report (RIR) is provided for reference as Figure 3.

The RIR provides a description of contaminant distribution throughout the site and the off-site treatment area. On-site petroleum impacts were identified over about 6,000 square feet of the site. The highest concentration of petroleum-related VOCs was identified in the southern and western parts of the site, which were identified as the source area. On-site petroleum impacted soil will be excavated and removed as part of the site redevelopment and will not require in-situ remediation. Petroleum-impacted groundwater will be pumped from the site and treated as part of dewatering activities, as required for construction of the new development. Petroleum impacts to groundwater beneath the southern- and western-adjoining sidewalks span about 2,750 square feet. The treatment area contains concentrations of petroleum-related VOCs in soil and groundwater, staining, odors, and/or photoionization detector (PID) readings above background. The extent of the treatment area is presented on Figure 4.

Contaminants of concern (COC) that will be addressed by the in-situ groundwater treatment are petroleum-related VOCs, including benzene, toluene, ethylbenzene, xylene (BTEX), and their breakdown products. Based on the vertical delineation of the petroleum plume on-site, the target depth for the off-site in-situ remedial treatment is from about 16 to 30 feet bgs.

2.0 IN-SITU REMEDIAL TECHNOLOGY OPTIONS AND DESCRIPTION

The following methods and products were evaluated to treat the "off-site impacts:

- In-situ Chemical Oxidation (ISCO) via RegenOx®, and
- Adsorption and Bioremediation via Petrofix®

These treatment technologies are discussed below.

2.1 In-situ Chemical Oxidation via RegenOx®

ISCO involves application of a chemical oxidant (e.g., sodium percarbonate) for rapid degradation of the targeted COCs. During the oxidation reaction, electrons are transferred from the contaminant to the oxidant, which oxidizes the contaminant and reduces the electron acceptor (i.e., oxidant). In turn, the contaminant is degraded or destroyed. The oxidant selected for use is based upon its effectiveness for the COCs, minimal production of heat and pressure, non-corrosive nature and ease of use.

RegenOx® maximizes ISCO performance through the use a two-part product - sodium percarbonate oxidant activated by a catalyst. The oxidant degrades pollutants through direct oxidation, while generating free radicals, which work to oxidize recalcitrant contaminants. RegenOx® can persist in the subsurface for up to 30 days on a single application.

2.2 Adsorption and Bioremediation via Petrofix®

PetroFix® has a dual function; first, a liquid activated carbon component adsorbs hydrocarbons from the dissolved phase. The second component stimulates hydrocarbon biodegradation via added electron acceptors (sulfate or nitrate blend). In turn, the contaminant is degraded or destroyed. PetroFix® provides an effective solution for the COCs that is easy to use, produces minimal heat and is non-corrosive.

3.0 SUPPLEMENTAL INVESTIGATION

Langan performed a supplemental investigation on February 15 and March 1, 2019 that consisted of collecting additional soil and groundwater samples from the off-site treatment area and a soil sample from the southwest part of the site. The objective of the supplemental investigation was analyze samples for remedial design parameters.

3.1 Objectives

The remedial design testing objectives were to:

1) Evaluate the feasibility to treat petroleum-related VOC impacts in saturated soil and groundwater
2) Determine full-scale design parameters (i.e., field dosing concentrations)

3.2 Methodology

The methodology for sample collection, sample preparation, and Total Oxygen Demand (TOD) testing is described below.

Sample Collection and Preparation

Soil and groundwater samples were collected for use in the remedial design testing. Soil boring SB-106 was advanced on-site within the petroleum plume to evaluate the area with the greatest degree of impacts. Soil boring SB-112 was advanced on the western-adjoining sidewalk, within the off-site treatment area, to evaluate soil conditions. A PID was used to screen VOC concentrations during sampling. Soil samples were collected from 19 to 21 feet bgs and 30 to 32 feet bgs in boring SB-106, and from 9 to 11 feet bgs from boring SB-112. Soil samples were analyzed for total petroleum hydrocarbons (TPH) diesel range organics (DRO), gasoline range organics (GRO), TOD, total organic carbon (TOC), nitrite, nitrate, ammonia, sulfate, phosphate, iron, manganese, and total alkalinity.

One groundwater sample was collected from MW-2 located on the southern-adjoining sidewalk within the off-site treatment area. The groundwater sample was analyzed for Target Compound List (TCL) VOCs, SVOCs, Target Analyte list (TAL) total and dissolved metals, chemical oxidant demand (COD), biological oxidant demand (BOD), sulfate, nitrite, chloride, and total alkalinity. A site layout and sample location map, with boring and monitoring well locations, is provided as Figure 2.

Soil and groundwater samples were collected into labeled, laboratory-supplied containers, placed in a laboratory-supplied cooler, and packed on ice to support maintaining a temperature of about 4°C. Soil samples were delivered to Regenesis Lab of San Clemente, California under standard chain of custody. Groundwater samples were delivered via courier to Alpha Analytical Laboratories Inc. of Mahwah, New Jersey for analysis of remediation parameters.

The TOD test was setup with 10 grams of site soil and 100 grams of distilled water. Test samples were prepared with a known amount of oxidant (1,000 parts per million [ppm]) and the oxidant concentration was measured at the beginning of the test. After a specified time, the remaining oxidant concentration was calculated from a calibration curve.

3.3 Results

The following summarizes the results of the remediation parameter analyses and the results.

Remediation Parameters

Table 1 and 2 present the results of the remediation parameter analyses. Soil and groundwater remediation parameters were used to design the proposed remedy for the site.

Soil Parameters

- TOC was detected from 126 milligrams per kilogram (mg/kg) in SB106_30-32 to 381 mg/kg in SB106_19-21.
- TPH DRO was detected at 181 mg/kg in SB106_19-21.
- TPH GRO was detected from 1 mg/kg in SB106_30-32 to 31 mg/kg in SB106_19-21.

Groundwater Parameters

- TOC was detected at 3.6 milligrams per liter (mg/L) in MW-2
- BOD was detected at 8.8 mg/L in MW-2
- COD was detected at 47 mg/L in MW-2

Total Oxidant Demand Test Results

The TOD was determined by the final oxidant consumption at the end of the oxidant demand test. The TOD value ranged from 3.96 to 7.96 grams of oxidant per kilogram of soil. Laboratory analytical data packages are included as Appendix A.

4.0 REMEDY SELECTION AND IMPLEMENTATION

Both of the selected products are anticipated to yield similar results; however, up to three applications of RegenOx® would be required to yield the same results as one application of PetroFix®. Considering the limited access and complications of additional injections during construction, an injection event using PetroFix® is the selected remedy.

A direct-push application of PetroFix® will be injected over the approximately 2,750-square-foot targeted petroleum plume. The product application area is presented on Figure 4. Prior to PetroFix® injection to address off-site petroleum impact, the on-site source material will be isolated from the off-site area with a sheet pile wall. The wall will support on-site dewatering operations and removal of the impacted on-site source material.

4.1 Reagent Selection and Dosage

The approximately 2,750-square-foot area will be treated via PetroFix® mixed with a nitrate and sulfate blend. Based on the remedial testing, about 14,000 pounds of PetroFix® will be applied to the treatment area. We anticipate a dosing of about 32.8 pounds per cubic yard (lb/yd^3), which equates to an application of about 442 gallons per injection point, or 10,519 gallons of PetroFix® across the treatment area.

Approximate direct-push injection locations are shown on Figure 4. The contractor will provide all product submittals prior to purchase and implementation. Appendix C includes the Safety Data Sheets (SDS) for these products.

4.2 Field Implementation

Free product was observed in off-site monitoring well MW-2 during the October 2018 Remedial Investigation (RI). Subsequently, a light non-aqueous phase liquid (LNAPL) Recovery Assessment was conducted on March 13, 2019 to determine the recovery rates of free product and effectiveness of free product removal events. Based on the results of the assessment, free product does not appear to be recharging in the monitoring well.

Prior to implementation of the selected in-situ groundwater treatment, off-site wells on the adjoining western and southern sidewalks will be measured prior to implementation of groundwater treatment. Should free product be identified, a vacuum truck will be used to extract any remaining product. If free-product removal from existing monitoring well MW-2 is not effective, LNAPL extraction wells may be installed to enhance free-product recovery. Application of PetroFix® will not occur in the event that free-product remains in the treatment area.

Application of PetroFix® will be conducted via a direct-push drill rig. The remedial application will target the 16 to 30 feet bgs interval where the targeted COC concentrations were observed. Direct push injection locations are detailed on Figure 4. The anticipated radius of influence for the PetroFix via direct-push is 6 feet. Injection points are located in a rough grid pattern to spread chemicals evenly across the treatment area. Injections will be sequenced in a manner that will minimize off-site migration of contaminant mass. The PetroFix® will be applied via low-pressure pumps with maximum pressure not to exceed 100 pounds per square inch (psi), which will not significantly alter groundwater elevation. Injections will start up-gradient of the contaminant mass along the Jackson Avenue sidewalk, proceed west along the Jackson Avenue sidewalk, and then up the 43rd Avenue sidewalk.

Flexible hose will be extended from a mixing tank to the injection pump and then to an injection manifold at the drill rig. During the injection, the direct-push rig will advance drill rods to the bottom of the target interval, and then gradually pull the rods upward through the target interval. To avoid mounding at localized areas during the injection, an alternating injection sequence shall be applied, meaning that the adjacent injection points should not be injected without lag between the injections. The alternating injections will allow the aquifer to have time to equilibrate with the surroundings. The injection record should include the rate, pressure, and volume at each location.

5.0 MONITORING

Performance monitoring will consist of baseline and post-injection monitoring. The baseline sampling will be conducted prior to injection and post-injection sampling will be conducted quarterly during the two years following the injections.

Real-time monitoring will be performed during the injections at four off-site monitoring wells (MW-1 through MW-4) within the plume to monitor for potential contaminant migration. The real-time monitoring will include daily collection of well headspace readings via a PID, and depth to groundwater measurements.

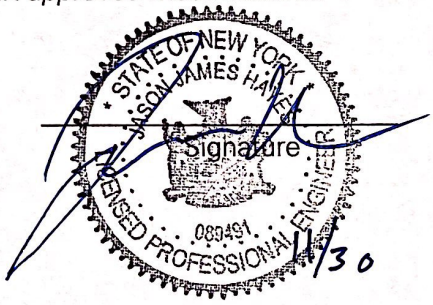
Post-injection monitoring for VOCs will be performed at the four existing monitoring wells, MW-1 through MW-4, located inside the petroleum plume, as shown on Figure 5. Post-injection monitoring will be performed at least 3 months after the final application event.

6.0 CERTIFICATION

I, Jason Hayes, PE, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Technical Memorandum was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the 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.

JASON HAYES
NYS Professional Engineer 089491

11/30/2020
Date



Signature

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Table 2: Remediation Parameters - Groundwater

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Figure 3: Groundwater Contour Map
Figure 4: Treatment Area Location Plan
Figure 5: Groundwater Monitoring Plan

Appendices
Appendix A: Laboratory Analytical Reports
Appendix B: Product Specifications
Appendix C: SDS

TABLES

Table 1
Remediation Parameters - Soil
Off-Site In-Situ Treatment Remedial Design Plan

27-01 Jackson Avenue
Long Island City, New York
BCP Site No.: C241209
Langan Project No.: 170472002

Sample ID	**SB106_19-21**		**SB106_30-32**		**SB112_9-11**	
Sample Date	**2/15/2019**		**2/15/2019**		**2/15/2019**	
Laboratory ID	**L1906234-01**		**L1906234-02**		**L1906234-03**	
Sample Depth (feet bgs)	**19 to 21**		**30 to 32**		**9 to 11**	
Total Oxidant Demand ($g_{oxidant}/kg_{soil}$)						
Total Oxidant Demand	7.96		3.96		7.54	
Total Petroleum Hydrocarbons (mg/kg)						
Diesel Range Organics	181		37.7	U	40.1	U
Gasoline Range Organics	31		1	J	2.8	
General Chemistry (mg/kg)						
Nitrogen, Ammonia	12		9.6		6.6	J
Nitrogen, Nitrate	0.4	J	0.27	J	1.1	U
Nitrogen, Nitrite	1.2	U	0.99	U	1.1	U
Phosphate, Total	2400		1600		2100	
Solids, Total (%)	79.3		87.2		82.1	
Sulfate	36	J	24	J	25	J
Total Organic Carbon	381		126		198	
Inorganics (mg/kg)						
Iron	10600		12100		14500	
Manganese	112		194		260	

Notes:
1. mg/kg = milligrams per kilogram
2. % = percent
3. bgs = below grade surface

Qualifiers:
J = The analyte was detected above the Method Detection Limit (MDL), but below the Reporting Limit (RL); therefore, the result is an estimated concentration.
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 2
Remediation Parameters - Groundwater
Off-Site In-Situ Treatment Remedial Design Plan

27-01 Jackson Avenue
Long Island City, New York
BCP Site No.: C241209
Langan Project No.: 170472002

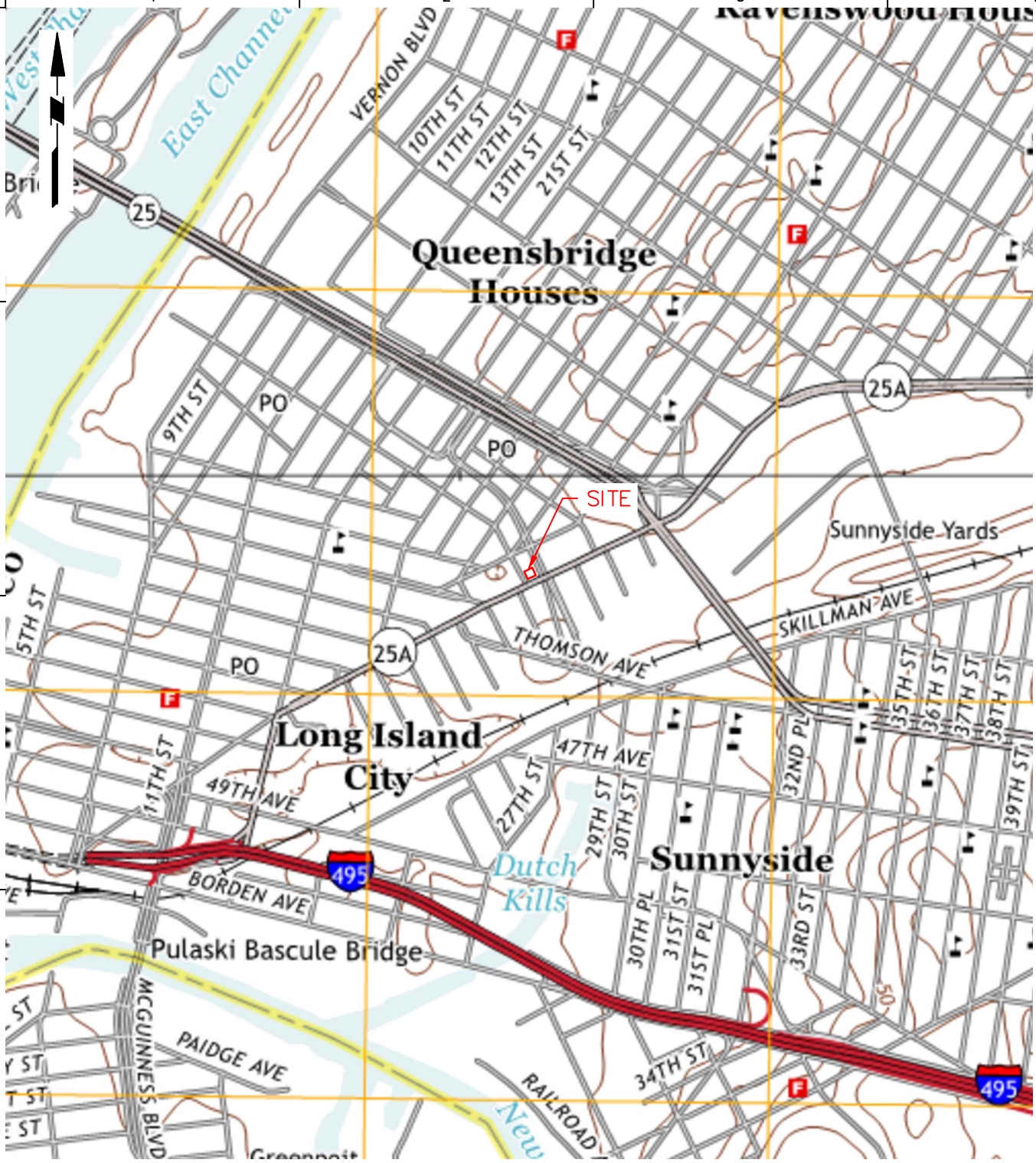
Sample ID	MW-2_030119	
Sample Date	3/1/2019	
Laboratory ID	L1908135-01	
General Chemistry (µg/L)		
Alkalinity, Total (mg CaCO3/L)	139	
Biological Oxygen Demand, 5 day	8800	
Chemical Oxygen Demand	47000	
Chloride	700000	
Nitrogen, Nitrate	100	U
Sulfate	12000	
Total Organic Carbon	3600	J
Volatile Organic Compounds (µg/L)		
1,2,3-Trichloropropane	6.6	
1,2,4,5-Tetramethylbenzene	77	
1,2,4-Trimethylbenzene	300	
1,3,5-Trimethylbenzene	90	
Benzene	0.79	J
Ethylbenzene	84	
Isopropylbenzene	16	
n-Butylbenzene	21	
n-Propylbenzene	46	
Naphthalene	22	
o-Xylene	2.6	J
p-Diethylbenzene	180	
p-Ethyltoluene	160	
p-Isopropyltoluene	6.6	
p/m-Xylene	220	
sec-Butylbenzene	11	
Toluene	6.4	
Xylenes, Total	220	J
Semivolatile Organic Compounds (µg/L)		
Biphenyl	0.54	J
2-Methylnaphthalene	15	
Acenaphthene	0.33	
Acenaphthylene	0.09	J
Anthracene	0.2	
Benzo(a)anthracene	0.05	J
Benzo(a)pyrene	0.03	J
Benzo(b)fluoranthene	0.03	J
Benzo(ghi)perylene	0.02	J
Benzo(k)fluoranthene	0.03	J
Chrysene	0.07	J
Fluoranthene	0.35	
Fluorene	0.64	
Indeno(1,2,3-cd)pyrene	0.02	J
Naphthalene	9.2	
Phenanthrene	1.1	
Pyrene	0.32	

Sample ID	MW-2_030119	
Sample Date	3/1/2019	
Laboratory ID	L1908135-01	
Inorganics, Total (µg/L)		
Aluminum	3370	
Arsenic	1.39	
Barium	192.2	
Beryllium	0.24	J
Cadmium	0.06	J
Calcium	108000	
Chromium	12.76	
Cobalt	5.28	
Copper	11.75	
Iron	14300	
Lead	4.78	
Magnesium	11300	
Manganese	1569	
Nickel	10.46	
Potassium	19300	
Sodium	309000	
Vanadium	12.19	
Zinc	19.58	
Inorganics, Dissolved (µg/L)		
Aluminum	3.96	J
Antimony	1.08	J
Arsenic	0.63	
Barium	160	
Calcium	120000	
Chromium	0.18	J
Iron	4640	
Lead	0.79	J
Magnesium	10200	
Manganese	1481	
Nickel	0.65	J
Potassium	20700	
Sodium	369000	

Notes:
1. µg/L = micrograms per liter
2. Only detected volatile organic compounds, semivolatile organic compounds, and inorganics are shown in the table

Qualifiers:
J = The analyte was detected above the Method Detection Limit (MDL), but below the Reporting Limit (RL); therefore, the result is an estimated concentration.
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

FIGURES



BASEMAP SOURCE: CENTRAL PARK AND BROADWAY, 7.5-MINUTE SERIES, TOPOGRAPHIC QUADRANGLE MAPS, DATED 2013.

———— - APPROXIMATE SITE BOUNDARY

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LANGAN

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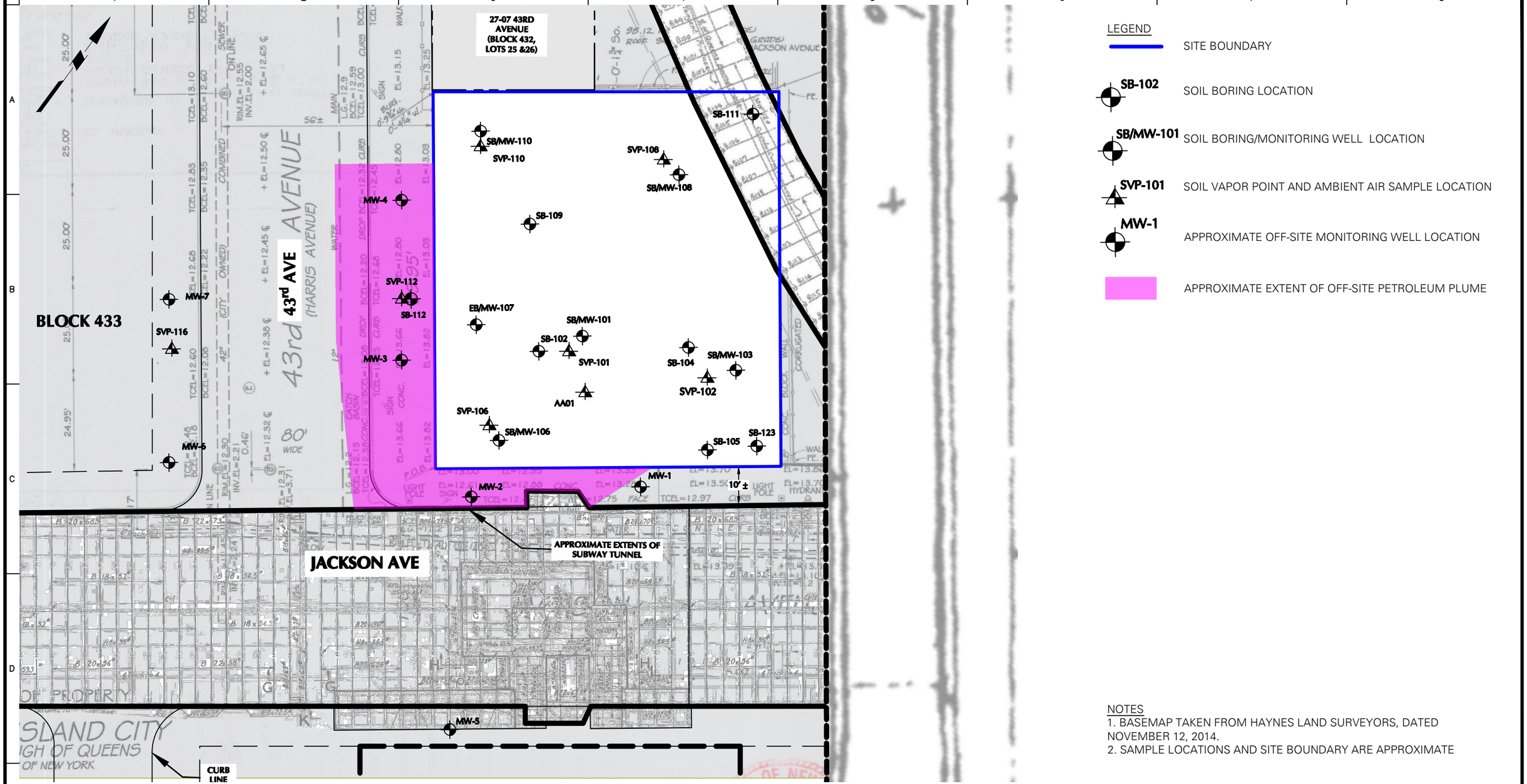
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A.
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
Langan Engineering and Environmental Services, Inc.
Langan CT, Inc.
Langan International LLC
Collectively known as Langan

Project	27-01 JACKSON AVENUE BLOCK 432, LOT 21 LONG ISLAND CITY NEW YORK
Figure Title	SITE LOCATION MAP
Project No.	170472002
Figure No.	1
Date	10/2/2019
Scale	NTS
Drawn By	JFY
Checked By	BG
Submission Date	
Sheet	1 of 5

Filename: \\langan.com\data\NYC\data0\170472002\Project Data\CAD\02\SheetFiles\Off-Site In-Situ Treatment\Figure 1 - Site Location Map.dwg Date: 10/2/2019 Time: 16:21 User: jyanowitz Style Table: Langan.stb Layout: F1 - SITE LCO MAP



LEGEND

- SITE BOUNDARY
- SB-102 — SOIL BORING LOCATION
- SB/MW-101 — SOIL BORING/MONITORING WELL LOCATION
- SVP-101 — SOIL VAPOR POINT AND AMBIENT AIR SAMPLE LOCATION
- MW-1 — APPROXIMATE OFF-SITE MONITORING WELL LOCATION
- APPROXIMATE EXTENT OF OFF-SITE PETROLEUM PLUME

NOTES
1. BASEMAP TAKEN FROM HAYNES LAND SURVEYORS, DATED NOVEMBER 12, 2014.
2. SAMPLE LOCATIONS AND SITE BOUNDARY ARE APPROXIMATE

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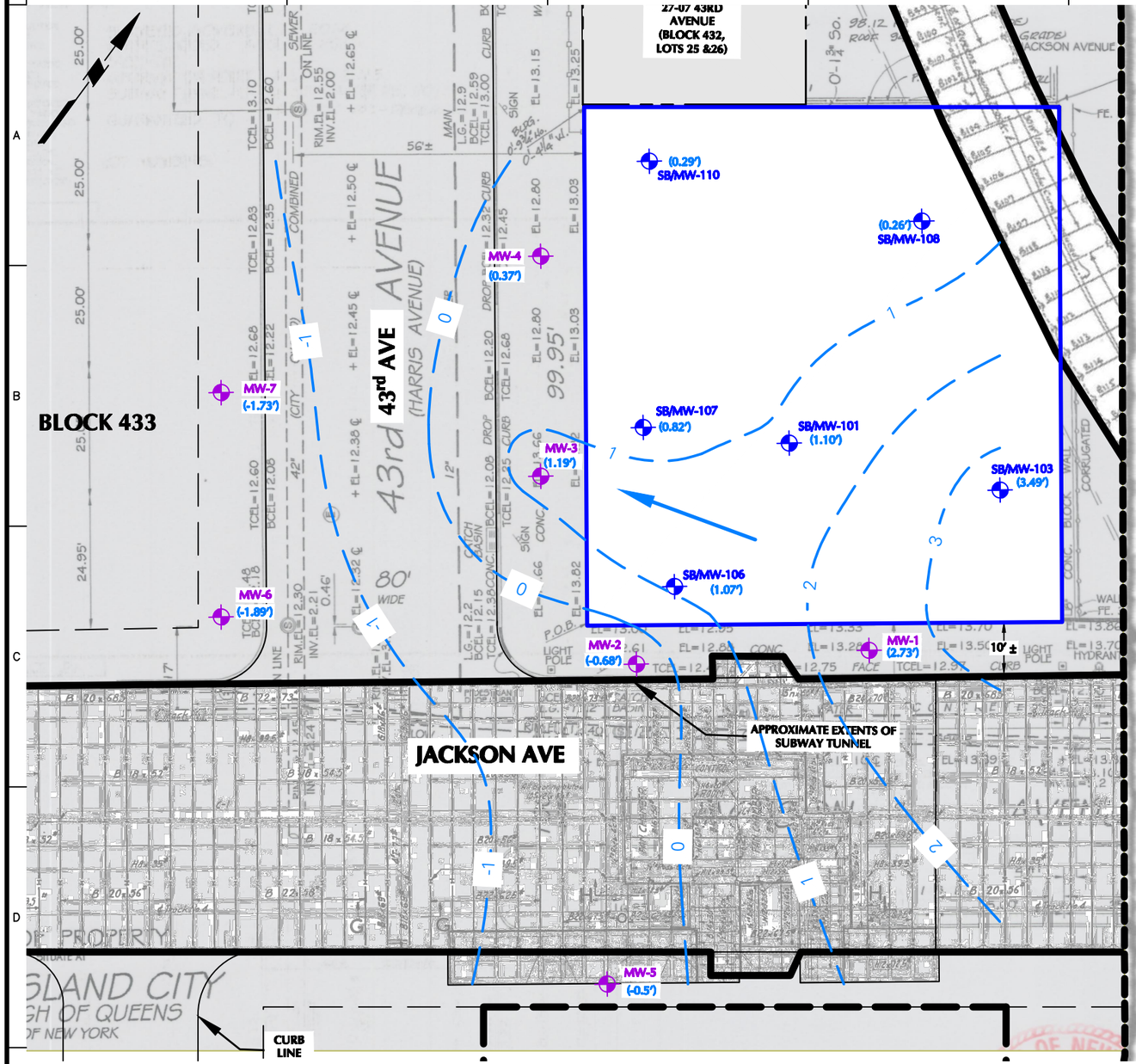
Project
27-01 JACKSON AVENUE
BLOCK No. 432 LOT No. 21
LONG ISLAND CITY NEW YORK

Drawing Title
SITE LAYOUT AND SAMPLE LOCATION PLAN

Project No. 170472002
Date 10/2/2019
Drawn By JFY
Checked By KD

Drawing No. 2
Sheet 2 of 5

Filename: \\langan.com\data\NYC\data0\170472002\Project Data\CAD\02\SheetFiles\Off-Site In-Situ Treatment\Figure 2 - Site Layout and Sample Location Map.dwg Date: 10/3/2019 Time: 10:38 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



LEGEND

- SITE BOUNDARY
- SB/MW-101 (1.10') — SOIL BORING/MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- MW-1 (2.73') — OFF-SITE MONITORING WELL LOCATION (GROUNDWATER ELEVATION)
- 1 — GROUNDWATER CONTOUR ELEVATION
- INFERRED GROUNDWATER FLOW DIRECTION

NOTES

1. BASEMAP TAKEN FROM HAYNES LAND SURVEYORS, DATED ON NOVEMBER 12, 2014.
2. MONITORING WELL TOP OF CASING ELEVATIONS WERE SURVEY BY LANGAN ON NOVEMBER 1, 2018.
3. GROUNDWATER ELEVATIONS ARE BASED ON A SYNOPTIC ROUND OF GROUNDWATER GAUGING ON OCTOBER 24, 2018.
4. GROUNDWATER CONTOURS INTERVAL IS 1 FOOT
5. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

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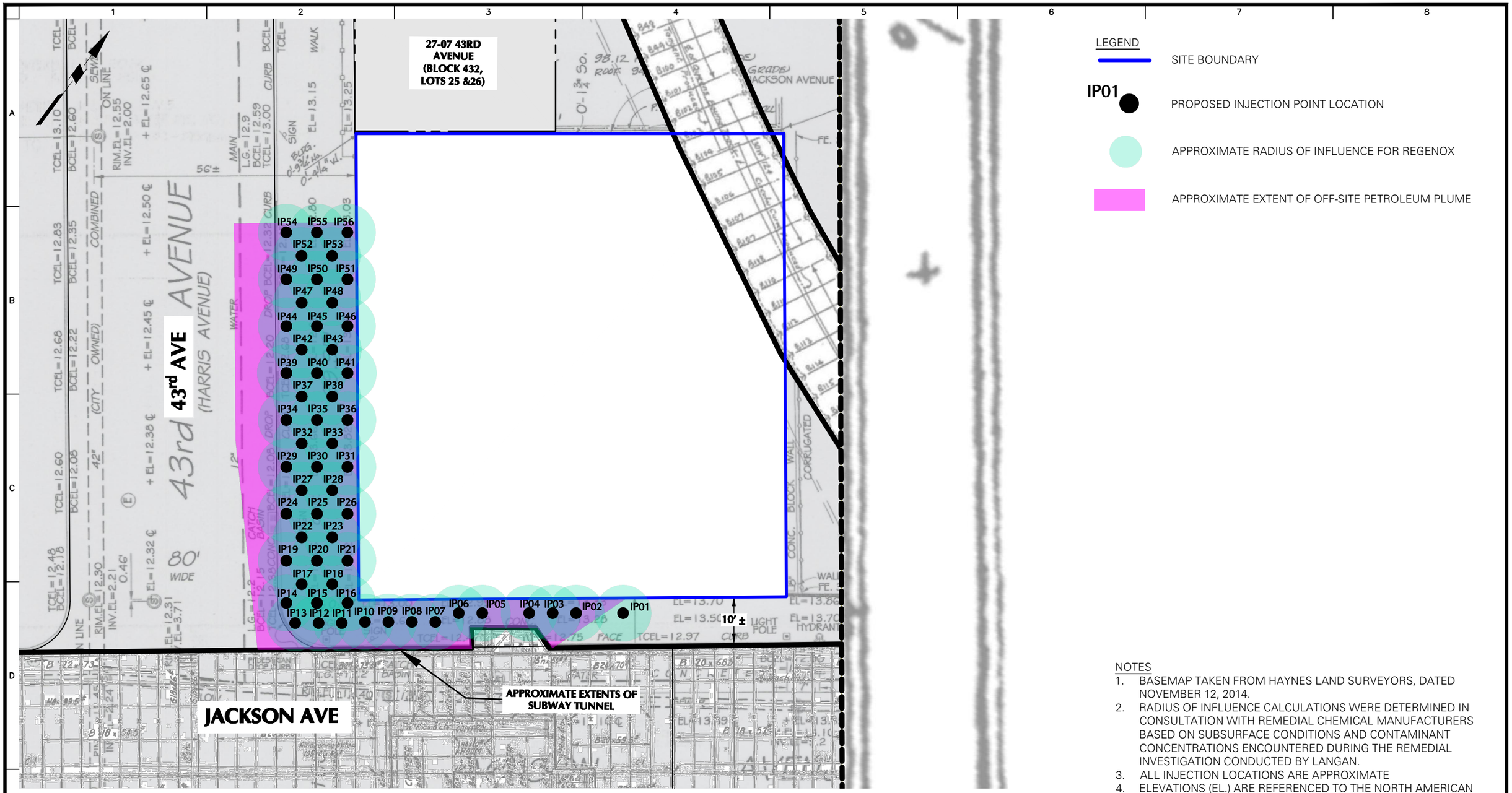
Project
27-01 JACKSON AVENUE
BLOCK No. 432 LOT No. 21
LONG ISLAND CITY NEW YORK

Drawing Title
GROUNDWATER ELEVATION CONTOUR MAP

Project No. 170472002
Date 10/2/2019
Drawn By JFY
Checked By KD

Drawing No. 3
Sheet 3 of 5

Filename: \\langan.com\data\NYC\data0\170472002\Project Data\CAD\02\SheetFiles\Off-Site In-Situ Treatment\Figure 3 - Groundwater Elevation Contour Map.dwg Date: 10/2/2019 Time: 16:49 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL



NOTES
1. BASEMAP TAKEN FROM HAYNES LAND SURVEYORS, DATED NOVEMBER 12, 2014.
2. RADIUS OF INFLUENCE CALCULATIONS WERE DETERMINED IN CONSULTATION WITH REMEDIAL CHEMICAL MANUFACTURERS BASED ON SUBSURFACE CONDITIONS AND CONTAMINANT CONCENTRATIONS ENCOUNTERED DURING THE REMEDIAL INVESTIGATION CONDUCTED BY LANGAN.
3. ALL INJECTION LOCATIONS ARE APPROXIMATE
4. ELEVATIONS (EL.) ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1983 (NAVD83).

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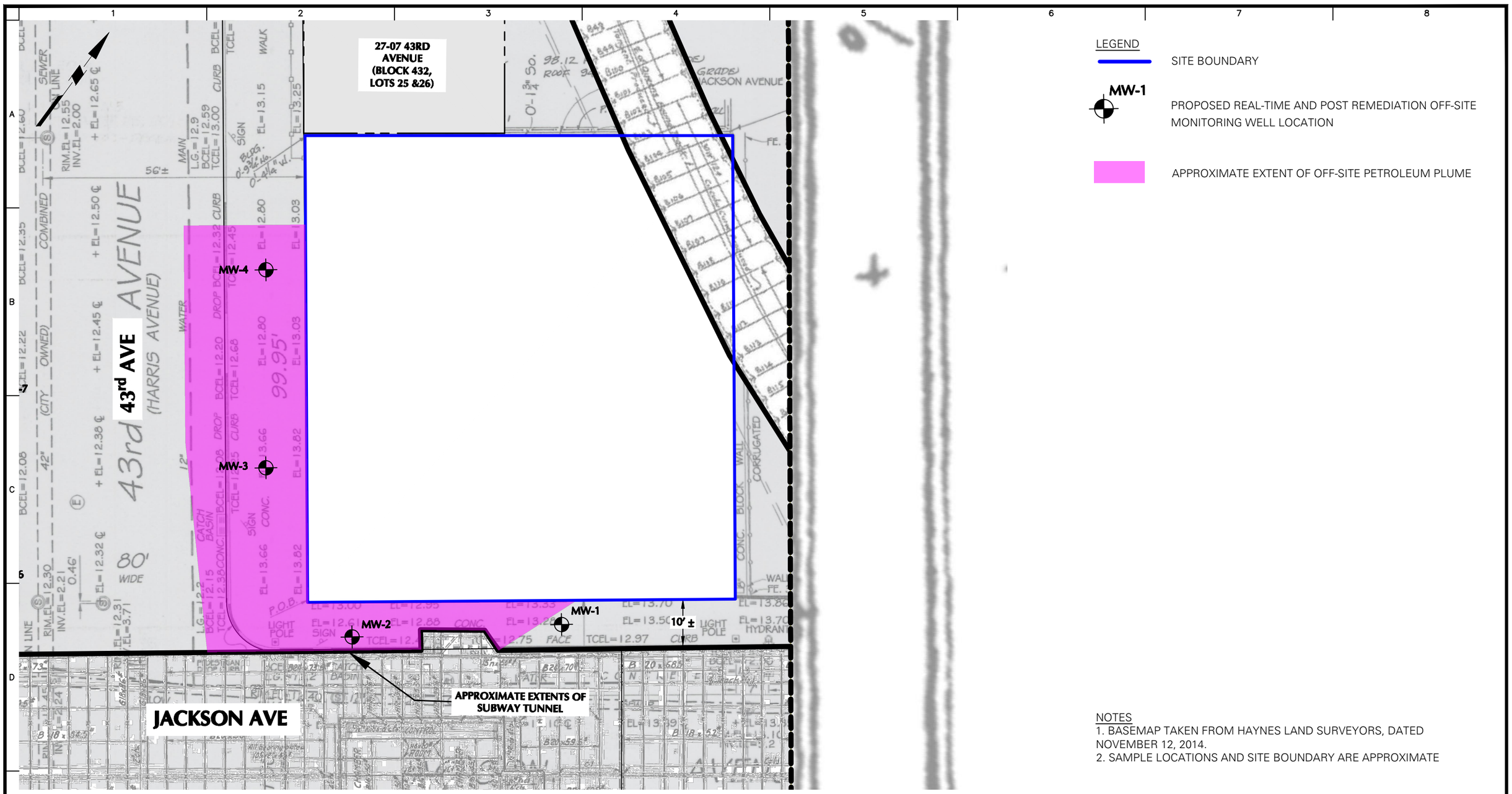
Project
27-01 JACKSON AVENUE
BLOCK No. 432 LOT No. 21
LONG ISLAND CITY NEW YORK

Figure Title
TREATMENT AREA LOCATION PLAN

Project No.	170472002
Date	1/22/2020
Drawn By	JFY
Checked By	KD

Figure No. 4
Sheet 4 of 5

Filename: \\langan.com\data\NYC\data0\170472002\Project Data\CAD\02\SheetFiles\Off-Site In-Situ Treatment\Figure 4 - Treatment Area Location Plan.dwg Date: 1/22/2020 Time: 17:21 User: lesmail Style Table: Langan.stb Layout: ANSIB-BL



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1. BASEMAP TAKEN FROM HAYNES LAND SURVEYORS, DATED NOVEMBER 12, 2014.
2. SAMPLE LOCATIONS AND SITE BOUNDARY ARE APPROXIMATE

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

20 0 10 20
SCALE IN FEET

LANGAN
Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
27-01 JACKSON AVENUE
BLOCK No. 432 LOT No. 21
LONG ISLAND CITY NEW YORK

Drawing Title
GROUNDWATER MONITORING PLAN

Project No.	170472002
Date	10/2/2019
Drawn By	JFY
Checked By	KD

Drawing No. 5
Sheet 5 of 5

Filename: \\langan.com\data\NYC\data0\170472002\Project Data\CAD\02\SheetFiles\Off-Site In-Situ Treatment\Figure 5 - Groundwater Monitoring Plan.dwg Date: 10/3/2019 Time: 09:12 User: jyanowitz Style Table: Langan.stb Layout: ANSIB-BL

APPENDIX A

LABORATORY ANALYTICAL DATA

ANALYTICAL REPORT

Lab Number:	L1906234
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Kimberly Del Col
Phone:	(212) 479-5486
Project Name:	27-01 JACKSON AVE.
Project Number:	170472002
Report Date:	02/25/19

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1906234
Report Date: 02/25/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1906234-01	SB106_19-21	SOIL	QUEENS, NY	02/15/19 12:00	02/15/19
L1906234-02	SB106_30-32	SOIL	QUEENS, NY	02/15/19 14:20	02/15/19
L1906234-03	SB112_9-11	SOIL	QUEENS, NY	02/15/19 09:30	02/15/19

Project Name:	27-01 JACKSON AVE.	**Lab Number:**	L1906234
Project Number:	170472002	**Report Date:**	02/25/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	27-01 JACKSON AVE.	**Lab Number:**	L1906234
Project Number:	170472002	**Report Date:**	02/25/19

Case Narrative (continued)

Report Submission

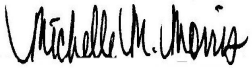
All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

The analysis of Alkalinity was subcontracted. A copy of the laboratory report is included as an addendum. Please note: This data is only available in PDF format and is not available on Data Merger.

Phosphate, Total

The WG1208094-3 MS recovery (180%), performed on L1906234-01, is outside the acceptance criteria; however, the associated LCS recovery is within criteria. No further action was taken.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Michelle M. Morris

Title: Technical Director/Representative Date: 02/25/19

ORGANICS

PETROLEUM HYDROCARBONS

Project Name: 27-01 JACKSON AVE.
Lab Number: L1906234
Project Number: 170472002
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-01
Client ID: SB106_19-21
Sample Location: QUEENS, NY

Date Collected: 02/15/19 12:00
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Analytical Method: 1,8015D(M)
Analytical Date: 02/16/19 15:34
Analyst: MZ
Percent Solids: 79%

Extraction Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Gasoline Range Organics - Westborough Lab						
Gasoline Range Organics	31000		ug/kg	3100	60.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	117		70-130
4-Bromofluorobenzene	116		70-130

Project Name: 27-01 JACKSON AVE.
Lab Number: L1906234
Project Number: 170472002
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-01
Client ID: SB106_19-21
Sample Location: QUEENS, NY

Date Collected: 02/15/19 12:00
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Analytical Method: 1,8015D(M)
Analytical Date: 02/19/19 23:47
Analyst: SC
Percent Solids: 79%

Extraction Method: EPA 3546
Extraction Date: 02/19/19 09:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbon Quantitation - Westborough Lab						
TPH	181000		ug/kg	41600	4790	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	77		40-140

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1906234
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-02
Client ID: SB106_30-32
Sample Location: QUEENS, NY

Date Collected: 02/15/19 14:20
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Analytical Method: 1,8015D(M)
Analytical Date: 02/16/19 16:15
Analyst: MZ
Percent Solids: 87%

Extraction Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Gasoline Range Organics - Westborough Lab						
Gasoline Range Organics	1000	J	ug/kg	2700	52.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	110		70-130
4-Bromofluorobenzene	114		70-130

Project Name: 27-01 JACKSON AVE.
Lab Number: L1906234
Project Number: 170472002
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-02
Client ID: SB106_30-32
Sample Location: QUEENS, NY

Date Collected: 02/15/19 14:20
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Analytical Method: 1,8015D(M)
Analytical Date: 02/19/19 22:42
Analyst: SC
Percent Solids: 87%

Extraction Method: EPA 3546
Extraction Date: 02/19/19 09:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbon Quantitation - Westborough Lab						
TPH	ND		ug/kg	37700	4340	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	70		40-140

Project Name: 27-01 JACKSON AVE.
Lab Number: L1906234
Project Number: 170472002
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-03
Client ID: SB112_9-11
Sample Location: QUEENS, NY

Date Collected: 02/15/19 09:30
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Analytical Method: 1,8015D(M)
Analytical Date: 02/16/19 16:55
Analyst: MZ
Percent Solids: 82%

Extraction Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Gasoline Range Organics - Westborough Lab						
Gasoline Range Organics	2800		ug/kg	2700	53.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	109		70-130
4-Bromofluorobenzene	116		70-130

Project Name: 27-01 JACKSON AVE.
Lab Number: L1906234
Project Number: 170472002
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-03
Client ID: SB112_9-11
Sample Location: QUEENS, NY

Date Collected: 02/15/19 09:30
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Analytical Method: 1,8015D(M)
Analytical Date: 02/19/19 23:15
Analyst: SC
Percent Solids: 82%

Extraction Method: EPA 3546
Extraction Date: 02/19/19 09:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbon Quantitation - Westborough Lab						
TPH	ND		ug/kg	40100	4610	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	69		40-140

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1906234
Report Date: 02/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8015D(M)
Analytical Date: 02/19/19 05:16
Analyst: SC

Extraction Method: EPA 3546
Extraction Date: 02/18/19 23:12

Parameter	Result	Qualifier	Units	RL	MDL
Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 01-03 Batch: WG1207954-1					
TPH	ND		ug/kg	31300	3600

Surrogate	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	81		40-140

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1906234
Report Date: 02/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8015D(M)
Analytical Date: 02/16/19 10:07
Analyst: MZ

Parameter	Result	Qualifier	Units	RL	MDL
Gasoline Range Organics - Westborough Lab for sample(s): 01-03 Batch: WG1208117-4					
Gasoline Range Organics	760	J	ug/kg	2500	48.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	109		70-130
4-Bromofluorobenzene	112		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1906234

Report Date: 02/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01-03 Batch: WG1207954-2								
TPH	89		-		40-140	-		40

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
o-Terphenyl	83				40-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1906234

Report Date: 02/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Gasoline Range Organics - Westborough Lab	Associated sample(s): 01-03		Batch: WG1208117-2 WG1208117-3					
Gasoline Range Organics	106		104		80-120	2		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,1,1-Trifluorotoluene	112		110		70-130
4-Bromofluorobenzene	115		113		70-130

METALS

Project Name: 27-01 JACKSON AVE.
Lab Number: L1906234
Project Number: 170472002
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-01
Client ID: SB106_19-21
Sample Location: QUEENS, NY
Date Collected: 02/15/19 12:00
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Percent Solids: 79%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Iron, Total	10600		mg/kg	2.48	0.448	1	02/19/19 21:00	02/20/19 14:42	EPA 3050B	1,6010D	AB
Manganese, Total	112		mg/kg	0.496	0.079	1	02/19/19 21:00	02/20/19 14:42	EPA 3050B	1,6010D	AB

Project Name: 27-01 JACKSON AVE.
Lab Number: L1906234
Project Number: 170472002
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-02
Client ID: SB106_30-32
Sample Location: QUEENS, NY
Date Collected: 02/15/19 14:20
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Percent Solids: 87%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Iron, Total	12100		mg/kg	2.28	0.412	1	02/19/19 21:00	02/20/19 14:47	EPA 3050B	1,6010D	AB
Manganese, Total	194		mg/kg	0.456	0.073	1	02/19/19 21:00	02/20/19 14:47	EPA 3050B	1,6010D	AB

Project Name: 27-01 JACKSON AVE.
Lab Number: L1906234
Project Number: 170472002
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-03
Client ID: SB112_9-11
Sample Location: QUEENS, NY
Date Collected: 02/15/19 09:30
Date Received: 02/15/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil
Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Iron, Total	14500		mg/kg	2.37	0.428	1	02/19/19 21:00	02/20/19 14:52	EPA 3050B	1,6010D	AB
Manganese, Total	260		mg/kg	0.474	0.075	1	02/19/19 21:00	02/20/19 14:52	EPA 3050B	1,6010D	AB

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1906234
Report Date: 02/25/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1208260-1										
Iron, Total	ND		mg/kg	2.00	0.361	1	02/19/19 21:00	02/20/19 13:32	1,6010D	AB
Manganese, Total	ND		mg/kg	0.400	0.064	1	02/19/19 21:00	02/20/19 13:32	1,6010D	AB

Prep Information

Digestion Method: EPA 3050B

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1906234

Report Date: 02/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1208260-2 SRM Lot Number: D101-540								
Iron, Total	105		-		62-138	-		
Manganese, Total	102		-		82-118	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1906234
Report Date: 02/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1208260-3 WG1208260-4 QC Sample: L1906393-06 Client ID: MS Sample												
Iron, Total	13800	89	16700	**3260**	Q	12900	**0**	Q	75-125	**26**	Q	20
Manganese, Total	166	44.5	270	**234**	Q	259	**209**	Q	75-125	4		20

INORGANICS
&
MISCELLANEOUS

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1906234
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-01
Client ID: SB106_19-21
Sample Location: QUEENS, NY
Sample Depth:
Matrix: Soil

Date Collected: 02/15/19 12:00
Date Received: 02/15/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	304		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
Total Organic Carbon (Rep2)	458		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
Total Organic Carbon (Average)	381		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
General Chemistry - Westborough Lab										
Solids, Total	79.3		%	0.100	NA	1	-	02/19/19 12:37	121,2540G	RI
Nitrogen, Ammonia	12		mg/kg	9.1	3.4	1	02/17/19 15:30	02/18/19 20:46	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/kg	1.2	0.32	1	-	02/18/19 20:31	121,4500NO3-F	MR
Nitrogen, Nitrate	0.40	J	mg/kg	1.2	0.30	1	-	02/18/19 20:31	121,4500NO3-F	MR
Phosphate, Total	2400		mg/kg	72	72.	3.8	-	02/19/19 11:00	121,4500P-E(M)	SD
Sulfate	36	J	mg/kg	130	17.	1	-	02/18/19 21:55	1,9038	JR

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1906234
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-02
Client ID: SB106_30-32
Sample Location: QUEENS, NY
Sample Depth:
Matrix: Soil

Date Collected: 02/15/19 14:20
Date Received: 02/15/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	113		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
Total Organic Carbon (Rep2)	139		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
Total Organic Carbon (Average)	126		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
General Chemistry - Westborough Lab										
Solids, Total	87.2		%	0.100	NA	1	-	02/19/19 12:37	121,2540G	RI
Nitrogen, Ammonia	9.6		mg/kg	8.5	3.2	1	02/17/19 15:30	02/18/19 20:52	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/kg	0.99	0.28	1	-	02/18/19 20:45	121,4500NO3-F	MR
Nitrogen, Nitrate	0.27	J	mg/kg	0.99	0.26	1	-	02/18/19 20:45	121,4500NO3-F	MR
Phosphate, Total	1600		mg/kg	70	70.	4.1	-	02/19/19 11:00	121,4500P-E(M)	SD
Sulfate	24	J	mg/kg	110	16.	1	-	02/18/19 21:55	1,9038	JR

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1906234
Report Date: 02/25/19

SAMPLE RESULTS

Lab ID: L1906234-03
Client ID: SB112_9-11
Sample Location: QUEENS, NY
Sample Depth:
Matrix: Soil

Date Collected: 02/15/19 09:30
Date Received: 02/15/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	ND		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
Total Organic Carbon (Rep2)	323		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
Total Organic Carbon (Average)	198		mg/kg	100	100.	1	-	02/20/19 11:02	1,9060A	SP
General Chemistry - Westborough Lab										
Solids, Total	82.1		%	0.100	NA	1	-	02/19/19 12:37	121,2540G	RI
Nitrogen, Ammonia	6.6	J	mg/kg	7.8	2.9	1	02/17/19 15:30	02/18/19 20:53	121,4500NH3-BH	AT
Nitrogen, Nitrite	ND		mg/kg	1.1	0.30	1	-	02/18/19 20:46	121,4500NO3-F	MR
Nitrogen, Nitrate	ND		mg/kg	1.1	0.28	1	-	02/18/19 20:46	121,4500NO3-F	MR
Phosphate, Total	2100		mg/kg	82	82.	4.5	-	02/19/19 11:00	121,4500P-E(M)	SD
Sulfate	25	J	mg/kg	120	16.	1	-	02/18/19 21:55	1,9038	JR

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1906234
Report Date: 02/25/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1207598-1										
Nitrogen, Ammonia	4.7	J	mg/kg	7.5	0.02	1	02/17/19 15:30	02/18/19 20:44	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1207905-1										
Nitrogen, Nitrate	ND		mg/kg	1.0	0.03	1	-	02/18/19 20:14	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1207906-1										
Nitrogen, Nitrite	ND		mg/kg	1.0	0.03	1	-	02/18/19 20:17	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1207936-1										
Sulfate	19	J	mg/kg	100	14.	1	-	02/18/19 21:55	1,9038	JR
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1208094-1										
Phosphate, Total	ND		mg/kg	15	15.	1	-	02/19/19 11:00	121,4500P-E(M)	SD

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1906234

Report Date: 02/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1207598-2								
Nitrogen, Ammonia	99		-		83-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1207905-2								
Nitrogen, Nitrate	97		-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1207906-2								
Nitrogen, Nitrite	100		-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1207936-2								
Sulfate	101		-		80-121	-		12
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1208094-2								
Phosphate, Total	89		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1906234
Report Date: 02/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1207598-4 QC Sample: L1906234-01 Client ID: SB106_19-21												
Nitrogen, Ammonia	12	450	400	86		-	-		55-144	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1207905-4 QC Sample: L1906234-01 Client ID: SB106_19-21												
Nitrogen, Nitrate	0.40J	96	96	100		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1207906-4 QC Sample: L1906234-01 Client ID: SB106_19-21												
Nitrogen, Nitrite	ND	87	91	105		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1207936-4 QC Sample: L1906234-01 Client ID: SB106_19-21												
Sulfate	36J	252	290	110		-	-		22-183	-		12
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1208094-3 QC Sample: L1906234-01 Client ID: SB106_19-21												
Phosphate, Total	2400	900	4000	**180**	Q	-	-		75-125	-		25

Lab Duplicate Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1906234

Report Date: 02/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1207598-3 QC Sample: L1906234-01 Client ID: SB106_19-21						
Nitrogen, Ammonia	12	8.5J	mg/kg	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1207905-3 QC Sample: L1906234-01 Client ID: SB106_19-21						
Nitrogen, Nitrate	0.40J	0.34J	mg/kg	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1207906-3 QC Sample: L1906234-01 Client ID: SB106_19-21						
Nitrogen, Nitrite	ND	ND	mg/kg	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1207936-3 QC Sample: L1906234-01 Client ID: SB106_19-21						
Sulfate	36J	36J	mg/kg	NC		12
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1208094-4 QC Sample: L1906234-01 Client ID: SB106_19-21						
Phosphate, Total	2400	2300	mg/kg	4		25
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1208137-1 QC Sample: L1906329-01 Client ID: DUP Sample						
Solids, Total	83.0	83.0	%	0		20

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1906234
Report Date: 02/25/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1906234-01A	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.5	Y	Absent		FE-TI(180),MN-TI(180),A2-TOC9060-2REPS-PPM(28)
L1906234-01B	Vial Large Septa unpreserved (4oz)	A	NA		2.5	Y	Absent		TPH-GRO(14)
L1906234-01B9	Vial MeOH preserved split	A	NA		2.5	Y	Absent		TPH-GRO(14)
L1906234-01C	Glass 250ml/8oz unpreserved	A	NA		2.5	Y	Absent		SUB-ALKALINITY()
L1906234-01D	Glass 250ml/8oz unpreserved	A	NA		2.5	Y	Absent		TPO4-4500(28),SO4-9038(28),TS(7),NO3-4500(2),NO2-4500NO3(2),TPH-DRO-D(14),NH3-4500(28)
L1906234-02A	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.5	Y	Absent		FE-TI(180),MN-TI(180),A2-TOC9060-2REPS-PPM(28)
L1906234-02B	Vial Large Septa unpreserved (4oz)	A	NA		2.5	Y	Absent		TPH-GRO(14)
L1906234-02B9	Vial MeOH preserved split	A	NA		2.5	Y	Absent		TPH-GRO(14)
L1906234-02C	Glass 250ml/8oz unpreserved	A	NA		2.5	Y	Absent		SUB-ALKALINITY()
L1906234-02D	Glass 250ml/8oz unpreserved	A	NA		2.5	Y	Absent		TPO4-4500(28),SO4-9038(28),TS(7),NO3-4500(2),NO2-4500NO3(2),TPH-DRO-D(14),NH3-4500(28)
L1906234-03A	Metals Only-Glass 60mL/2oz unpreserved	A	NA		2.5	Y	Absent		FE-TI(180),MN-TI(180),A2-TOC9060-2REPS-PPM(28)
L1906234-03B	Vial Large Septa unpreserved (4oz)	A	NA		2.5	Y	Absent		TPH-GRO(14)
L1906234-03B9	Vial MeOH preserved split	A	NA		2.5	Y	Absent		TPH-GRO(14)
L1906234-03C	Glass 250ml/8oz unpreserved	A	NA		2.5	Y	Absent		SUB-ALKALINITY()
L1906234-03D	Glass 250ml/8oz unpreserved	A	NA		2.5	Y	Absent		TPO4-4500(28),SO4-9038(28),TS(7),NO3-4500(2),NO2-4500NO3(2),TPH-DRO-D(14),NH3-4500(28)

*Values in parentheses indicate holding time in days

Project Name:	27-01 JACKSON AVE.	**Lab Number:**	L1906234
Project Number:	170472002	**Report Date:**	02/25/19

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total'

result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Project Name:	27-01 JACKSON AVE.	**Lab Number:**	L1906234
Project Number:	170472002	**Report Date:**	02/25/19

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 1

Date Rec'd in Lab: 2/16/19

ALPHA Job #: L1906334

Client Information
Client: Langan Engineering
Address: 360 W. 31st Street 8th
New York, NY 10001
Phone: 212-479-5400
Fax: 212-479-5444
Email: KDelCol@langan.com

Project Information
Project Name: 27-01 Jackson Ave
Project Location: Queens, NY
Project #: 170472002
(Use Project name as Project #)
Project Manager: Kim Del Col
ALPHAQuote #:

Turn-Around Time
Standard [X] Due Date:
Rush (only if pre approved) [ ] # of Days:

Deliverables
[ ] ASP-A [ ] ASP-B
[ ] EQuIS (1 File) [X] EQuIS (4 File)
[ ] Other

Billing Information
[ ] Same as Client Info
PO #

Regulatory Requirement
[ ] NY TOGS [ ] NY Part 375
[ ] AWQ Standards [ ] NY CP-51
[ ] NY Restricted Use [ ] Other
[ ] NY Unrestricted Use
[ ] NYC Sewer Discharge

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
[ ] NJ [ ] NY
[ ] Other:

These samples have been previously analyzed by Alpha [ ]

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
[ ] Done
[ ] Lab to do
Preservation
[ ] Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TPH DRO + GRO	TOC	nitrate, nitrite	ammonia, sulfate	phosphate	iron, manganese	alkalinity	Total Bottle	Sample Specific Comments
06234-01	SB106-19-21	2/15/19	1200	S	JR	X	X	X	X	X	X	X		
-02	SB106_30-32	"	1420	"	"	X	X	X	X	X	X	X		
-03	SB112_9-11	"	0930	"	"	X	X	X	X	X	X	X		
-04	~~SB106_29-32~~	~~"~~	~~1410~~	~~"~~	~~"~~									
	JR 2/15/19													

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type								
Preservative								

Relinquished By:	Date/Time	Received By:	Date/Time
JR	2/15/19 15:20	PS	2/15/19 15:20
PS	2/15/19 19:15	Paul Magella	2/15/19 1943
Paul Magella	2/16/19 00:33		2/16/19 0033

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

Envirotest
315 Fullerton Avenue
Newburgh, NY 12550

Alpha Job Number
L1906234

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 201.812.2633
Email: brao@alphalab.com

Project Information

Project Location: NY
Project Manager: Ben Rao

Turnaround & Deliverables Information

Due Date: 02/22/19
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L1906234

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	SB106_19-21	02-15-19 12:00	SOIL	ALKALINITY	
	SB106_30-32	02-15-19 14:20	SOIL	ALKALINITY	
	SB112_9-11	02-15-19 09:30	SOIL	ALKALINITY	

Relinquished By:	Date/Time:	Received By:	Date/Time:
[signature] SAR	2/18/19		

Form No: AL_subcoc

EnviroTest Laboratories Inc.

ANALYTICAL REPORT

Job Number:

420-149583

Job Description:

L1906234

For:
Alpha Analytical
Eight Walkup Drive
Westborough, MA 01581

Ben Rao

Renee Cusack
Customer Service Manager
2/25/2019

EnviroTest Laboratories, Inc. Certifications and Approvals: NYSDOH 10142, NJDEP NY015, CTDOPH PH-0554

EnviroTest Laboratories, Inc.
315 Fullerton Avenue
Newburgh, NY 12550
Tel (845)562-0890 Fax (845)562-0841 www.envirotestlaboratories.com

Analytical Data

Client: Alpha Analytical **Job Number: 420-149583**

Client Sample ID: SB106_19-21

Lab Sample ID: 420-149583-1 **Date Sampled: 2/15/2019**
Client Matrix: Soil **Date Received: 2/19/2019**

Method: SM2320B
Date Analyzed: 2/20/2019 11:40

Analyte	Result (mg/Kg Dry)	Qualifier	RL	RL
Alkalinity	13970		3480	3480

Client Sample ID: SB106_30-32

Lab Sample ID: 420-149583-2 **Date Sampled: 2/15/2019**
Client Matrix: Soil **Date Received: 2/19/2019**

Method: SM2320B
Date Analyzed: 2/20/2019 11:40

Analyte	Result (mg/Kg Dry)	Qualifier	RL	RL
Alkalinity	2970	U	2970	2970

Client Sample ID: SB112_9-11

Lab Sample ID: 420-149583-3 **Date Sampled: 2/15/2019**
Client Matrix: Soil **Date Received: 2/19/2019**

Method: SM2320B
Date Analyzed: 2/20/2019 11:40

Analyte	Result (mg/Kg Dry)	Qualifier	RL	RL
Alkalinity	3240	U	3240	3240

DATA REPORTING QUALIFIERS

Client: Alpha Analytical **Job Number: 420-149583**

Qualifier	Description
U	The analyte was analyzed for but not detected at or above the stated limit.
g	Result fails applicable NYS drinking water standards.
*	LCS or LCSD exceeds the control limits.
H	Sample was prepped or analyzed beyond the specified holding time.
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
E	Result exceeded calibration range, secondary dilution required.
B	The compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

149583

Subcontract Chain of Custody

Envirotest
315 Fullerton Avenue
Newburgh, NY 12550

Alpha Job Number
L1906234

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 201.812.2633
Email: brao@alphalab.com

Project Information

Project Location: NY
Project Manager: Ben Rao

Turnaround & Deliverables Information

Due Date: 02/22/19
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L1906234

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	SB106_19-21	02-15-19 12:00	SOIL	ALKALINITY	
	SB106_30-32	02-15-19 14:20	SOIL	ALKALINITY	
	SB112_9-11	02-15-19 09:30	SOIL	ALKALINITY	

420-149583-A-1
SB106_19-21
Date Sampled: 2/15/2019 420-1302802

Relinquished By:	Date/Time:	Received By:	Date/Time:
	2/18/19		02/19/19 @ 10:40

Form No: AL_subcoc

UPS NEXT DAY 1Z E30 654 01 9926 0831
IR#4 1.5°C ICE ✓

4

LOGIN SAMPLE RECEIPT CHECK LIST

Client: Alpha Analytical **Job Number: 420-149583**

Question	T/F/NA	Comment
Samples were collected by ETL employee as per SOP-SAM-1	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	TRUE	
Samples were received on ice.	TRUE	
Cooler Temperature is recorded.	TRUE	1.5C
Cooler Temp. is within method specified range. (0-6 C PW, 0-8 C NPW, or BAC <10C)	TRUE	
If false, was sample received on ice within 6 hours of collection.	TRUE	
Based on above criteria cooler temperature is acceptable.	TRUE	
COC is present.	TRUE	
COC is filled out in ink and legible.	TRUE	
COC is filled out with all pertinent information.	TRUE	
There are no discrepancies between the sample IDs on the containers and the COC.	TRUE	
Samples are received within Holding Time.	TRUE	
Sample containers have legible labels.	TRUE	
Containers are not broken or leaking.	TRUE	
Sample collection date/times are provided.	TRUE	
Appropriate sample containers are used.	TRUE	
Sample bottles are completely filled.	TRUE	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	TRUE	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	TRUE	
Multiphasic samples are not present.	TRUE	
Samples do not require splitting or compositing.	TRUE	

ANALYTICAL REPORT

Lab Number:	L1908135
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Kimberly Del Col
Phone:	(212) 479-5486
Project Name:	27-01 JACKSON AVE.
Project Number:	170472002
Report Date:	03/08/19

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1908135-01	MW-2_030119	WATER	LONG ISLAND CITY, NY	03/01/19 11:06	03/01/19

Project Name:	27-01 JACKSON AVE.	**Lab Number:**	L1908135
Project Number:	170472002	**Report Date:**	03/08/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	27-01 JACKSON AVE.	**Lab Number:**	L1908135
Project Number:	170472002	**Report Date:**	03/08/19

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Dissolved Metals

The WG1212313-3 MS recoveries for iron (137%) and sodium (0%), performed on L1908135-01, do not apply because the sample concentrations are greater than four times the spike amount added.

The WG1212313-3 MS recoveries, performed on L1908135-01, are outside the acceptance criteria for antimony (138%) and magnesium (126%). A post digestion spike was performed and was within acceptance criteria.

Nitrogen, Nitrate

L1908135-01: The sample was analyzed for Nitrite within the method required holding time. An aliquot of sample was then preserved and analyzed for Nitrate.

Total Organic Carbon

L1908135-01: The sample has an elevated detection limit due to the dilution required by the sample matrix.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Cristin Walker

Title: Technical Director/Representative Date: 03/08/19

ORGANICS

VOLATILES

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01 D
Client ID: MW-2_030119
Sample Location: LONG ISLAND CITY, NY

Date Collected: 03/01/19 11:06
Date Received: 03/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 03/06/19 17:36
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	5.0	1.4	2
1,1-Dichloroethane	ND		ug/l	5.0	1.4	2
Chloroform	ND		ug/l	5.0	1.4	2
Carbon tetrachloride	ND		ug/l	1.0	0.27	2
1,2-Dichloropropane	ND		ug/l	2.0	0.27	2
Dibromochloromethane	ND		ug/l	1.0	0.30	2
1,1,2-Trichloroethane	ND		ug/l	3.0	1.0	2
Tetrachloroethene	ND		ug/l	1.0	0.36	2
Chlorobenzene	ND		ug/l	5.0	1.4	2
Trichlorofluoromethane	ND		ug/l	5.0	1.4	2
1,2-Dichloroethane	ND		ug/l	1.0	0.26	2
1,1,1-Trichloroethane	ND		ug/l	5.0	1.4	2
Bromodichloromethane	ND		ug/l	1.0	0.38	2
trans-1,3-Dichloropropene	ND		ug/l	1.0	0.33	2
cis-1,3-Dichloropropene	ND		ug/l	1.0	0.29	2
1,3-Dichloropropene, Total	ND		ug/l	1.0	0.29	2
1,1-Dichloropropene	ND		ug/l	5.0	1.4	2
Bromoform	ND		ug/l	4.0	1.3	2
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	0.33	2
Benzene	0.79	J	ug/l	1.0	0.32	2
Toluene	6.4		ug/l	5.0	1.4	2
Ethylbenzene	84		ug/l	5.0	1.4	2
Chloromethane	ND		ug/l	5.0	1.4	2
Bromomethane	ND		ug/l	5.0	1.4	2
Vinyl chloride	ND		ug/l	2.0	0.14	2
Chloroethane	ND		ug/l	5.0	1.4	2
1,1-Dichloroethene	ND		ug/l	1.0	0.34	2
trans-1,2-Dichloroethene	ND		ug/l	5.0	1.4	2

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01 D
Client ID: MW-2_030119
Sample Location: LONG ISLAND CITY, NY

Date Collected: 03/01/19 11:06
Date Received: 03/01/19
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	0.35	2
1,2-Dichlorobenzene	ND		ug/l	5.0	1.4	2
1,3-Dichlorobenzene	ND		ug/l	5.0	1.4	2
1,4-Dichlorobenzene	ND		ug/l	5.0	1.4	2
Methyl tert butyl ether	ND		ug/l	5.0	1.4	2
p/m-Xylene	220		ug/l	5.0	1.4	2
o-Xylene	2.6	J	ug/l	5.0	1.4	2
Xylenes, Total	220	J	ug/l	5.0	1.4	2
cis-1,2-Dichloroethene	ND		ug/l	5.0	1.4	2
1,2-Dichloroethene, Total	ND		ug/l	5.0	1.4	2
Dibromomethane	ND		ug/l	10	2.0	2
1,2,3-Trichloropropane	6.6		ug/l	5.0	1.4	2
Acrylonitrile	ND		ug/l	10	3.0	2
Styrene	ND		ug/l	5.0	1.4	2
Dichlorodifluoromethane	ND		ug/l	10	2.0	2
Acetone	ND		ug/l	10	2.9	2
Carbon disulfide	ND		ug/l	10	2.0	2
2-Butanone	ND		ug/l	10	3.9	2
Vinyl acetate	ND		ug/l	10	2.0	2
4-Methyl-2-pentanone	ND		ug/l	10	2.0	2
2-Hexanone	ND		ug/l	10	2.0	2
Bromochloromethane	ND		ug/l	5.0	1.4	2
2,2-Dichloropropane	ND		ug/l	5.0	1.4	2
1,2-Dibromoethane	ND		ug/l	4.0	1.3	2
1,3-Dichloropropane	ND		ug/l	5.0	1.4	2
1,1,1,2-Tetrachloroethane	ND		ug/l	5.0	1.4	2
Bromobenzene	ND		ug/l	5.0	1.4	2
n-Butylbenzene	21		ug/l	5.0	1.4	2
sec-Butylbenzene	11		ug/l	5.0	1.4	2
tert-Butylbenzene	ND		ug/l	5.0	1.4	2
o-Chlorotoluene	ND		ug/l	5.0	1.4	2
p-Chlorotoluene	ND		ug/l	5.0	1.4	2
1,2-Dibromo-3-chloropropane	ND		ug/l	5.0	1.4	2
Hexachlorobutadiene	ND		ug/l	5.0	1.4	2
Isopropylbenzene	16		ug/l	5.0	1.4	2
p-Isopropyltoluene	6.6		ug/l	5.0	1.4	2
Naphthalene	22		ug/l	5.0	1.4	2

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01 D
Client ID: MW-2_030119
Sample Location: LONG ISLAND CITY, NY

Date Collected: 03/01/19 11:06
Date Received: 03/01/19
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
n-Propylbenzene	46		ug/l	5.0	1.4	2
1,2,3-Trichlorobenzene	ND		ug/l	5.0	1.4	2
1,2,4-Trichlorobenzene	ND		ug/l	5.0	1.4	2
1,3,5-Trimethylbenzene	90		ug/l	5.0	1.4	2
1,2,4-Trimethylbenzene	300		ug/l	5.0	1.4	2
1,4-Dioxane	ND		ug/l	500	120	2
p-Diethylbenzene	180		ug/l	4.0	1.4	2
p-Ethyltoluene	160		ug/l	4.0	1.4	2
1,2,4,5-Tetramethylbenzene	77		ug/l	4.0	1.1	2
Ethyl ether	ND		ug/l	5.0	1.4	2
trans-1,4-Dichloro-2-butene	ND		ug/l	5.0	1.4	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	91		70-130

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 03/06/19 08:38
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1213330-5					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.14
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,3-Dichloropropene, Total	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.07
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.17
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.18

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 03/06/19 08:38
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1213330-5					
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
Xylenes, Total	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
1,2-Dichloroethene, Total	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.5
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.9
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 03/06/19 08:38
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1213330-5					
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
1,4-Dioxane	ND		ug/l	250	61.
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.54
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	97		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1213330-3 WG1213330-4								
Methylene chloride	98		100		70-130	2		20
1,1-Dichloroethane	100		110		70-130	10		20
Chloroform	97		98		70-130	1		20
Carbon tetrachloride	93		92		63-132	1		20
1,2-Dichloropropane	110		110		70-130	0		20
Dibromochloromethane	100		100		63-130	0		20
1,1,2-Trichloroethane	100		100		70-130	0		20
Tetrachloroethene	96		96		70-130	0		20
Chlorobenzene	100		100		75-130	0		20
Trichlorofluoromethane	89		89		62-150	0		20
1,2-Dichloroethane	99		100		70-130	1		20
1,1,1-Trichloroethane	94		95		67-130	1		20
Bromodichloromethane	100		100		67-130	0		20
trans-1,3-Dichloropropene	94		96		70-130	2		20
cis-1,3-Dichloropropene	95		98		70-130	3		20
1,1-Dichloropropene	94		95		70-130	1		20
Bromoform	99		100		54-136	1		20
1,1,2,2-Tetrachloroethane	110		110		67-130	0		20
Benzene	96		99		70-130	3		20
Toluene	99		100		70-130	1		20
Ethylbenzene	100		100		70-130	0		20
Chloromethane	120		120		64-130	0		20
Bromomethane	64		64		39-139	0		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1213330-3 WG1213330-4								
Vinyl chloride	100		100		55-140	0		20
Chloroethane	86		86		55-138	0		20
1,1-Dichloroethene	93		94		61-145	1		20
trans-1,2-Dichloroethene	93		95		70-130	2		20
Trichloroethene	95		97		70-130	2		20
1,2-Dichlorobenzene	99		100		70-130	1		20
1,3-Dichlorobenzene	98		100		70-130	2		20
1,4-Dichlorobenzene	97		99		70-130	2		20
Methyl tert butyl ether	93		95		63-130	2		20
p/m-Xylene	105		105		70-130	0		20
o-Xylene	100		105		70-130	5		20
cis-1,2-Dichloroethene	97		100		70-130	3		20
Dibromomethane	92		94		70-130	2		20
1,2,3-Trichloropropane	110		110		64-130	0		20
Acrylonitrile	100		110		70-130	10		20
Styrene	100		100		70-130	0		20
Dichlorodifluoromethane	90		89		36-147	1		20
Acetone	100		100		58-148	0		20
Carbon disulfide	100		100		51-130	0		20
2-Butanone	82		79		63-138	4		20
Vinyl acetate	110		110		70-130	0		20
4-Methyl-2-pentanone	120		120		59-130	0		20
2-Hexanone	100		100		57-130	0		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1213330-3 WG1213330-4								
Bromochloromethane	100		110		70-130	10		20
2,2-Dichloropropane	95		95		63-133	0		20
1,2-Dibromoethane	100		100		70-130	0		20
1,3-Dichloropropane	100		100		70-130	0		20
1,1,1,2-Tetrachloroethane	100		100		64-130	0		20
Bromobenzene	100		100		70-130	0		20
n-Butylbenzene	110		110		53-136	0		20
sec-Butylbenzene	110		110		70-130	0		20
tert-Butylbenzene	110		110		70-130	0		20
o-Chlorotoluene	98		100		70-130	2		20
p-Chlorotoluene	100		110		70-130	10		20
1,2-Dibromo-3-chloropropane	92		100		41-144	8		20
Hexachlorobutadiene	100		100		63-130	0		20
Isopropylbenzene	100		110		70-130	10		20
p-Isopropyltoluene	110		110		70-130	0		20
Naphthalene	100		110		70-130	10		20
n-Propylbenzene	100		110		69-130	10		20
1,2,3-Trichlorobenzene	98		100		70-130	2		20
1,2,4-Trichlorobenzene	97		100		70-130	3		20
1,3,5-Trimethylbenzene	110		110		64-130	0		20
1,2,4-Trimethylbenzene	110		110		70-130	0		20
1,4-Dioxane	118		114		56-162	3		20
p-Diethylbenzene	110		110		70-130	0		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1213330-3 WG1213330-4								
p-Ethyltoluene	100		110		70-130	10		20
1,2,4,5-Tetramethylbenzene	100		110		70-130	10		20
Ethyl ether	92		93		59-134	1		20
trans-1,4-Dichloro-2-butene	110		110		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	102		103		70-130
Toluene-d8	100		100		70-130
4-Bromofluorobenzene	103		103		70-130
Dibromofluoromethane	97		95		70-130

SEMIVOLATILES

Project Name: 27-01 JACKSON AVE.
Lab Number: L1908135
Project Number: 170472002
Report Date: 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01
Client ID: MW-2_030119
Sample Location: LONG ISLAND CITY, NY

Date Collected: 03/01/19 11:06
Date Received: 03/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 03/06/19 18:16
Analyst: EK

Extraction Method: EPA 3510C
Extraction Date: 03/05/19 17:58

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50	1
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50	1
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45	1
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40	1
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43	1
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6	1
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2	1
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49	1
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50	1
Hexachlorocyclopentadiene	ND		ug/l	20	0.69	1
Isophorone	ND		ug/l	5.0	1.2	1
Nitrobenzene	ND		ug/l	2.0	0.77	1
NDPA/DPA	ND		ug/l	2.0	0.42	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	1.5	1
Butyl benzyl phthalate	ND		ug/l	5.0	1.2	1
Di-n-butylphthalate	ND		ug/l	5.0	0.39	1
Di-n-octylphthalate	ND		ug/l	5.0	1.3	1
Diethyl phthalate	ND		ug/l	5.0	0.38	1
Dimethyl phthalate	ND		ug/l	5.0	1.8	1
Biphenyl	0.54	J	ug/l	2.0	0.46	1
4-Chloroaniline	ND		ug/l	5.0	1.1	1
2-Nitroaniline	ND		ug/l	5.0	0.50	1
3-Nitroaniline	ND		ug/l	5.0	0.81	1
4-Nitroaniline	ND		ug/l	5.0	0.80	1

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01 Date Collected: 03/01/19 11:06

Client ID: MW-2_030119 Date Received: 03/01/19

Sample Location: LONG ISLAND CITY, NY Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Dibenzofuran	ND		ug/l	2.0	0.50	1
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44	1
Acetophenone	ND		ug/l	5.0	0.53	1
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61	1
p-Chloro-m-cresol	ND		ug/l	2.0	0.35	1
2-Chlorophenol	ND		ug/l	2.0	0.48	1
2,4-Dichlorophenol	ND		ug/l	5.0	0.41	1
2,4-Dimethylphenol	ND		ug/l	5.0	1.8	1
2-Nitrophenol	ND		ug/l	10	0.85	1
4-Nitrophenol	ND		ug/l	10	0.67	1
2,4-Dinitrophenol	ND		ug/l	20	6.6	1
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8	1
Phenol	ND		ug/l	5.0	0.57	1
2-Methylphenol	ND		ug/l	5.0	0.49	1
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48	1
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77	1
Benzoic Acid	ND		ug/l	50	2.6	1
Benzyl Alcohol	ND		ug/l	2.0	0.59	1
Carbazole	ND		ug/l	2.0	0.49	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	42		21-120
Phenol-d6	32		10-120
Nitrobenzene-d5	53		23-120
2-Fluorobiphenyl	45		15-120
2,4,6-Tribromophenol	49		10-120
4-Terphenyl-d14	47		41-149

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1908135
Report Date: 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01
Client ID: MW-2_030119
Sample Location: LONG ISLAND CITY, NY

Date Collected: 03/01/19 11:06
Date Received: 03/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D-SIM
Analytical Date: 03/07/19 01:25
Analyst: CB

Extraction Method: EPA 3510C
Extraction Date: 03/05/19 18:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	0.33		ug/l	0.10	0.01	1
2-Chloronaphthalene	ND		ug/l	0.20	0.02	1
Fluoranthene	0.35		ug/l	0.10	0.02	1
Hexachlorobutadiene	ND		ug/l	0.50	0.05	1
Naphthalene	9.2		ug/l	0.10	0.05	1
Benzo(a)anthracene	0.05	J	ug/l	0.10	0.02	1
Benzo(a)pyrene	0.03	J	ug/l	0.10	0.02	1
Benzo(b)fluoranthene	0.03	J	ug/l	0.10	0.01	1
Benzo(k)fluoranthene	0.03	J	ug/l	0.10	0.01	1
Chrysene	0.07	J	ug/l	0.10	0.01	1
Acenaphthylene	0.09	J	ug/l	0.10	0.01	1
Anthracene	0.20		ug/l	0.10	0.01	1
Benzo(ghi)perylene	0.02	J	ug/l	0.10	0.01	1
Fluorene	0.64		ug/l	0.10	0.01	1
Phenanthrene	1.1		ug/l	0.10	0.02	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.01	1
Indeno(1,2,3-cd)pyrene	0.02	J	ug/l	0.10	0.01	1
Pyrene	0.32		ug/l	0.10	0.02	1
2-Methylnaphthalene	15		ug/l	0.10	0.02	1
Pentachlorophenol	ND		ug/l	0.80	0.01	1
Hexachlorobenzene	ND		ug/l	0.80	0.01	1
Hexachloroethane	ND		ug/l	0.80	0.06	1

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01 Date Collected: 03/01/19 11:06

Client ID: MW-2_030119 Date Received: 03/01/19

Sample Location: LONG ISLAND CITY, NY Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	32		21-120
Phenol-d6	28		10-120
Nitrobenzene-d5	41		23-120
2-Fluorobiphenyl	51		15-120
2,4,6-Tribromophenol	58		10-120
4-Terphenyl-d14	54		41-149

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 03/05/19 11:24
Analyst: ALS

Extraction Method: EPA 3510C
Extraction Date: 03/04/19 18:59

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1212360-1					
Acenaphthene	ND		ug/l	2.0	0.44
1,2,4-Trichlorobenzene	ND		ug/l	5.0	0.50
Hexachlorobenzene	ND		ug/l	2.0	0.46
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.50
2-Chloronaphthalene	ND		ug/l	2.0	0.44
1,2-Dichlorobenzene	ND		ug/l	2.0	0.45
1,3-Dichlorobenzene	ND		ug/l	2.0	0.40
1,4-Dichlorobenzene	ND		ug/l	2.0	0.43
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.6
2,4-Dinitrotoluene	ND		ug/l	5.0	1.2
2,6-Dinitrotoluene	ND		ug/l	5.0	0.93
Fluoranthene	ND		ug/l	2.0	0.26
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.49
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.38
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.53
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.50
Hexachlorobutadiene	ND		ug/l	2.0	0.66
Hexachlorocyclopentadiene	ND		ug/l	20	0.69
Hexachloroethane	ND		ug/l	2.0	0.58
Isophorone	ND		ug/l	5.0	1.2
Naphthalene	ND		ug/l	2.0	0.46
Nitrobenzene	ND		ug/l	2.0	0.77
NDPA/DPA	ND		ug/l	2.0	0.42
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.64
Bis(2-ethylhexyl)phthalate	1.6	J	ug/l	3.0	1.5
Butyl benzyl phthalate	ND		ug/l	5.0	1.2
Di-n-butylphthalate	ND		ug/l	5.0	0.39
Di-n-octylphthalate	ND		ug/l	5.0	1.3
Diethyl phthalate	ND		ug/l	5.0	0.38

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 03/05/19 11:24
Analyst: ALS

Extraction Method: EPA 3510C
Extraction Date: 03/04/19 18:59

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1212360-1					
Dimethyl phthalate	ND		ug/l	5.0	1.8
Benzo(a)anthracene	ND		ug/l	2.0	0.32
Benzo(a)pyrene	ND		ug/l	2.0	0.41
Benzo(b)fluoranthene	ND		ug/l	2.0	0.35
Benzo(k)fluoranthene	ND		ug/l	2.0	0.37
Chrysene	ND		ug/l	2.0	0.34
Acenaphthylene	ND		ug/l	2.0	0.46
Anthracene	ND		ug/l	2.0	0.33
Benzo(ghi)perylene	ND		ug/l	2.0	0.30
Fluorene	ND		ug/l	2.0	0.41
Phenanthrene	ND		ug/l	2.0	0.33
Dibenzo(a,h)anthracene	ND		ug/l	2.0	0.32
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.0	0.40
Pyrene	ND		ug/l	2.0	0.28
Biphenyl	ND		ug/l	2.0	0.46
4-Chloroaniline	ND		ug/l	5.0	1.1
2-Nitroaniline	ND		ug/l	5.0	0.50
3-Nitroaniline	ND		ug/l	5.0	0.81
4-Nitroaniline	ND		ug/l	5.0	0.80
Dibenzofuran	ND		ug/l	2.0	0.50
2-Methylnaphthalene	ND		ug/l	2.0	0.45
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.44
Acetophenone	ND		ug/l	5.0	0.53
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.61
p-Chloro-m-cresol	ND		ug/l	2.0	0.35
2-Chlorophenol	ND		ug/l	2.0	0.48
2,4-Dichlorophenol	ND		ug/l	5.0	0.41
2,4-Dimethylphenol	ND		ug/l	5.0	1.8
2-Nitrophenol	ND		ug/l	10	0.85

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 03/05/19 11:24
Analyst: ALS

Extraction Method: EPA 3510C
Extraction Date: 03/04/19 18:59

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1212360-1					
4-Nitrophenol	ND		ug/l	10	0.67
2,4-Dinitrophenol	ND		ug/l	20	6.6
4,6-Dinitro-o-cresol	ND		ug/l	10	1.8
Pentachlorophenol	ND		ug/l	10	1.8
Phenol	ND		ug/l	5.0	0.57
2-Methylphenol	ND		ug/l	5.0	0.49
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	0.48
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.77
Benzoic Acid	ND		ug/l	50	2.6
Benzyl Alcohol	ND		ug/l	2.0	0.59
Carbazole	ND		ug/l	2.0	0.49

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	47		21-120
Phenol-d6	40		10-120
Nitrobenzene-d5	55		23-120
2-Fluorobiphenyl	48		15-120
2,4,6-Tribromophenol	64		10-120
4-Terphenyl-d14	58		41-149

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 03/06/19 21:06
Analyst: CB

Extraction Method: EPA 3510C
Extraction Date: 03/04/19 19:05

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1212362-1					
Acenaphthene	ND		ug/l	0.10	0.01
2-Chloronaphthalene	ND		ug/l	0.20	0.02
Fluoranthene	ND		ug/l	0.10	0.02
Hexachlorobutadiene	ND		ug/l	0.50	0.05
Naphthalene	ND		ug/l	0.10	0.05
Benzo(a)anthracene	ND		ug/l	0.10	0.02
Benzo(a)pyrene	ND		ug/l	0.10	0.02
Benzo(b)fluoranthene	ND		ug/l	0.10	0.01
Benzo(k)fluoranthene	ND		ug/l	0.10	0.01
Chrysene	ND		ug/l	0.10	0.01
Acenaphthylene	ND		ug/l	0.10	0.01
Anthracene	ND		ug/l	0.10	0.01
Benzo(ghi)perylene	ND		ug/l	0.10	0.01
Fluorene	ND		ug/l	0.10	0.01
Phenanthrene	ND		ug/l	0.10	0.02
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.01
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.01
Pyrene	ND		ug/l	0.10	0.02
2-Methylnaphthalene	ND		ug/l	0.10	0.02
Pentachlorophenol	ND		ug/l	0.80	0.01
Hexachlorobenzene	ND		ug/l	0.80	0.01
Hexachloroethane	ND		ug/l	0.80	0.06

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 03/06/19 21:06
Analyst: CB

Extraction Method: EPA 3510C
Extraction Date: 03/04/19 19:05

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1212362-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	36		21-120
Phenol-d6	30		10-120
Nitrobenzene-d5	52		23-120
2-Fluorobiphenyl	48		15-120
2,4,6-Tribromophenol	56		10-120
4-Terphenyl-d14	54		41-149

Lab Control Sample Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1212360-2 WG1212360-3								
Acenaphthene	65		69		37-111	6		30
1,2,4-Trichlorobenzene	53		58		39-98	9		30
Hexachlorobenzene	62		64		40-140	3		30
Bis(2-chloroethyl)ether	57		60		40-140	5		30
2-Chloronaphthalene	53		56		40-140	6		30
1,2-Dichlorobenzene	50		53		40-140	6		30
1,3-Dichlorobenzene	49		50		40-140	2		30
1,4-Dichlorobenzene	49		52		36-97	6		30
3,3'-Dichlorobenzidine	**24**	Q	**26**	Q	40-140	8		30
2,4-Dinitrotoluene	60		66		48-143	10		30
2,6-Dinitrotoluene	59		61		40-140	3		30
Fluoranthene	56		56		40-140	0		30
4-Chlorophenyl phenyl ether	64		67		40-140	5		30
4-Bromophenyl phenyl ether	70		72		40-140	3		30
Bis(2-chloroisopropyl)ether	79		80		40-140	1		30
Bis(2-chloroethoxy)methane	57		59		40-140	3		30
Hexachlorobutadiene	42		45		40-140	7		30
Hexachlorocyclopentadiene	42		45		40-140	7		30
Hexachloroethane	44		49		40-140	11		30
Isophorone	59		61		40-140	3		30
Naphthalene	54		56		40-140	4		30
Nitrobenzene	56		58		40-140	4		30
NDPA/DPA	63		63		40-140	0		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1212360-2 WG1212360-3								
n-Nitrosodi-n-propylamine	60		62		29-132	3		30
Bis(2-ethylhexyl)phthalate	57		58		40-140	2		30
Butyl benzyl phthalate	53		54		40-140	2		30
Di-n-butylphthalate	50		51		40-140	2		30
Di-n-octylphthalate	60		63		40-140	5		30
Diethyl phthalate	61		64		40-140	5		30
Dimethyl phthalate	55		59		40-140	7		30
Benzo(a)anthracene	65		69		40-140	6		30
Benzo(a)pyrene	69		75		40-140	8		30
Benzo(b)fluoranthene	70		74		40-140	6		30
Benzo(k)fluoranthene	66		72		40-140	9		30
Chrysene	60		64		40-140	6		30
Acenaphthylene	57		59		45-123	3		30
Anthracene	56		59		40-140	5		30
Benzo(ghi)perylene	66		67		40-140	2		30
Fluorene	61		66		40-140	8		30
Phenanthrene	54		55		40-140	2		30
Dibenzo(a,h)anthracene	69		69		40-140	0		30
Indeno(1,2,3-cd)pyrene	73		73		40-140	0		30
Pyrene	55		56		26-127	2		30
Biphenyl	62		66		40-140	6		30
4-Chloroaniline	**26**	Q	**35**	Q	40-140	30		30
2-Nitroaniline	56		63		52-143	12		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1212360-2 WG1212360-3								
3-Nitroaniline	36		38		25-145	5		30
4-Nitroaniline	52		54		51-143	4		30
Dibenzofuran	61		64		40-140	5		30
2-Methylnaphthalene	55		58		40-140	5		30
1,2,4,5-Tetrachlorobenzene	54		59		2-134	9		30
Acetophenone	57		58		39-129	2		30
2,4,6-Trichlorophenol	55		58		30-130	5		30
p-Chloro-m-cresol	56		58		23-97	4		30
2-Chlorophenol	58		57		27-123	2		30
2,4-Dichlorophenol	58		60		30-130	3		30
2,4-Dimethylphenol	47		53		30-130	12		30
2-Nitrophenol	57		61		30-130	7		30
4-Nitrophenol	53		52		10-80	2		30
2,4-Dinitrophenol	58		65		20-130	11		30
4,6-Dinitro-o-cresol	62		62		20-164	0		30
Pentachlorophenol	63		68		9-103	8		30
Phenol	43		46		12-110	7		30
2-Methylphenol	55		56		30-130	2		30
3-Methylphenol/4-Methylphenol	56		58		30-130	4		30
2,4,5-Trichlorophenol	54		59		30-130	9		30
Benzoic Acid	53		50		10-164	6		30
Benzyl Alcohol	52		50		26-116	4		30
Carbazole	**51**	Q	**53**	Q	55-144	4		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1212360-2 WG1212360-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	45		48		21-120
Phenol-d6	40		42		10-120
Nitrobenzene-d5	54		55		23-120
2-Fluorobiphenyl	47		48		15-120
2,4,6-Tribromophenol	71		67		10-120
4-Terphenyl-d14	57		57		41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1212362-2 WG1212362-3								
Acenaphthene	50		54		40-140	8		40
2-Chloronaphthalene	50		53		40-140	6		40
Fluoranthene	55		61		40-140	10		40
Hexachlorobutadiene	41		51		40-140	22		40
Naphthalene	46		52		40-140	12		40
Benzo(a)anthracene	59		62		40-140	5		40
Benzo(a)pyrene	52		55		40-140	6		40
Benzo(b)fluoranthene	55		52		40-140	6		40
Benzo(k)fluoranthene	54		56		40-140	4		40
Chrysene	60		60		40-140	0		40
Acenaphthylene	49		55		40-140	12		40
Anthracene	52		55		40-140	6		40
Benzo(ghi)perylene	53		54		40-140	2		40
Fluorene	56		56		40-140	0		40
Phenanthrene	52		53		40-140	2		40
Dibenzo(a,h)anthracene	56		56		40-140	0		40
Indeno(1,2,3-cd)pyrene	55		55		40-140	0		40
Pyrene	55		58		40-140	5		40
2-Methylnaphthalene	48		53		40-140	10		40
Pentachlorophenol	67		67		40-140	0		40
Hexachlorobenzene	54		58		40-140	7		40
Hexachloroethane	**38**	Q	46		40-140	19		40

Lab Control Sample Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1212362-2 WG1212362-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	39		42		21-120
Phenol-d6	30		34		10-120
Nitrobenzene-d5	50		55		23-120
2-Fluorobiphenyl	44		51		15-120
2,4,6-Tribromophenol	66		63		10-120
4-Terphenyl-d14	58		57		41-149

METALS

Project Name: 27-01 JACKSON AVE.
Lab Number: L1908135
Project Number: 170472002
Report Date: 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01
Client ID: MW-2_030119
Sample Location: LONG ISLAND CITY, NY
Date Collected: 03/01/19 11:06
Date Received: 03/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	3.37		mg/l	0.0100	0.00327	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Antimony, Total	ND		mg/l	0.00400	0.00042	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Arsenic, Total	0.00139		mg/l	0.00050	0.00016	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Barium, Total	0.1922		mg/l	0.00050	0.00017	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Beryllium, Total	0.00024	J	mg/l	0.00050	0.00010	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Cadmium, Total	0.00006	J	mg/l	0.00020	0.00005	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Calcium, Total	108.		mg/l	0.100	0.0394	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Chromium, Total	0.01276		mg/l	0.00100	0.00017	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Cobalt, Total	0.00528		mg/l	0.00050	0.00016	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Copper, Total	0.01175		mg/l	0.00100	0.00038	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Iron, Total	14.3		mg/l	0.0500	0.0191	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Lead, Total	0.00478		mg/l	0.00100	0.00034	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Magnesium, Total	11.3		mg/l	0.0700	0.0242	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Manganese, Total	1.569		mg/l	0.00100	0.00044	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Mercury, Total	ND		mg/l	0.00020	0.00006	1	03/05/19 15:21	03/06/19 22:24	EPA 7470A	1,7470A	EA
Nickel, Total	0.01046		mg/l	0.00200	0.00055	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Potassium, Total	19.3		mg/l	0.100	0.0309	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Selenium, Total	ND		mg/l	0.00500	0.00173	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Silver, Total	ND		mg/l	0.00040	0.00016	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Sodium, Total	309.		mg/l	0.100	0.0293	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Thallium, Total	ND		mg/l	0.00050	0.00014	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Vanadium, Total	0.01219		mg/l	0.00500	0.00157	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Zinc, Total	0.01958		mg/l	0.01000	0.00341	1	03/04/19 15:30	03/05/19 13:38	EPA 3005A	1,6020B	AM
Dissolved Metals - Mansfield Lab											
Aluminum, Dissolved	0.00396	J	mg/l	0.0100	0.00327	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Antimony, Dissolved	0.00108	J	mg/l	0.00400	0.00042	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Arsenic, Dissolved	0.00063		mg/l	0.00050	0.00016	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Barium, Dissolved	0.1600		mg/l	0.00050	0.00017	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Beryllium, Dissolved	ND		mg/l	0.00050	0.00010	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01 Date Collected: 03/01/19 11:06

Client ID: MW-2_030119 Date Received: 03/01/19

Sample Location: LONG ISLAND CITY, NY Field Prep: Refer to COC

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Cadmium, Dissolved	ND		mg/l	0.00020	0.00005	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Calcium, Dissolved	120.		mg/l	0.100	0.0394	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Chromium, Dissolved	0.00018	J	mg/l	0.00100	0.00017	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Cobalt, Dissolved	ND		mg/l	0.00050	0.00016	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Copper, Dissolved	ND		mg/l	0.00100	0.00038	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Iron, Dissolved	4.64		mg/l	0.0600	0.0191	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Lead, Dissolved	0.00079	J	mg/l	0.00100	0.00034	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Magnesium, Dissolved	10.2		mg/l	0.0700	0.0242	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Manganese, Dissolved	1.481		mg/l	0.00100	0.00044	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Mercury, Dissolved	ND		mg/l	0.00020	0.00006	1	03/05/19 11:53	03/06/19 20:28	EPA 7470A	1,7470A	EA
Nickel, Dissolved	0.00065	J	mg/l	0.00200	0.00055	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Potassium, Dissolved	20.7		mg/l	0.100	0.0309	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Selenium, Dissolved	ND		mg/l	0.00500	0.00173	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Silver, Dissolved	ND		mg/l	0.00040	0.00016	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Sodium, Dissolved	369.		mg/l	0.100	0.0293	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Thallium, Dissolved	ND		mg/l	0.00050	0.00014	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Vanadium, Dissolved	ND		mg/l	0.00500	0.00157	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM
Zinc, Dissolved	ND		mg/l	0.01000	0.00341	1	03/04/19 18:45	03/05/19 12:29	EPA 3005A	1,6020B	AM

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1212287-1										
Aluminum, Total	ND		mg/l	0.0100	0.00327	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Antimony, Total	ND		mg/l	0.00400	0.00042	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Barium, Total	ND		mg/l	0.00050	0.00017	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Beryllium, Total	ND		mg/l	0.00050	0.00010	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Calcium, Total	ND		mg/l	0.100	0.0394	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Chromium, Total	ND		mg/l	0.00100	0.00017	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Cobalt, Total	ND		mg/l	0.00050	0.00016	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Iron, Total	ND		mg/l	0.0500	0.0191	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Magnesium, Total	ND		mg/l	0.0700	0.0242	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Manganese, Total	ND		mg/l	0.00100	0.00044	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Nickel, Total	ND		mg/l	0.00200	0.00055	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Potassium, Total	ND		mg/l	0.100	0.0309	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Selenium, Total	ND		mg/l	0.00500	0.00173	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Silver, Total	ND		mg/l	0.00040	0.00016	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Sodium, Total	ND		mg/l	0.100	0.0293	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Thallium, Total	ND		mg/l	0.00050	0.00014	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Vanadium, Total	ND		mg/l	0.00500	0.00157	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM
Zinc, Total	ND		mg/l	0.01000	0.00341	1	03/04/19 15:30	03/05/19 12:09	1,6020B	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1212313-1										
Aluminum, Dissolved	0.00346	J	mg/l	0.0100	0.00327	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Antimony, Dissolved	0.00072	J	mg/l	0.00400	0.00042	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Arsenic, Dissolved	ND		mg/l	0.00050	0.00016	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Barium, Dissolved	ND		mg/l	0.00050	0.00017	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM

Project Name: 27-01 JACKSON AVE. **Lab Number:** L1908135

Project Number: 170472002 **Report Date:** 03/08/19

Method Blank Analysis
Batch Quality Control

Beryllium, Dissolved	ND		mg/l	0.00050	0.00010	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Cadmium, Dissolved	ND		mg/l	0.00020	0.00005	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Calcium, Dissolved	ND		mg/l	0.100	0.0394	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Chromium, Dissolved	ND		mg/l	0.00100	0.00017	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Cobalt, Dissolved	ND		mg/l	0.00050	0.00016	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Copper, Dissolved	ND		mg/l	0.00100	0.00038	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Iron, Dissolved	0.0272	J	mg/l	0.0600	0.0191	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Lead, Dissolved	ND		mg/l	0.00100	0.00034	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Magnesium, Dissolved	ND		mg/l	0.0700	0.0242	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Manganese, Dissolved	ND		mg/l	0.00100	0.00044	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Nickel, Dissolved	ND		mg/l	0.00200	0.00055	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Potassium, Dissolved	ND		mg/l	0.100	0.0309	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Selenium, Dissolved	ND		mg/l	0.00500	0.00173	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Silver, Dissolved	ND		mg/l	0.00040	0.00016	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Sodium, Dissolved	ND		mg/l	0.100	0.0293	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Thallium, Dissolved	ND		mg/l	0.00050	0.00014	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Vanadium, Dissolved	ND		mg/l	0.00500	0.00157	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM
Zinc, Dissolved	ND		mg/l	0.01000	0.00341	1	03/04/19 18:45	03/05/19 12:05	1,6020B	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1212575-1										
Mercury, Dissolved	ND		mg/l	0.00020	0.00006	1	03/05/19 11:53	03/06/19 20:02	1,7470A	EA

Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1212631-1										
Mercury, Total	ND		mg/l	0.00020	0.00006	1	03/05/19 15:21	03/06/19 21:59	1,7470A	EA

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1908135
Report Date: 03/08/19

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 7470A

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212287-2								
Aluminum, Total	102		-		80-120	-		
Antimony, Total	95		-		80-120	-		
Arsenic, Total	112		-		80-120	-		
Barium, Total	104		-		80-120	-		
Beryllium, Total	104		-		80-120	-		
Cadmium, Total	113		-		80-120	-		
Calcium, Total	100		-		80-120	-		
Chromium, Total	100		-		80-120	-		
Cobalt, Total	102		-		80-120	-		
Copper, Total	99		-		80-120	-		
Iron, Total	110		-		80-120	-		
Lead, Total	109		-		80-120	-		
Magnesium, Total	106		-		80-120	-		
Manganese, Total	102		-		80-120	-		
Nickel, Total	104		-		80-120	-		
Potassium, Total	100		-		80-120	-		
Selenium, Total	115		-		80-120	-		
Silver, Total	102		-		80-120	-		
Sodium, Total	94		-		80-120	-		
Thallium, Total	104		-		80-120	-		
Vanadium, Total	100		-		80-120	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212287-2					
Zinc, Total	111	-	80-120	-	

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212313-2					
Aluminum, Dissolved	105	-	80-120	-	
Antimony, Dissolved	98	-	80-120	-	
Arsenic, Dissolved	110	-	80-120	-	
Barium, Dissolved	106	-	80-120	-	
Beryllium, Dissolved	104	-	80-120	-	
Cadmium, Dissolved	106	-	80-120	-	
Calcium, Dissolved	114	-	80-120	-	
Chromium, Dissolved	101	-	80-120	-	
Cobalt, Dissolved	101	-	80-120	-	
Copper, Dissolved	98	-	80-120	-	
Iron, Dissolved	115	-	80-120	-	
Lead, Dissolved	111	-	80-120	-	
Magnesium, Dissolved	113	-	80-120	-	
Manganese, Dissolved	100	-	80-120	-	
Nickel, Dissolved	102	-	80-120	-	
Potassium, Dissolved	106	-	80-120	-	
Selenium, Dissolved	112	-	80-120	-	
Silver, Dissolved	102	-	80-120	-	
Sodium, Dissolved	111	-	80-120	-	
Thallium, Dissolved	109	-	80-120	-	
Vanadium, Dissolved	102	-	80-120	-	

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212313-2					
Zinc, Dissolved	106	-	80-120	-	
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212575-2					
Mercury, Dissolved	106	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212631-2					
Mercury, Total	88	-	80-120	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212287-3 QC Sample: L1908186-01 Client ID: MS Sample												
Aluminum, Total	0.555	2	2.74	109		-	-		75-125	-		20
Antimony, Total	0.00087J	0.5	0.5815	116		-	-		75-125	-		20
Arsenic, Total	0.00105	0.12	0.1354	112		-	-		75-125	-		20
Barium, Total	0.07452	2	2.178	105		-	-		75-125	-		20
Beryllium, Total	ND	0.05	0.05206	104		-	-		75-125	-		20
Cadmium, Total	0.00027	0.051	0.05626	110		-	-		75-125	-		20
Calcium, Total	265.	10	286	**210**	Q	-	-		75-125	-		20
Chromium, Total	0.00409	0.2	0.2034	100		-	-		75-125	-		20
Cobalt, Total	0.01047	0.5	0.5146	101		-	-		75-125	-		20
Copper, Total	0.00699	0.25	0.2567	100		-	-		75-125	-		20
Iron, Total	1.71	1	2.74	103		-	-		75-125	-		20
Lead, Total	0.00860	0.51	0.5605	108		-	-		75-125	-		20
Magnesium, Total	22.3	10	33.7	114		-	-		75-125	-		20
Manganese, Total	2.871	0.5	3.346	95		-	-		75-125	-		20
Nickel, Total	0.00719	0.5	0.5084	100		-	-		75-125	-		20
Potassium, Total	16.2	10	26.5	103		-	-		75-125	-		20
Selenium, Total	ND	0.12	0.137	114		-	-		75-125	-		20
Silver, Total	ND	0.05	0.05076	102		-	-		75-125	-		20
Sodium, Total	760.	10	734	**0**	Q	-	-		75-125	-		20
Thallium, Total	ND	0.12	0.1273	106		-	-		75-125	-		20
Vanadium, Total	0.00241J	0.5	0.5171	103		-	-		75-125	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212287-3 QC Sample: L1908186-01 Client ID: MS Sample									
Zinc, Total	0.00815J	0.5	0.5362	107	-	-	75-125	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery		MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212313-3 QC Sample: L1908135-01 Client ID: MW-2_030119										
Aluminum, Dissolved	0.00396J	2	2.26	113		-	-	75-125	-	20
Antimony, Dissolved	0.00108J	0.5	0.6910	**138**	Q	-	-	75-125	-	20
Arsenic, Dissolved	0.00063	0.12	0.1436	119		-	-	75-125	-	20
Barium, Dissolved	0.1600	2	2.429	113		-	-	75-125	-	20
Beryllium, Dissolved	ND	0.05	0.05443	109		-	-	75-125	-	20
Cadmium, Dissolved	ND	0.051	0.05567	109		-	-	75-125	-	20
Calcium, Dissolved	120.	10	132	120		-	-	75-125	-	20
Chromium, Dissolved	0.00018J	0.2	0.2227	111		-	-	75-125	-	20
Cobalt, Dissolved	ND	0.5	0.5494	110		-	-	75-125	-	20
Copper, Dissolved	ND	0.25	0.2571	103		-	-	75-125	-	20
Iron, Dissolved	4.64	1	6.01	**137**	Q	-	-	75-125	-	20
Lead, Dissolved	0.00079J	0.51	0.6118	120		-	-	75-125	-	20
Magnesium, Dissolved	10.2	10	22.8	**126**	Q	-	-	75-125	-	20
Manganese, Dissolved	1.481	0.5	2.093	122		-	-	75-125	-	20
Nickel, Dissolved	0.00065J	0.5	0.5346	107		-	-	75-125	-	20
Potassium, Dissolved	20.7	10	31.8	111		-	-	75-125	-	20
Selenium, Dissolved	ND	0.12	0.120	100		-	-	75-125	-	20
Silver, Dissolved	ND	0.05	0.05567	111		-	-	75-125	-	20
Sodium, Dissolved	369.	10	353	**0**	Q	-	-	75-125	-	20
Thallium, Dissolved	ND	0.12	0.1414	118		-	-	75-125	-	20
Vanadium, Dissolved	ND	0.5	0.5602	112		-	-	75-125	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212313-3 QC Sample: L1908135-01 Client ID: MW-2_030119									
Zinc, Dissolved	ND	0.5	0.5592	112	-	-	75-125	-	20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212575-3 QC Sample: L1907984-01 Client ID: MS Sample									
Mercury, Dissolved	ND	0.005	0.00494	99	-	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212631-3 QC Sample: L1907833-01 Client ID: MS Sample									
Mercury, Total	ND	0.005	0.00443	89	-	-	75-125	-	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212287-4 QC Sample: L1908186-01 Client ID: DUP Sample						
Aluminum, Total	0.555	0.560	mg/l	1		20
Antimony, Total	0.00087J	0.00190J	mg/l	NC		20
Arsenic, Total	0.00105	0.00108	mg/l	3		20
Barium, Total	0.07452	0.07461	mg/l	0		20
Beryllium, Total	ND	ND	mg/l	NC		20
Cadmium, Total	0.00027	0.00029	mg/l	5		20
Calcium, Total	265.	269	mg/l	1		20
Chromium, Total	0.00409	0.00411	mg/l	1		20
Cobalt, Total	0.01047	0.01050	mg/l	0		20
Copper, Total	0.00699	0.00667	mg/l	5		20
Iron, Total	1.71	1.69	mg/l	1		20
Lead, Total	0.00860	0.00876	mg/l	2		20
Magnesium, Total	22.3	22.4	mg/l	0		20
Manganese, Total	2.871	2.905	mg/l	1		20
Nickel, Total	0.00719	0.00651	mg/l	10		20
Potassium, Total	16.2	16.1	mg/l	1		20
Selenium, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Sodium, Total	760.	768	mg/l	1		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212287-4 QC Sample: L1908186-01 Client ID: DUP Sample					
Thallium, Total	ND	0.00032J	mg/l	NC	20
Vanadium, Total	0.00241J	0.00239J	mg/l	NC	20
Zinc, Total	0.00815J	0.00888J	mg/l	NC	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212313-4 QC Sample: L1908135-01 Client ID: MW-2_030119					
Aluminum, Dissolved	0.00396J	ND	mg/l	NC	20
Antimony, Dissolved	0.00108J	0.00314J	mg/l	NC	20
Arsenic, Dissolved	0.00063	0.00071	mg/l	11	20
Barium, Dissolved	0.1600	0.1541	mg/l	4	20
Beryllium, Dissolved	ND	ND	mg/l	NC	20
Cadmium, Dissolved	ND	ND	mg/l	NC	20
Calcium, Dissolved	120.	121	mg/l	1	20
Chromium, Dissolved	0.00018J	0.00024J	mg/l	NC	20
Cobalt, Dissolved	ND	ND	mg/l	NC	20
Copper, Dissolved	ND	ND	mg/l	NC	20
Iron, Dissolved	4.64	4.66	mg/l	0	20
Lead, Dissolved	0.00079J	0.00081J	mg/l	NC	20
Magnesium, Dissolved	10.2	10.0	mg/l	2	20
Manganese, Dissolved	1.481	1.498	mg/l	1	20
Nickel, Dissolved	0.00065J	0.00107J	mg/l	NC	20
Potassium, Dissolved	20.7	20.7	mg/l	0	20
Selenium, Dissolved	ND	ND	mg/l	NC	20
Silver, Dissolved	ND	ND	mg/l	NC	20
Sodium, Dissolved	369.	364	mg/l	1	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212313-4 QC Sample: L1908135-01 Client ID: MW-2_030119					
Thallium, Dissolved	ND	0.00030J	mg/l	NC	20
Vanadium, Dissolved	ND	ND	mg/l	NC	20
Zinc, Dissolved	ND	ND	mg/l	NC	20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212575-4 QC Sample: L1907984-01 Client ID: DUP Sample					
Mercury, Dissolved	ND	ND	mg/l	NC	20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212631-4 QC Sample: L1907833-01 Client ID: DUP Sample					
Mercury, Total	ND	ND	mg/l	NC	20

INORGANICS
&
MISCELLANEOUS

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

SAMPLE RESULTS

Lab ID: L1908135-01
Client ID: MW-2_030119
Sample Location: LONG ISLAND CITY, NY

Date Collected: 03/01/19 11:06
Date Received: 03/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Alkalinity, Total	139.		mg CaCO3/L	2.00	NA	1	-	03/05/19 10:29	121,2320B	BR
Chloride	700		mg/l	20	4.0	20	-	03/05/19 23:33	1,9251	TL
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	03/05/19 21:49	121,4500NO3-F	MR
Sulfate	12.		mg/l	10	1.4	1	03/02/19 21:15	03/02/19 21:15	1,9038	JR
Chemical Oxygen Demand	47.		mg/l	20	6.0	1	03/04/19 18:00	03/04/19 21:46	44,410.4	TL
BOD, 5 day	8.8		mg/l	5.0	NA	2.5	03/02/19 14:00	03/07/19 15:10	121,5210B	RM
Total Organic Carbon	3.6	J	mg/l	4.0	0.91	8	-	03/07/19 07:45	1,9060A	DW

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002
Lab Number: L1908135
Report Date: 03/08/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1211980-1										
BOD, 5 day	ND		mg/l	2.0	NA	1	03/02/19 14:00	03/07/19 15:10	121,5210B	RM
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1211997-1										
Sulfate	1.9	J	mg/l	10	1.4	1	03/02/19 21:15	03/02/19 21:15	1,9038	JR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1212333-1										
Chemical Oxygen Demand	ND		mg/l	20	6.0	1	03/04/19 18:00	03/04/19 21:45	44,410.4	TL
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1212519-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	03/05/19 10:29	121,2320B	BR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1212678-1										
Chloride	ND		mg/l	1.0	0.20	1	-	03/05/19 22:28	1,9251	TL
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1212704-1										
Nitrogen, Nitrate	ND		mg/l	0.100	0.032	1	-	03/05/19 21:24	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1213183-1										
Total Organic Carbon	ND		mg/l	0.50	0.11	1	-	03/07/19 07:45	1,9060A	DW

Lab Control Sample Analysis

Batch Quality Control

Project Name: 27-01 JACKSON AVE.

Project Number: 170472002

Lab Number: L1908135

Report Date: 03/08/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1211980-2								
BOD, 5 day	109		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1211997-2								
Sulfate	95		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1212333-2								
Chemical Oxygen Demand	98		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1212519-2								
Alkalinity, Total	105		-		90-110	-		10
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1212678-2								
Chloride	107		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1212704-2								
Nitrogen, Nitrate	105		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1213183-2								
Total Organic Carbon	104		-		90-110	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1211980-4 QC Sample: L1908135-01 Client ID: MW-2_030119												
BOD, 5 day	8.8	100	120	112		-	-		50-145	-		35
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1211997-4 QC Sample: L1908206-01 Client ID: MS Sample												
Sulfate	8.0J	20	30	**150**	Q	-	-		55-147	-		14
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212333-3 QC Sample: L1908035-01 Client ID: MS Sample												
Chemical Oxygen Demand	450	238	630	**76**	Q	-	-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212519-4 QC Sample: L1908036-02 Client ID: MS Sample												
Alkalinity, Total	24.2	100	129	105		-	-		86-116	-		10
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212678-4 QC Sample: L1908113-01 Client ID: MS Sample												
Chloride	190	20	200	**50**	Q	-	-		58-140	-		7
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212704-4 QC Sample: L1900003-11 Client ID: MS Sample												
Nitrogen, Nitrate	0.759	4	4.88	103		-	-		83-113	-		17
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1213183-4 QC Sample: L1908491-01 Client ID: MS Sample												
Total Organic Carbon	33.	40	65	80		-	-		80-120	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1211980-3 QC Sample: L1908135-01 Client ID: MW-2_030119						
BOD, 5 day	8.8	9.4	mg/l	7		35
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1211997-3 QC Sample: L1908206-01 Client ID: DUP Sample						
Sulfate	8.0J	7.2J	mg/l	NC		14
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212333-4 QC Sample: L1908035-01 Client ID: DUP Sample						
Chemical Oxygen Demand	450	440	mg/l	2		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212519-3 QC Sample: L1908036-01 Client ID: DUP Sample						
Alkalinity, Total	13.7	13.1	mg CaCO3/L	4		10
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212678-3 QC Sample: L1908113-01 Client ID: DUP Sample						
Chloride	190	190	mg/l	0		7
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212704-3 QC Sample: L1900003-11 Client ID: DUP Sample						
Nitrogen, Nitrate	0.759	0.743	mg/l	2		17
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1213183-3 QC Sample: L1908491-01 Client ID: DUP Sample						
Total Organic Carbon	33.	31	mg/l	6		20

Project Name: 27-01 JACKSON AVE.
Project Number: 170472002

Lab Number: L1908135
Report Date: 03/08/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1908135-01A	Vial HCl preserved	A	NA		3.1	Y	Absent		NYTCL-8260(14)
L1908135-01B	Vial HCl preserved	A	NA		3.1	Y	Absent		NYTCL-8260(14)
L1908135-01C	Vial HCl preserved	A	NA		3.1	Y	Absent		NYTCL-8260(14)
L1908135-01D	Vial H2SO4 preserved	A	NA		3.1	Y	Absent		TOC-9060(28)
L1908135-01E	Vial H2SO4 preserved	A	NA		3.1	Y	Absent		TOC-9060(28)
L1908135-01F	Vial H2SO4 preserved	A	NA		3.1	Y	Absent		TOC-9060(28)
L1908135-01G	Plastic 250ml unpreserved/No Headspace	A	NA		3.1	Y	Absent		ALK-T-2320(14)
L1908135-01H	Plastic 250ml HNO3 preserved	A	<2	<2	3.1	Y	Absent		CU-6020S(180),K-6020S(180),SE-6020S(180),V-6020S(180),MN-6020S(180),BE-6020S(180),CO-6020S(180),MG-6020S(180),ZN-6020S(180),CA-6020S(180),CR-6020S(180),FE-6020S(180),BA-6020S(180),NA-6020S(180),NI-6020S(180),PB-6020S(180),TL-6020S(180),AG-6020S(180),AS-6020S(180),SB-6020S(180),AL-6020S(180),CD-6020S(180),HG-S(28)
L1908135-01I	Plastic 250ml HNO3 preserved	A	<2	<2	3.1	Y	Absent		BA-6020T(180),FE-6020T(180),SE-6020T(180),TL-6020T(180),CA-6020T(180),CR-6020T(180),K-6020T(180),NI-6020T(180),CU-6020T(180),NA-6020T(180),ZN-6020T(180),PB-6020T(180),BE-6020T(180),MN-6020T(180),AS-6020T(180),SB-6020T(180),V-6020T(180),AG-6020T(180),AL-6020T(180),CD-6020T(180),HG-T(28),MG-6020T(180),CO-6020T(180)
L1908135-01J	Plastic 250ml H2SO4 preserved	A	<2	<2	3.1	Y	Absent		COD-410(28)
L1908135-01K	Amber 250ml unpreserved	A	7	7	3.1	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L1908135-01L	Amber 250ml unpreserved	A	7	7	3.1	Y	Absent		NYTCL-8270-SIM-LVI(7),NYTCL-8270-LVI(7)
L1908135-01M	Plastic 950ml unpreserved	A	7	7	3.1	Y	Absent		CL-9251(28),SO4-9038(28),NO3-4500(2),BOD-5210(2)

*Values in parentheses indicate holding time in days

Project Name:	27-01 JACKSON AVE.	**Lab Number:**	L1908135
Project Number:	170472002	**Report Date:**	03/08/19

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total'

Report Format: DU Report with 'J' Qualifiers

result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Project Name:	27-01 JACKSON AVE.	**Lab Number:**	L1908135
Project Number:	170472002	**Report Date:**	03/08/19

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

44 Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

GW TREATABILITY

NEW YORK CHAIN OF CUSTODY

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 1

Date Rec'd in Lab: 3/1/19

ALPHA Job #: L1908135

Client Information

Client: LANDAU PPC
Address: 21 PENN PLAZA FLR. 7, NY NY 10001
Phone: 212-479-5400
Fax:
Email: KDELCOL@LANDAU.COM

Project Information

Project Name: 27-01 JACKSON AVE.
Project Location: LONG ISLAND CITY, NY
Project #: 170472002
(Use Project name as Project #)
Project Manager: KIM DEL COL
ALPHAQuote #:

Turn-Around Time

Standard: X
Rush (only if pre approved):
Due Date:
# of Days:

Deliverables

ASP-A
ASP-B
EQuIS (1 File)
EQuIS (4 File)
Other: NONE

Billing Information

X Same as Client Info
PO #:

Regulatory Requirement

NY TOGS
X NY Part 375
AWQ Standards
NY CP-51
NY Restricted Use
Other
NY Unrestricted Use
NYC Sewer Discharge

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
NJ
NY
Other:

These samples have been previously analyzed by Alpha

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration: X Done; Lab to do
Preservation: Lab to do
(Please Specify below): FIELD FILTERED DISS. METALS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TCL VOCs	TCL SVOCs	TOTAL DISS. METALS (TAL)	TCL PCB, COD	TOTAL ALKALINITY	SULFATE	NITRATE-NITROGEN	CHLORIDE	Sample Specific Comments	Total Bottle
0813501	MW-2_030119	3/1/19	11:06	GW	JM	X	X	X	X	X	X	X	X	(6) 40ml (2) 250ml (3) 250ml (1) 1L	

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	
Preservative	

Relinquished By:	Date/Time	Received By:	Date/Time
	3/1/19 15:10	AAL	3/1/19 1530
D. Santos AAL	3/1/19 1820	D. Santos AAL	3/1/19 1900
D. Santos AAL	3/1/19 2220		3/1/19 2220

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

REGENESIS

RegenOx™

CHEMICAL OXIDATION REDEFINED...

P. 949-366-8000
F. 949-366-8090
Hours: M-F 8-5 pm, PST

RegenOx™ Bench Test Results

March 13, 2019

To: Kimberly Del Col
Langan Engineering & Environmental
360 West 31st Street, 8th Floor
New York, NY 10001

From: Victor David, Regenesis
Cc: Alana Miller, Regenesis

Site Name: 27-01 Jackson Ave

Site Location: Queens, NY

Bench Test ID: Case 00001538

OXIDANT DEMAND RESULTS

Total Oxidant Demand of the Site Soil

Sample Name	TOD ($g_{oxidant}/kg_{soil}$)
SB 106-19-21	7.96
SB 112-9-11	7.54
SB 106-30-32	3.96

After four hours, the oxidant demand of the soil and water are shown in the above table.

DESCRIPTION OF EXPERIMENTAL METHODS

The oxidant demand test is typically performed to determine the amount of oxidant is used in the presence of site soil and contaminants. Soil and site water samples are obtained from the field site. If site water is not used, distilled water will be used in its place. All reactors and controls are set up with 10 grams of site soil and 100 grams of distilled water or site water, if supplied. A known amount of RegenOx (typically 1000 ppm) is added to the reaction vessel. After a specified time, a filtered sample of the supernatant is measured by UV-Vis and the remaining RegenOx concentration is calculated from a calibration curve.

APPENDIX B

PRODUCT SPECIFICATIONS

PetroFix™ Application Summary
Barrier Estimate
27-01 Jackson Ave, Long Island City NY

PetroFix Amount	14,000 lbs
Barrier Length	135 ft
Delivery Points	23
Point Spacing	6 ft
Number of Rows	1
Top of Treatment Interval	16.0 ft bgs
Bottom of Treatment Interval	30.0 ft bgs
Treatment Area	810 ft^2
PetroFix Dose	32.8 lb/yd^3

Total Volume	10,159 gal
Product Volume	1,429 gal
Water Volume	8,730 gal
Injection Volume Per Point	442 gal
Injection Volume Per Vertical Foot	32 gal
Product/Point	62.1 gal
Water/Point	379.6 gal
Soil Type	Mix of Coarse and Fine
Effective Pore Volume Fill %	60%

Reported Ground Water Concentrations (mg/L)

NAPL Present? No

Benzene	0.0
Toluene	0.1
Ethylbenzene	0.5
Xylenes	1.8
Trimethylbenzenes	2.6

Napthalene	0.3
MTBE	0.0
TPH-GRO	5.5
TPH-DRO	0.0
TPH-ORO	0.0

In generating this design proposal REGENESIS relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site. The attached design summary tables specify the assumptions used in preparation of this technical design. We request that these modeling input assumptions be verified by your firm. Barrier modeling is highly dependent on seepage velocity, which can be measured in field using passive flux meter technology (www.enviroflux.com).

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s). The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the Government.

Date Generated (revised): *Prepared By: Alana Miller* *646-838-2926 amiller@regenesis.com*

PetroFix™ Specification Sheet

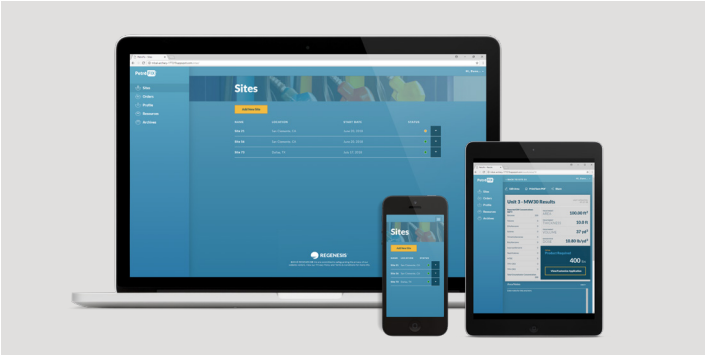
PetroFix Technical Description

PetroFix is a new remedial technology designed to treat petroleum fuel spills in soil and groundwater. A simple-to-use fluid that can be applied under low pressure into the subsurface or simply poured into open excavations, PetroFix offers a cost-effective solution for environmental practitioners and responsible parties to address petroleum hydrocarbon contaminants quickly and effectively.

PetroFix has a dual function; quickly removing hydrocarbons from the dissolved phase, by adsorbing them onto the activated carbon particles, while added electron acceptors stimulate hydrocarbon biodegradation in-place. PetroFix does not require high pressure "fracking" for application and can be applied with ease using readily available equipment associated with direct push technology.

The remedial fluid is a highly concentrated water-based suspension consisting of micron-scale activated carbon and biostimulating electron acceptors. PetroFix has a viscosity higher than water and is black in apperance. Its environmentally-compatible formulation of micron-scale activated carbon (1-2 microns) is combined with both slow and quick-release inorganic electron acceptors. A blend of additional electron acceptors is included along with the PetroFix fluid. Practitioners can select between a sulfate and nitrate combination blend (recommended), or sulfate only for the additional electron acceptors required.

PetroFix Design Assistant



REGENESIS has developed a proprietary web-based design assistant called PetroFix Design Assistant™ that provides environmental professionals the ability to input their site parameters, determine the required product amount, and order the product through REGENESIS' customer service. The PetroFix Design Assistant includes defaults and warnings throughout the process to guide users toward effective designs that will offer best results.

To access the PetroFix Design Assistant, create an account and login at www.PetroFix.com

PetroFIX Remediation Fluid

Chemical Composition

Activated Carbon - CAS 7440-44-0 >30%

Calcium Sulfate Dihydrate - CAS 10101-41-4 < 10%

Properties

Appearance: Black Fluid

Viscosity: 1500-3500 cP (corn syrup-like)

pH: 8-10

Storage and Handling Guidelines

Storage:

- Store away from incompatible materials
- Store in original closed container
- Store at temperatures below 95° F
- Dispose of waste and residues in accordance with local authority requirements

Handling:

- Never add additives to solution prior to mixing with water
- Wear appropriate personal protective equipment
- Do not taste or ingest
- Observe good industrial hygiene practices
- Wash hands after handling

Applications

PetroFix is mixed with water on-site and easily applied into the sub-surface using low pressure injections, or mixed in excavations. PetroFix is compatible with and can be used with ORC Advanced® to expedite rates of biodegration. For more information about co-application with ORC Advanced, contact REGENESIS.

REGENESIS

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Tel: +44 (0)1225 61 81 61

www.regenesis.com

Remedial Design Assumptions and Qualifications

Cost Estimate Disclaimer: The cost listed assumes conditions set forth within the proposed scope of work and assumptions and qualifications. Changes to either could impact the final cost of the project. This may include final shipping arrangements, sales tax or application related tasks such as product storage and handling, access to water, etc. If items listed need to be modified, please contact Regenesis for further evaluation.

Shipping Estimates: Shipping estimates are valid for 30 days. All shipping charges are estimates and actual freight charges are calculated at the time of invoice. Additional freight charges may be assessed for any accessorial requested at the time of delivery. The estimate included within assumes standard shipping.

Standard delivery is between 8am -5pm Monday –Friday. *accessorial – can include, but not limited to lift gate and pallet jack at delivery, inside delivery, time definite deliveries, and delivery appointments.

Please communicate any requirements for delivery with the customer service department at the time the order is placed.

Return Policy: To initiate a return please contact your local sales manager for an RMA. A 15% re-stocking fee will be charged for all returned goods. Return freight must be prepaid. All requests to return product must be in original condition and no product will be accepted for return after 90 days from date of delivery.

Professional Judgement: In generating this estimate, REGENESIS relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s), and in reliance upon REGENESIS' prior experience on similar project sites. The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, *it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission*. When serving as a supplier or subcontractor to an entity which seeks reimbursement from Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the government.

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Terms and Conditions
Products and Services

1. PAYMENT TERMS. Net 30 Days. Accounts outstanding after 30 days will be assessed 1.5% monthly interest. Volume discount pricing will be rescinded on all accounts outstanding over 90 days. An early payment discount of 1.5% Net 10 is available for cash or check payments only. We accept Master Card, Visa and American Express.

2. **RETURN POLICY.** A 15% re-stocking fee will be charged for all returned goods. All requests to return product must be pre-approved by seller. Returned product must be in original condition and no product will be accepted for return after a period of 90 days.

3 FORCE MAJEURE. Seller shall not be liable for delays in delivery or services or failure to manufacture or deliver due to causes beyond its reasonable control, including but not limited to acts of God, acts of buyer, acts of military or civil authorities, fires, strikes, flood, epidemic, war, riot, delays in transportation or car shortages, or inability to obtain necessary labor, materials, components or services through seller's usual and regular sources at usual and regular prices. In any such event Seller may, without notice to buyer, at any time and from time to time, postpone the delivery or service dates under this contract or make partial delivery or performance or cancel all or any portion of this and any other contract with buyer without further liability to buyer. Cancellation of any part of this order shall not affect Seller's right to payment for any product delivered or service performed hereunder.

4. LIMITED WARRANTY. Seller warrants the product(s) sold and services provided as specified on face of invoice, solely to buyer. Seller makes no other warranty of any kind respecting the product and services, and expressly DISCLAIMS ALL OTHER WARRANTIES OF WHATEVER KIND RESPECTING THE PRODUCT AND SERVICES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE AND NON-INFRINGEMENT.

5. DISCLAIMER. Where warranties to a person other than buyer may not be disclaimed under law, seller extends to such a person the same warranty seller makes to buyer as set forth herein, subject to all disclaimers, exclusions and limitations of warranties, all limitations of liability and all other provisions set forth in the Terms and Conditions herein. Buyer agrees to transmit a copy of the Terms and Conditions set forth herein to any and all persons to whom buyer sells, or otherwise furnishes the products and/or services provided buyer by seller and buyer agrees to indemnify seller for any liability, loss, costs and attorneys' fees which seller may incur by reason, in whole or in part, of failure by buyer to transmit the Terms and Conditions as provided herein.

6. LIMITATION OF SELLER'S LIABILITY AND LIMITATION OF BUYER'S REMEDY. Seller's liability on any claim of any kind, including negligence, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair or use of any goods or performance of any services covered by or furnished hereunder, shall in no case exceed the lesser of (1) the cost of repairing or replacing goods and repeating the services failing to conform to the forgoing warranty or the price of the goods and/or services or part thereof which gives rise to the claim. IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, OR FOR DAMAGES IN THE NATURE OF PENALTIES.

7. INDEMNIFICATION. Buyer agrees to defend and indemnify seller of and from any and all claims or liabilities asserted against seller in connection with the manufacture, sale, delivery, resale or repair or use of any goods, and performance of any services, covered by or furnished hereunder arising in whole or in part out of or by reason of the failure of buyer, its agents, servants, employees or customers to follow instructions, warnings or recommendations furnished by seller in connection with such goods and services, by reason of the failure of buyer, its agents, servants, employees or customers to comply with all federal, state and local laws applicable to such goods and services, or the use thereof, including the Occupational Safety and Health Act of 1970, or by reason of the negligence or misconduct of buyer, its agents, servants, employees or customers.

8. EXPENSES OF ENFORCEMENT. In the event seller undertakes any action to collect amounts due from buyer, or otherwise enforce its rights hereunder, Buyer agrees to pay and reimburse Seller for all such expenses, including, without limitation, all attorneys and collection fees.

9. TAXES. Liability for all taxes and import or export duties, imposed by any city, state, federal or other governmental authority, shall be assumed and paid by buyer. Buyer further agrees to defend and indemnify seller against any and all liabilities for such taxes or duties and legal fees or costs incurred by seller in connection therewith.

10. ASSISTANCE AND ADVICE. Upon request, seller in its discretion will furnish as an accommodation to buyer such technical advice or assistance as is available in reference to the goods and services. Seller assumes no obligation or liability for the advice or assistance given or results obtained, all such advice or assistance being given and accepted at buyer's risk.

11. SITE SAFETY. Buyer shall provide a safe working environment at the site of services and shall comply with all applicable provisions of federal, state, provincial and municipal safety laws, building codes, and safety regulations to prevent accidents or injuries to persons on, about or adjacent to the site.

12. INDEPENDENT CONTRACTOR. Seller and Buyer are independent contractors and nothing shall be construed to place them in the relationship of partners, principal and agent, employer/employee or joint ventures. Neither party will have the power or right to bind or obligate the other party except as may be expressly agreed and delegated by other party, nor will it hold itself out as having such authority.

13. REIMBURSEMENT. Seller shall provide the products and services in reliance upon the data and professional judgments provided by or on behalf of buyer. The fees and charges associated with the products and services thus may not conform to billing guidelines, constraints or other limits on fees. Seller does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where seller may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by seller, it is the sole responsibility of the buyer or other entity seeking reimbursement to ensure the products and services and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, seller does not knowingly present or cause to be presented any claim for payment to the Government.

14. APPLICABLE LAW/JURISDICTION AND VENUE. The rights and duties of the parties shall be governed by, construed, and enforced in accordance with the laws of the State of California (excluding its conflict of laws rules which would refer to and apply the substantive laws of another jurisdiction). Any suit or proceeding hereunder shall be brought exclusively in state or federal courts located in Orange County, California. Each party consents to the personal jurisdiction of said state and federal courts and waives any objection that such courts are an inconvenient forum.

15. ENTIRE AGREEMENT. This agreement constitutes the entire contract between buyer and seller relating to the goods or services identified herein. No modifications hereof shall be binding upon the seller unless in writing and signed by seller's duly authorized representative, and no modification shall be effected by seller's acknowledgment or acceptance of buyer's purchase order forms containing different provisions. Trade usage shall neither be applicable nor relevant to this agreement, nor be used in any manner whatsoever to explain, qualify or supplement any of the provisions hereof. No waiver by either party of default shall be deemed a waiver of any subsequent default.

PetroFIX™
Remediation Fluid

DIRECT PUSH APPLICATION INSTRUCTIONS

PetroFIX™
Remediation Fluid

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PetroFIX™ Remediation Fluid

INTRODUCTION

One of the methods to deliver PetroFix™ Remediation Fluid (PetroFix) into the subsurface is to inject the material through direct push rods using hydraulic equipment. This approach increases the spreading and mixing of PetroFix into the aquifer. This set of instructions is specific to the direct push injection of PetroFix. For advice on other potential delivery techniques please contact REGENESIS directly at 949-366-8000 or send an inquiry to info@petrofix.com.

PetroFix should be installed with the goal of having the material fully coat all conductive zones of an aquifer to prevent any mobility or escape of contaminants to downgradient locations. Because PetroFix is a liquid-carbon suspension amended with soluble electron acceptors, it flows easily into most aquifers using relatively low-pressure. Adequate injection volume is needed to ensure that PetroFix contacts enough aquifer pore-space to fully coat aquifer transmissive zones and the starting volumes recommended to achieve this goal is provided as part of the PetroFix design assistant output. To achieve optimal contact and coverage with PetroFix, we recommend that the user consider these estimates as a starting point and be willing to adjust injection volumes and injection tooling as described later in this document.

When PetroFix is injected properly it will evenly coat the soil matrix across the horizontal and vertical transport zones of an aquifer and will appear as if the aquifer was "painted" black as shown in Figure 1. Most soils prior to PetroFix application are either brown or grayish in color and the presence of PetroFix post application is very evident.

PetroFix Distribution Goal

Fully coat all aquifer conductive pathways in the treatment zone with PetroFix and adjust field injection spacing, injection volumes, injection pressure, or injection tooling to accomplish that goal.

PetroFIX™
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FIGURE 1 *The photo on the left shows a soil core collected before a PetroFix application. The photo on the right shows a soil core collected after a PetroFix application exhibiting black soil where the PetroFix was successfully distributed.*

DIRECT PUSH GUIDANCE

Typical Installation Equipment and Supplied Needed

- Secure storage area
- Qualified driller/applicator
- Water source for mixing
- Access to electricity
- Appropriate Personal Protective Equipment (PPE) PetroFix SDS
- Direct Push Rig (such as a Geoprobe®) and associated probe tooling
- Mixing tanks – size based on product quantity to be applied per injection point
- Drum mixer for homogenizing PetroFix in its 55-gallon drums [can be power drill paint stirrer (3-inch diameter or smaller propeller tip)]
- Injection tooling with fluid delivery sub-assembly (see injection tooling section)
- Injection pump rated to at least 200 psi and at least 5 gpm
- Injection hosing and pressure relief valve with a bypass (make sure all equipment is rated for expected injection pressures required)
- Hosing between mixing tank/drum and pump
- Pressure gauges to monitor injection pressure
- Flow meter for tracking injection volumes (or use visual drops in tank volumes over time)
- Pressure regulator to prevent pressure spikes (recommended, but not mandatory)
- Granular bentonite or grout to abandon completed injection boreholes. Some regulatory agencies have specific requirements for backfilling subsurface borings, so check with your local agency prior to beginning field work.
- Quick-set concrete or asphalt patch for surface closing

FIGURE 2 *PetroFix ships in 55-gallon poly drums (400 lb of product) plus one 20 lb bucket of electron acceptor blend per drum*

PERSONAL PROTECTIVE EQUIPMENT

Personnel working with or in areas where there is a potential for contact with PetroFix should be required at a minimum to be fitted with Level D personal protective equipment. However, this recommendation is only for PetroFix and does not supersede additional precautions due to site conditions and potential exposures.

PPE should be upgraded from modified Level D based on site-specific hazards and requirements.

PETROFIX APPLICATION STEPS

Injection Preparation and Mixing

1) Print a copy of the Area Summaries for your site created in the PetroFix App.

2) Review design with drilling crew.

3) Review SDS during health and safety tailgate.

4) Walk the site and make note of any obstacles or infrastructure that may impede application based on utility locates.

a. Make sure you have called in utility locates before mobilizing to the site.

b. Prior to the installation of PetroFix, identify any surface or overhead impediments as well as the location of all underground structures. Underground structures include but are not limited to: utility lines, tanks, distribution piping, sewers, drains, and landscape irrigation systems.

c. The planned installation locations should be adjusted to account for all impediments and obstacles while being mindful of PetroFix distribution needs.

5) Mark injection points based on site design provided in the PetroFix App.

a. Outlining injection area.

b. Mark all points and note any points that may have different vertical application requirements or total depth.

c. Ensure points are spaced appropriately based on recommended design provided by the PetroFix App.

6) Set up area for mixing PetroFix Remediation Fluid with water and PetroFix Electron Acceptor Blend.

7) Assemble product transfer system.

8) Assemble injection system.

9) NOTE: REGENESIS recommends injecting clean water (i.e. water without PetroFix mixed in) prior to mixing a PetroFix batch to check for leaks within the mixing and injection system. Repair any leaking equipment prior to mixing PetroFix in the mix tank.

a. It is critical to always depressurize the injection lines before disconnecting any fittings . This can be accomplished by fitting a bleed off valve near the injection pull cap (see Figure 3 below).

10) Advance the probe rods to the first vertical treatment interval and inject clean water into the interval while monitoring for leaks. If the leak test proved successful, continue to mix PetroFix into the mixing system.

a. During this step make sure to account for pressures and make sure the equipment is rated for the expected pressures.

11) Always add water to mixing tank prior to adding PetroFix Remediation Fluid

12) Always pre-mix PetroFix in its container prior to pumping material out of the container

a. **Note:** PetroFix drums are not completely full and PetroFix fills to roughly 10 to 12 inches below the top of the drum (See Figure 4).

13) Transfer designed ratio of PetroFix remediation fluid to the water in the mix tank. **Recommended batch sizes should range from 50 to 350 gallons to aid in easy mixing and for measuring injection volumes per point.**

14) Thoroughly mix PetroFix solution in the mixing tank using an impeller type drum mixer or by recirculating the product inside the tank.

15) Add recommended ratio of PetroFix Electron Acceptor Blend to the mixed solution in the tank. One tip is to use a scale to measure mass of electron acceptor blend needed for partial mix batches (Figure 4). Standard dosing is one bucket of electron acceptor blend per one drum of PetroFix.

a. **DO NOT mix PetroFix Electron Acceptor (EA) blend from the 20 lb buckets into undiluted PetroFix Remediation Fluid in the drums or totes. Only add the PetroFix EA blend into the diluted PetroFix solution in the mix tank.**

FIGURE 3 *LEFT: The pull cap can be outfitted with a bleed off valve to depressurize injection lines prior to breaking probe rods to advance to next vertical treatment interval. RIGHT: Geoprobe injection pull cap (1.5").*

FIGURE 4 *Image on left shows undiluted PetroFix in a drum prior to homogenization. PetroFix doesn't fully fill the drum and this is normal (a 400 lb drum of PetroFix contains approximately 41 gallons of product). The image in the middle shows an example transfer and PetroFix mixing setup where a 330-gallon tote was chosen as the mix tank. The picture on the right shows some PetroFix electron acceptor being weighed before placement into the mixing tank.*

Injecting PetroFix

1) Set up the direct push unit over each specific point and follow the manufacturer standard operating procedures (SOP) for the direct push equipment. Care should be taken to ensure that the probe holes remain in the vertical. If there are enough personnel, this step can be accomplished while other attend to the mixing phase.

a. To prevent fluid and pressure loss between probe rod connections, we advise that the threads be Teflon® taped for the best possible seal.

2) Advance drive rods through the surface and through any pavement or concrete at locations cleared for utilities, as necessary, following SOP.

a. Assure all personnel have hearing protection during this step when close to the direct push rig.

3) Push the drive rod assembly with your selected tool tip to the desired depth. This depth will depend on if you are performing a bottom up or top down injection – see section on "Examples of PetroFix Injection Tooling". REGENESIS suggests pre-counting the number of drive rods needed to reach depth prior to beginning injection activities.

4) After the drive rods have been pushed to the desired depth, apply the designed quantity of prepared PetroFix solution at the target treatment intervals specified in the design. The target injection volume will be determined by multiplying the volume per foot by the injection tooling length.

a. As a rule-of-thumb, 20 to 100 psi and 2 to7 gpm flow rates are common through a single injection point.

b. Whip checks should be used throughout the process when working with pressurized hoses.

5) Once target volume is reached, close off the injection line leading to the probe rods and depressurize the injection lines by draining the product into a bucket or similar. Use caution before and during opening any injection lines as there might be backpressure that could kick back or spray. See Figure 3 for an example of an injection pull cap outfitted with a bleed off valve.

6) Continue mixing and injecting the combined solution using the target injection volumes for the injection point described in the PetroFix design output page.

7) Once all injection points are completed, begin site cleanup by emptying the drums and flushing all injection lines using clean water. Product containers can be recycled after they are rinsed.

8) Dispose of any waste and residue in accordance with local authority requirements.

EXAMPLES OF PETROFIX INJECTION TOOLING

Injection tooling can be selected based on the type of soil present, logistic needs of the site, and prior experience of the consultant and injection crews. Our suggestions below are not exhaustive, but enough to outline injection tips common to most injection contractors. We advise that injection distribution is verified in field regardless of injection tooling used (see section of **"Verifying PetroFix Distribution In The Field"**). Injection tooling can be chosen in a variety of sizes (1.25", 1.5", 1.75", and 2.25"). Most environmental drillers will carry probe rods with 1.5" and 2.25" diameters for soil sampling and these same sizes can be used for injection. Geoprobe manufactures an injection pull cap that is designed to thread directly onto Geoprobe threaded probe rods. These pull caps can be outfitted with a bleed off valve steel pipe fittings available from McMaster-Carr®, Grainger®, or pipe fitting supply stores.

Multi-Port Bottom-Up Retractable or Multi-Port Top-Down Injection Tooling.

For injecting at lower pressures (typically below 60 psi) and maintaining relatively high volumetric injection rates, **REGENESIS recommends using multi-port retractable or top-down injection tooling** using 1-foot, 2-foot, or larger exposed injection screens (See Figure 5). An advantage of these types of tooling is they usually require no pre-probing and allows targeting larger vertical intervals of the aquifer. Retractable injection tooling also allows for semi-discrete targeting of the aquifer and allowing PetroFix to flow into hard to identify small or large conductive zones that are likely contaminant transport pathways.

EXAMPLES OF BOTTOM-UP RETRACTABLE OR TOP-DOWN INJECTION TOOLING:

- Variety of 1.5" OD bottom-up retractable and top-down injection tooling in different lengths available (Figure 5).
  https://www.shop-esp.com/ESP-Injection-Tooling-C517.aspx

- See section on remediation injection tooling for retractable remedial Injection tooling (RRIT) options.
  https://www.ams-samplers.com/powerprobe/direct-push-tooling-catalog.html

FIGURE 5 *Image on the left is an Environmental Service Products (ESP) bottom-up retractable tool. Image on the right is an ESP top-down injection tool.*

TIPS ON USING BOTTOM-UP RETRACTABLE OR TOP-DOWN INJECTION TOOLING:

- It is advisable not to exceed 24" of exposed retractable screen in silts and clays which will give you better control of the vertical distribution of the PetroFix solution.

- Larger than 24" injection tooling can be used in homogeneous, permeable soils (sand and gravel) where more even product distribution is expected through exposed screen if enough flow rate and pressure can be maintained.

- The selection of bottom-up retractable or top-down injection depends on the preference and experience of the drilling operator. A top-down tool is more robust when hammered into hard soils and allows the applicator to more quickly set a vertical interval without the need to pull the rods back; however, the top-down tool is more prone to clogging if pushing through silts or clays to get to the injection interval.

PRESSURE ACTIVATED TOOL TIP

Many injection companies make use of a pressure activated injection probe (Figure 6) that is supplied by Geoprobe®. These probes are effective in aquifers that have a higher permeability (high percentage of sand); however, in tighter formations these tool tips tend to generate enough pressure to cause hydraulic fracturing of PetroFix that may result in uncontrolled placement or surfacing.

TIPS ON USING PRESSURE ACTIVATED TOOLING:

- Top-down injection usually recommended in most formation with this tip.
- Be cautious of hydraulic fracturing with this tip. To get the uniform distribution shown in Figure 1 this approach may require that the vertical distance between push-and-inject intervals as low as 1 to 2 feet to prevent gaps in product coverage vertically.

FIGURE 6 *Image of Geoprobe® pressure activated injection probe*

EXPENDABLE DRIVE POINTS AND INJECTION THROUGH ROD BOTTOM

Bottom-up injection using expendable tool tips (Figure 7) is an option if the aquifer grades from tight soils at maximum injection depth to permeable soils at minimum injection depth, for instance injecting into clay or silt that grades to sand as you approach the surface. If the geology were reversed, one needs to be concerned about preferential delivery of PetroFix into deeper zones as the rod is raised and the PetroFix fluid preferentially flows to the zone of least resistance down the injection hole. For flowing sands and highly permeable environments, injection through rod bottom can achieve effective product delivery. The vertical distance between pull-and-inject lifts may need to be as low as 1 to 2 feet to prevent gaps in product coverage vertically. Bottom-up injection with expendable drive points offers the least control over injection and is least recommended, particularly for soils with silts and clays.

FIGURE 7 *Geoprobe® expendable steel point allowing for bottom-up injection through rod opening.*

VERIFYING PETROFIX DISTRIBUTION IN THE FIELD

PetroFix has the unique advantage of being its own tracer due to being black in color and this fact can be used to verify its distribution in the field. The PetroFix Design assistant **(https://petrofix.com/design/)** is an excellent starting point to estimate spacing and volumes to use for an application, but one should expect to make some minor adjustments in field due to natural variability of geology and pore space.

The easiest way to determine if PetroFix is distributing is to collect one or more soil cores at your site after the first 2 to 4 injection points have been placed. Most direct push operators have the tools required for rapid soil core sampling and we recommend that you double check this when bidding out your work. We recommend that a soil core be collected with the following criteria:

1. Take the observational soil core half-way between two PetroFix injection points or half the spacing distance away from any given injection point;

2. Take the observational soil core over the entire vertical interval. This may require more than one core be taken.

If you see a strong black color (like Figure 1 or Figure 8 below) coating the conductive zones of your aquifer, then congratulations as you are achieving product distribution. If you don't observe black, then you are not making distribution and should diagnose the reason why. It is important that PetroFix be observed both laterally and vertically at your site. It also is important to investigate if your injection is distributing PetroFix into the one or more geologic conductive zones at your site. A small percentage of sites may have dark or black soils because of hydrocarbon staining and it is important to distinguish if this is the case. Ideally, we recommend that you take a baseline soil core before injection and then compare this to one or more post-injection samples to see the difference.

FIGURE 8 *Photo showing an in-field verification of PetroFix distribution and its optimal coverage. Gray soil in upper right shows the edge of the injection zone where PetroFix not injected.*

Here are a few tips if PetroFix is not observed in your soil core:

- **Double check injection pressures** – Am I injecting with a steady pressure? If not, consider increasing pressure (which will also be increasing volumetric flow rate). If you are very low in pressure (<10 psi) it may be that you are not achieving enough product velocity to cause delivery far enough from your injection points. As a general rule-of-thumb most sites range in pressure from 20 to 100 psi and volumetric injection rates of 5 to 7 gpm. If you are not exceeding fracture pressures and are getting uniform distribution, then feel free to use the maximum volumetric flow rates or pressures that you can achieve.

- **Double check spacing** – Am I within the recommended spacing suggested by the PetroFix design assistant? If not, consider tightening spacing.

- **Double check volumes** – Have I injected the recommended volume of water and product together? If not, inject recommended volumes of water.

If spacing, volumes, and injection pressures are as initially designed, and you are still not getting distribution, it may be that the aquifer has a higher pore space than assumed for design purposes. Consider increasing the dilution water used for PetroFix by increments of 10% to 15% volume until distribution is achieved. Furthermore, it may be that the injection tooling you are using is not suited to your aquifer type and you should consider changing injection tooling.

Alternatively, you may find that you need less mix water and PetroFix verification testing can be used to minimize needed water if your effective porosity is less than designed for. If less water is needed to obtain the required ROI then we recommend that you reduce the overall injection volume, but keep the same design spacing versus spreading the points farther apart.

PetroFIX™ Remediation Fluid

Q: "How do I know if I am fracturing soil and having uncontrolled product placement?"

A: *Fractures are induced by rapid pressure build-up followed by high volumetric flow rates. If you notice a spike in pressure followed by a rapid drop in pressure, yet high-volumetric flow rates are sustained it is likely that you are pushing PetroFix into created fractures. You may not see any observable evidence of this happening or you may begin to see surfacing into utility corridors, ground surface, etc. We advise that pump pressures are slowly increased as well as volumetric flow rates where everything is steady without big pressure spikes and big pressure drops. The use of a pressure regulator as mentioned in the equipment list to prevent pressure spikes and the use of pressure gauges between the pump and the injection rods is very important to be able to monitor this process. Soil sampling is a good visual method to answer your questions as to if you are getting uniform and complete coverage or if you are creating fractures.*

Regarding the monitoring of pressures, it is common to see pressures rise to the point that fluid begins moving into the formation and then those pressures gradually decrease (versus a rapid decrease). This is different than the hydraulic fracturing of soil. We see this as a normal initiation pressure as the PetroFix fluid needs to overcome either partially occluded pore space immediately around the tooling because of soil smearing or through the compaction of soils around the tooling that can happen when the tooling is pushed into the formation.

Q: "What if I want to try and achieve larger injection spacing than the PetroFix Design Assistant Specifies?"

A: *Many customers ask if they can use injection spacing larger than specified by our PetroFix Design Assistant. Our answer is that we believe that our recommended spacing is a good recommendation and starting point (typically 5 ft- to 6.5 ft-on-center), particularly for sites with more silt and clay than sand. However, sites do vary in their characteristic effective porosities and percentage of fine-grained to course-grained materials and how they are layered. If stable pressures and flows are maintained, then it may be that larger ROI's can be achieved given the starting volumes that were calculated. If this is the case, our recommendation is to maintain injection spacing but reduce injection volumes to cut down on field time.*

However, if you want to spread injection points out, we encourage you to explore the ability to do so by performing an injection and follow the PetroFix distribution verification process we discussed earlier to document that you achieved distribution. If you can document distribution and are able to accommodate the change in volume injected and time spent per point you should feel free to use whatever spacing can be accommodated.

PETROFIX PUMP INFORMATION

REGENESIS strongly recommends using a pump with a minimum pressure rating of 200 pounds per square inch (psi) and a minimum delivery rate of 5 gallons per minute (gpm). A lower gpm rated pump can be used; however, they are not recommended due to the amount of time required to inject the volume typically associated with a PetroFix injection (i.e. 1,200 lb of PetroFix with 60 lb PetroFix Electron Acceptor will require 2,460 gallons of water to make a 5% by volume PetroFix solution).

PUMP CLEANING

Internal pump mechanisms and hoses can be easily cleaned by circulating water through the pump and injection lines until clear. Flush water can be injected into the treatment zone. Further cleaning and decontamination (if necessary due to subsurface conditions) should be performed according to the equipment supplier's standard procedures and local regulatory requirements.

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San Clemente, CA 92673

APPENDIX C

SAFETY DATA SHEETS

SAFETY DATA SHEET

1. Identification

Product identifier **PetroFix**

Other means of identification None.

Recommended use Remediation of contaminants in soil and groundwater.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673 USA

General information 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number For Hazardous Materials Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC 24/7 at:

USA, Canada, Mexico 1-800-424-9300

International 1-703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Activated carbon <10 µm	7440-44-0	>25
Calcium sulfate dihydrate	10101-41-4	<10
Additive	-	<2

Composition comments All concentrations are in percent by weight unless otherwise indicated.
Components not listed are either non-hazardous or are below reportable limits.
Chemical ingredient identity and/or concentration information withheld for some or all components present is confidential business information (trade secret), and is being withheld as permitted by 29 CFR 1910.1200(i).

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: carbon oxides, nitrogen oxides, sulfur oxides, calcium oxide.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	This material will not burn until the water has evaporated. Residue can burn. When dry may form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid prolonged exposure. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Activated carbon <10 µm (CAS 7440-44-0)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Activated carbon <10 µm (CAS 7440-44-0)	TWA	2 mg/m3	Respirable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Calcium sulfate dihydrate (CAS 10101-41-4)	TWA	10 mg/m3	Inhalable fraction.

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Skin protection

Other Wear suitable protective clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Aqueous suspension.

Color Not available.

Odor Not available.

Odor threshold Not available.

pH 8 - 10

Melting point/freezing point Not available.

Initial boiling point and boiling range 212 °F (100 °C)

Flash point Not available.

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%) Not available.

Vapor pressure Not available.

Vapor density Not available.

Relative density Not available.

Solubility(ies)

Solubility (water) Not available.

Partition coefficient (n-octanol/water) Not available.

Auto-ignition temperature Not available.

Decomposition temperature Not available.

Viscosity Not available.

Other information

Explosive properties Not explosive.

Oxidizing properties Not oxidizing.

10. Stability and reactivity

Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.

Chemical stability Material is stable under normal conditions.

Possibility of hazardous reactions No dangerous reaction known under conditions of normal use.

Conditions to avoid Contact with incompatible materials. Avoid drying out product. May generate combustible dust if material dries.

Incompatible materials Strong oxidizing agents. Acids.

Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation Spray mist may irritate the respiratory system. For dry material: Dust may irritate respiratory system.

Skin contact Prolonged or repeated exposure may cause minor irritation.

Eye contact Direct contact with eyes may cause temporary irritation.

Ingestion May cause discomfort if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity Not expected to be acutely toxic.

Components	Species	Test Results
Activated carbon <10 µm (CAS 7440-44-0)		
Acute		
Oral		
LD50	Rat	> 10000 mg/kg

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

15. Regulatory information

US federal regulations	This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Calcium sulfate dihydrate (CAS 10101-41-4)

US. New Jersey Worker and Community Right-to-Know Act

Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Activated carbon <10 µm (CAS 7440-44-0)
Calcium sulfate dihydrate (CAS 10101-41-4)

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 15-February-2018

Revision date -

Version # 01

HMIS® ratings Health: 1
Flammability: 1
Physical hazard: 0

NFPA ratings

Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

SAFETY DATA SHEET

1. Identification

Product identifier **PetroFix Electron Acceptor Blend**

Other means of identification None.

Recommended use Remediation of soils and groundwater.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673 USA

General information 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number For Hazardous Materials Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC 24/7 at:

USA, Canada, Mexico 1-800-424-9300

International 1-703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Serious eye damage/eye irritation Category 2B

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word Warning

Hazard statement Causes eye irritation.

Precautionary statement

Prevention Wash thoroughly after handling.

Response If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Ammonium sulfate	7783-20-2	40 - 60
Sodium nitrate	7631-99-4	40 - 60

Composition comments All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. Dusts may irritate the respiratory tract, skin and eyes.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Use extinguishing agent suitable for type of surrounding fire.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: nitrogen oxides, sulfur oxides, ammonia.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Material will not burn.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Avoid the generation of dusts during clean-up. Collect dust using a vacuum cleaner equipped with HEPA filter. Stop the flow of material, if this is without risk. Large Spills: Wet down with water and dike for later disposal. Absorb in vermiculite, dry sand or earth and place into containers. Shovel the material into waste container. Following product recovery, flush area with water. Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Minimize dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Avoid contact with eyes. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls	Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Provide eyewash station.

Individual protection measures, such as personal protective equipment

Eye/face protection	Unvented, tight fitting goggles should be worn in dusty areas.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment. Wear NIOSH approved respirator appropriate for airborne exposure at the point of use. Appropriate respirator selection should be made by a qualified professional. Recommended use: Wear respirator with dust filter.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Powder.
Color	White.
Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	This material will not burn.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials. Heat.
Incompatible materials	Strong reducing agents. Strong acids.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system.
Skin contact	Dust or powder may irritate the skin.
Eye contact	Causes eye irritation.
Ingestion	May cause discomfort if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics	Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. Dusts may irritate the respiratory tract, skin and eyes.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Causes eye irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Further information	Nitrate poisoning resulting in methemoglobinemia manifested as cyanosis is rare, but possible for people with specific susceptibility traits.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	The product solely consists of inorganic compounds which are not biodegradable.
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes
Classified hazard categories	Serious eye damage or eye irritation

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Ammonium sulfate	7783-20-2	40 - 60
Sodium nitrate	7631-99-4	40 - 60

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Ammonium sulfate (CAS 7783-20-2)
Sodium nitrate (CAS 7631-99-4)

US. New Jersey Worker and Community Right-to-Know Act

Sodium nitrate (CAS 7631-99-4)

US. Pennsylvania Worker and Community Right-to-Know Law

Ammonium sulfate (CAS 7783-20-2)
Sodium nitrate (CAS 7631-99-4)

US. Rhode Island RTK

Ammonium sulfate (CAS 7783-20-2)
Sodium nitrate (CAS 7631-99-4)

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 15-August-2018

Revision date -

Version # 01

HMIS® ratings

Health: 1
Flammability: 0
Physical hazard: 0

NFPA ratings

Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.