FORMER GETTY SERVICE STATION #00564
1107 DeKalb Avenue
KINGS COUNTY
BROOKLYN, NEW YORK
Block 1600 Lot 28

SITE MANAGEMENT PLAN

NYSDEC Site Number: C224176

Prepared for:
1107D LLC
45 North Station Plaza, Suite 315
Great Neck, NY 11021

Prepared by:

AMC Engineering PLLC
18-36 42nd Street
Astoria, NY 11105

Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date

DECEMBER 2019

CERTIFICATIONS

I, Ariel Czemerinski, certify that I am currently a NYS registered professional engineer and that this Site Management Plan 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).

076508	12/10/2019	
NYS Professional Engineer #	Date	Signature

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LIST OF ACRONYMS

Acronym	Definition
ASP	Analytical Services Protocol
AWQS	Ambient Water Quality Standards (6 NYCRR Part 703)
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BTEX	Benzene, toluene, ethylbenzene and xylene
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CLP	Contract Laboratory Program
COC	Certificate of Completion
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
EWP	Excavation Work Plan
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RSO	Remedial System Optimization
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Soil Management Plan
SOP	Standard Operating Procedures
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
SVMS	Soil Vapor Mitigation System
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank

EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: Site No: C224176

Former Getty Service Station #00564

Site Address: 1107 DeKalb Avenue, Brooklyn NY

Institutional Controls:	1. The property may be used for restricted residential, commercial, and industrial uses;
	2. The remedial party or site owner must complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
	3. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
	4. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
	5. All ECs must be operated and maintained as specified in this SMP;
	6. All ECs must be inspected at a frequency and in a manner defined in the SMP.
	7. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
	8. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
	9. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
	10. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
	11. Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
Engineering Controls:	1. Soil Vapor Extraction System

Site Identification: Site No: C224176
Former Getty Service Station #00564

Site Address: 1107 DeKalb Avenue, Brooklyn NY

	2. Site Cover System
Inspections:	**Frequency**
1. Soil Vapor Extraction System	Quarterly
2. Site Cover System	Annual
Monitoring:	**Frequency**
1. Soil Vapor Extraction System	Quarterly
2. Groundwater Sampling	Quarterly

Maintenance:	**Frequency**
Soil Vapor Extraction System:	
1. Blower Maintenance	As needed
2. Replacement of GAC units	As needed
Groundwater Monitoring Wells:	
1. Injection Well and Monitoring Well Maintenance	As needed

Reporting:	**Frequency**
1. Groundwater Data	Quarterly
2. SVE Discharge Monitoring	Quarterly
3. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Former Getty Service Station #00564 site located in Brooklyn, New York (hereinafter referred to as the "Site"). The site location map can be found in **Figure 1**. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP) Site No. C224176, which is administered by New York State Department of Environmental Conservation (NYSDEC).

1107D LLC entered into a Brownfield Cleanup Agreement (BCA) on May 30, 2014 with the NYSDEC to remediate the Site. **Figure 2** shows the Site boundary. The boundaries of the Site are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in **Attachment C**.

After completion of the remedial work, some contamination was left at this Site, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs/ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement, granted to the NYSDEC and recorded with the New York City Office of the City Register, requires compliance with this SMP and all ECs and ICs placed on the Site.

This SMP was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the BCA (Index #C224176-05-13; Site No. C224176) for the Site, and thereby subject to applicable penalties.

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided as **Attachment A** of this SMP.

This SMP was prepared by AMC Engineering, PLLC (AMC), on behalf of 1107D LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the Site.

1.2 Revisions

Revisions to this SMP shall be proposed in writing to the NYSDEC Project Manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements; upgrades to or shut-down of a remedial system; post-remedial removal of contaminated sediment or soil; or other significant change to Site conditions. In accordance with the Environmental Easement for the Site, NYSDEC will provide a notice of any approved changes to the SMP and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6NYCRR Part 375 and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Brownfield Cleanup Agreement (BCA), and all approved work plans and reports, including this SMP.

- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to NYSDEC.

Table 1, below, includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in **Attachment A**.

Table 1: Notifications*

Name	**Contact Information**
NYSDEC Project Manager: Shaun Bollers	(718) 482-4096; shaun.bollers@dec.ny.gov
NYSDEC Regional HW Engineer Jane O'Connell	718-482-4599; jane.oconnell@dec.ny.gov
NYSDEC Site Control Kelly Lewandowski	518-402-9581; kelly.lewandowski@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Site is located at 1107 DeKalb Avenue, in Brooklyn, Kings County, New York and is identified as Section 1900 Block 1600 and Lot 28 on the New York City Tax Map (**Figure 1**). The Site is an approximately 0.218-acre area located on the northeast corner of DeKalb Avenue and Malcolm X Boulevard. The Site is bounded by a 67-story mixed-use apartment building (Block 1600, Lot 4 – 1080 Broadway) to the north, a 2-story mixed-use apartment building with a first floor store (Block 1600, Lot 10 – 1086 Broadway) and a 3-story mixed-use apartment building with a first floor store (Block 1600, Lot 27 – 1009 DeKalb Avenue) to the east, DeKalb Avenue to the south, and Malcolm X Boulevard to the west (see **Figure 2** – Site Layout Map). The boundaries of the site are more fully described in **Attachment C** –Environmental Easement.

The owner(s) of the Site parcel(s) at the time of issuance of this SMP is:

1107D LLC
45 North Station Plaza, Suite 315
Great Neck, NY 11021

2.2 Physical Setting

2.2.1 Land Use

The Site consists of a new 6-story hotel building with a cellar. The Site is zoned C4-4L. The hotel building is currently under construction, and is not yet occupied.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include residential properties, some with first floor stores. The adjacent properties to the north and east are developed with mixed-use apartment buildings. Most properties along DeKalb Avenue to the south and west are developed with residential apartment buildings, some with first floor stores.

2.2.2 Geology

Subsurface soils at the Site include a silty non-native fill, fine to coarse sand and sandy silt to a depth of approximately 10 feet below grade (removed during site excavation), followed by sandy-clay to a depth of approximately 15 feet below grade, followed by medium/coarse grained gravelly sands to the water table (approximately 46 feet below grade).

A geologic cross-section is shown in **Figure 3**. Site specific boring logs are provided in **Attachment D**.

2.2.3 Hydrogeology

The depth to groundwater at the Site as determined during the Remedial Investigation varied between 46.13 ft and 47.93 ft below grade. Monitoring wells installed as part of the Remedial Investigation were surveyed to determine groundwater flow direction, which is generally toward the west at the Site (**Figure 4**). Prior to remedial activities, three new monitoring wells (MW1401, MW1402 and MW1403) were installed at the Site to determine the effectiveness of the chemical oxidant injection program. Monitoring wells MW1401 – MW1403 were installed in the sidewalk along the western perimeter of the Site, immediately down gradient of the former petroleum source area. Groundwater monitoring well construction logs are provided in **Attachment D**.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

2.3.1 July 2011- September 2011 – Quarterly Monitoring Report (Tyree)

This quarterly monitoring report prepared by Tyree documents and summarizes the results of on-going monitoring at the Site which began in July 2000. According to the report, there were six monitoring wells within the property boundaries and two monitoring wells in the adjacent sidewalk along Malcolm X Boulevard during the reporting period. The groundwater monitoring wells were sampled for STARs list volatile organic compounds (VOCs) by EPA method 8260.

VOCs were reported above standards in 4 of the 7 wells with total VOCs ranging from 828 µg/L to 3,812 µg/L.

2.3.2 Limited Phase II Subsurface Investigation (EBC, February 2013)

On February 12, 2013, a limited Phase II investigation began at the Site as part of due diligence to complete the purchase of the property. Although eight borings and groundwater samples were planned, only four borings were installed due to accessibility issues, weather conditions and scheduling constraints. A total of four soil samples and six groundwater samples, including three from the borings and three from existing monitoring wells, were collected. Soil samples were submitted for analysis of VOCs, PCBs and metals. Groundwater samples were submitted for analysis of VOCs only.

The results of this limited investigation showed elevated petroleum VOC levels in two of the four soil samples (from the 7-9ft below grade interval and 13-15 ft below grade interval) with total VOCs ranging from 184,000 µg/kg to 705,600 µg/kg. Xylenes, naphthalene, and n-propylbenzene were reported above unrestricted use soil cleanup objectives (SCOs) while 1,2,4-trimthylbenzene, 1,3,5-trimethylbenzene and ethylbenzene were all reported above restricted residential SCOs. In addition to the VOCs, one metal, chromium, was also reported in two soil samples above the Unrestricted Use SCO.

Petroleum-related VOCs were reported above standards in four of six groundwater samples ranging from 605 µg/L to 7,993 µg/L. Chlorinated VOCs were reported above standards in five of the six samples, ranging from 22 µg/L to 34 µg/L.

2.3.3 Remedial Investigation Report (EBC, October 2014)

The Remedial Investigation (RI) was performed by EBC following acceptance into the NYSDEC Brownfield Cleanup Program and in accordance with the approved Remedial Investigation Work Plan (RIWP). The Remedial Investigation consisted of the collection and laboratory analysis of soil, groundwater and soil gas samples.

A total of 12 soil borings (B1302 and B1304 through B1314) were performed to identify source areas and to obtain general soil quality information at the Site. Gasoline related VOCs were detected above Unrestricted Use SCOs and Restricted Residential Use SCOs (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, m&p-xylenes and naphthalene in B1308) within the soil sample retained from the groundwater table interface (45-47 ft) from soil boring B1308. Gasoline related VOCs were also detected above Unrestricted Use SCOs within soil samples B1302 (13-15ft), B1309 (0-2ft) and B1304 (7-9ft).

Six groundwater samples were collected from three boring locations (B1302, B1304, and B1306) and three existing monitoring wells (MW 2 through MW4) in February 2013 and four groundwater monitoring wells (MW1309 through MW1312) were installed in March/April 2014. The wells were installed at a depth of 55 feet below grade with 10 feet of 0.010 PVC well screen and 40 feet of PVC riser. Gasoline related VOCs were detected above Groundwater Quality Standards (AWQS) in six of the ten groundwater samples collected onsite. BTEX concentrations ranged from 373 µg/L in MW4 to 1,500 µg/L in B1302 during the February 2013 sampling event and 28.7 µg/L in MW1311 to 37 µg/L in MW1312 during the April sampling event. No benzene was detected in any of the samples obtained during either the February or April groundwater sampling events.

The highest concentrations of BTEX were detected adjacent to the current and former tank field as well as the former dispenser island. The chlorinated VOCs (CVOCs) tetrachloroethene (PCE), trichloroethene (TCE) and cis-1,2-Dichloroethene (cis-DCE), detected above its groundwater standard in one or more of the samples obtained in February 2013. Only one CVOC, TCE, was reported above standards in all four wells during the April 2014 sampling event. Two SVOC parameters, benzo(a)anthracene and chrysene, were detected at concentrations above groundwater quality standards in all 4 monitoring wells. Total SVOC concentrations in samples with individual parameters above standards ranged from 0.05 µg/L in MW1310 to 44.43 µg/L in MW1311.

To assess the presence of VOCs in soil vapor beneath the Site, five soil vapor samples (SG1-SG5) were collected from a depth of approximately 12 feet below grade. Multiple VOCs were

detected above the laboratory method detection limit in each of the soil gas samples collected as well as the ambient outdoor air sample. BTEX concentrations were generally low to moderate throughout the Site, with the exception of SG2 located adjacent to the current tank field. BTEX concentrations ranged from 97.34 µg/m^3 in SG1 located along the northern property line to 417.4 µg/m^3 in SG4 located along the southwestern property line, and 1.66 µg/m^3 in the ambient outdoor sample. Total BTEX concentrations at location SG2, adjacent to the former tank field, were 1,213.9 µg/m^3.

CVOCs were reported in five of the six soil gas samples collected as well as the ambient outdoor air sample. CVOC concentrations ranged from 1.317 µg/m^3 in SG3, located on the central portion of the property, to 6.869 µg/m^3 in SS1, located within the service station building, and 3.59 µg/m^3 in the ambient outdoor air sample. Tetrachloroethene (PCE) was reported in five of the six soil gas samples and ranged from 1 µg/m^3 in SG3 to 5.56 µg/m^3 in SS1. Trichloroethene (TCE) and carbon tetrachloride were reported in two of the six soil gas samples at concentrations of 1.88 µg/m^3 in SG5 and 0.806 µg/m^3 in SS1, and 0.314 µg/m^3 in SG3 and 0.503 µg/m^3 in SS1, respectively. 1,1,1-Trichloroethane was not detected in any of the samples collected from the Site.

Conceptual Model of Site Contamination

Petroleum contamination is present in the vicinity of the former tank field west of the former station building, the former dispenser island along Malcolm X Boulevard and the former tank location in the southeast corner of the property. The release scenarios are unknown; however, the contamination within the former tank field was related to the twelve 550 gallon tanks which were removed in 1998 and replaced with two 4,000 gallon tanks. The volume of the spill in this location was sufficient to allow vertical migration through a 30-35 foot soil column to the water table at a depth of 46-48 feet below grade. Upon reaching the water table the free phase gasoline spread out forming a lens of residually impacted soil. This zone of impacted soil acted as a source of contamination to the groundwater passing through it forming a plume of contaminated water which migrated in the direction of groundwater flow.

Gasoline releases also occurred at the south dispenser and adjacent underground tank. Releases in these areas were likely small and occurred prior to the system upgrade in 1998. The volume of the release in these areas was insufficient to extend beyond a depth of 20 feet. Based on the distribution of petroleum VOCs in groundwater, contaminants were likely transferred to the groundwater in these areas through transport water migrating through voids and cracks in the surface.

The residual sources had undergone significant weathering over time as the lighter, more volatile and mobile contaminants have left the source area and biological processes have degraded individual components. In both cases significant source depletion had occurred as the petroleum related VOC concentrations in groundwater are moderate and have been decreasing over time.

Petroleum VOCs which transferred to the dissolved phase have been migrating with groundwater flow to the southwest. Off-gassing of VOCs is not significant due to the age of the release and the absence of the more volatile components of the fuel, with the exception of the soil gas sample collected adjacent to the current tank field. Off-gassing is occurring adjacent to the most recent tank field (now removed), as is evidenced by concentrations detected in soil gas sample SG2. No significant off-gassing is occurring on-site from any other source area as is evident by the perimeter and interior soil vapor sampling results.

Trichloroethene was reported above groundwater standards in all groundwater samples collected across the Site in April 2014. Based on the site-wide distribution in groundwater including upgradient positions and the absence of CVOCs reported in soil, with the exception of low concentrations detected in one shallow upgradient sample, it is likely related to an off-site source.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in Decision Document dated February 11, 2015 are as follows:

2.4.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre- disposal/pre-release conditions, to the extent practicable.
- Remove the source of groundwater or surface water contamination.

2.4.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

2.4.3 Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a Site.

2.5 Remaining Contamination

2.5.1 Soil

The majority of the Site was excavated to a depth of approximately 11 feet below grade, and additional excavation to a depth of approximately 14-15 feet below grade in three source areas.

The perimeter of the Site was excavated on a 1:1 slope from sidewalk grade to 11 feet below grade.

Soil sampling conducted during the Remedial Investigation identified gasoline related volatile organic compounds at concentrations above Protection of Groundwater SCOs and Restricted Residential Use SCOs (namely 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, naphthalene, n-butylbenzene, n-propylbenzene and mixed xylenes) in in soil immediately above the groundwater table in the main UST source area. The contaminated soil area extended 30 feet to the water table (located at 45 to 46 feet below grade). This zone of impacted soil acts as a source of contamination to the groundwater which then migrated in the direction of groundwater flow.

During excavation of the Site, three petroleum source areas, associated with former underground storage tanks (USTs), were encountered including the main UST area in the north part of the Site, a waste oil tank area located in the central area of the Site and a third UST area located in the southwest corner of the Site. All three areas were excavated to a depth of approximately 14 to 15 feet below grade. The main UST area was expanded towards the north and south based on laboratory results of sidewall endpoint samples. The approximate area of the main UST source area excavation was 2,120 ft^2. The excavation of the central waste oil UST area covered approximately 100 ft^2. During the general excavation of the site for the cellar level of the new building, four 550-gallon underground gasoline tanks were encountered in the southwestern corner of the Site (**Figure 2**). The excavation of this area was also expanded based on the laboratory results of the sidewall samples. The final measurement of the southwest UST area was approximately 350 ft^2.

Table 2 and **Figure 5** summarizes the remaining soil concentrations exceeding Protection of Groundwater SCOs and Restricted Residential Use SCOs in a soil sample collected from the source area immediately above the groundwater table (B1308) and in the post-excavation endpoint samples.

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TABLE 2. Remaining Parameters in Soil Above SCOs

COMPOUND (µg/Kg)	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives	B1308 4/1/2014 (45-47')	EP1 10/25/2016 (1')	EP4 12/28/2016 (15')	EP5 12/28/2016 (15')	EP6 12/28/2016 (15')	EP8 12/28/2016 (14')	EP9 12/28/2016 (14')	EP10 12/28/2016 (14')	EP18 12/30/2016 (15')	EP19 12/30/2016 (14')	EP20 10/25/2016 (1')	EP22E 1/4/2017 (14')	EP23N 1/4/2017 (14')	EP25 1/4/2017 (15')	EP27 1/4/2017 (11')	EP29 2/14/2017 (11')
1,2,4-Trimethylbenzene	*3,600*	*52,000*	**280,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	*8,400*	*52,000*	**76,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone			-	-	-	-	-	-	-	-	-	-	-	-	**910**	**5,300**	**1,600**	-
Benzene	*60*	*4,800*	-	-	-	-	**320**	-	-	**75**	-	-	-	-	-	-	-	-
Ethylbenzene	*1,000*	*41,000*	**41,000**	-	**8,300**	**16,000**	**40,000**	**2,100**	-	**13,000**	**30,000**	-	-	**9,900**	**21,000**	**23,000**	**7,600**	-
Indeno(1,2,3-cd)pyrene	*500*	*500*	-	**520**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	*63*	*400*	-	**185**	-	-	-	-	-	-	-	-	**253**	-	-	-	-	**78.8**
m&p-Xylenes	*260*	*100,000*	**120,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	*12,000*	*100,000*	**47,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	*12,000*	*100,000*	**17,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Propylbenzene	*3,900*	*100,000*	**47,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	*260*	*100,000*	**15,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	*700*	*100,000*	-	-	-	-	**910**	-	-	-	-	-	-	-	-	-	-	-
Total Xylenes	*260*	*100,000*	**135,000**	-	**47,000**	**58,000**	**142,000**	**9,400**	**576**	**23,800**	**113,000**	**560**	-	**16,800**	**51,500**	**71,000**	**33,100**	-

Notes:

* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

RL- Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

Based on Remedial Investigation data (pre-remediation conditions), petroleum contaminated soil may be present at depths greater than 2 feet below the new building slab down to the water table. Petroleum contaminated soil in the source areas, from 15 feet below grade down to the water table, is being remediated via a soil vapor extraction system (see Section 2.5.3).

2.5.2 Groundwater

Sampling Results

Remediation of dissolved phase VOCs in groundwater was accomplished through a chemical oxidant injection program. The area of injection was within the source areas. Injections at this location delivered oxidant to the subsurface allowing it to flow west with groundwater, treating both residual contaminants in soil and the groundwater. The chemical oxidant injection program utilized ten new injections wells (IW1-IW10) for oxidant application. The locations of the injection wells within the source areas are shown on **Figures 8a** and **8b**.

The first chemical oxidant injection event was performed in September 2016 in the locations shown on **Figure 8a**. The oxidant injection consisted of 100 gallons of a 10 to 30 percent solution of sodium persulfate and chelated iron activator injected into each of the injection wells.

Three monitoring wells (MW1401, MW1402 and MW1403) were installed at the Site to determine the effectiveness of the chemical oxidant injection program. The three monitoring wells were installed within the sidewalk of Malcolm X Boulevard immediately downgradient of the former petroleum source areas (**Figure 8a**).

Groundwater samples were collected prior to initiating the ISCO program, from each of the three monitoring wells on August 17, 2016 for laboratory analysis of VOCs by EPA Method 8260. Groundwater samples showed several petroleum related VOCs detected above their respective AWQSin all three monitoring wells). Total BTEX concentrations ranged from 450 µg/L (MW1401) to 4,279 µg/L (MW1402). The chlorinated VOC trichloroethene (TCE) was detected above AWQSAWQS in one groundwater sample (MW1403) at a concentration of 13 ug/L. Total VOC concentrations ranged from 757 µg/L (MW1403) to 8,978 µg/L (MW1402).

AWQSGroundwater results above standards prior to beginning the oxidant injection are presented in **Table 3a** and **Figure 6a.**

Table 3a

Groundwater Results August 17, 2016 (Pre-ISCO)

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1401 8/17/2016 µg/L	MW1402 8/17/2016 µg/L	MW1403 8/17/2016 µg/L
1,2,4-Trimethylbenzene	*5*	160	2,900	130
1,3,5-Trimethylbenzene	*5*	38	460	18
Benzene	*1*	-	19	-
cis-1,2-Dichloroethene	*5*	1.9	69	2.3
Ethylbenzene	*5*	760	1,600	130
Isopropylbenzene	*5*	43	170	22
m&p-Xylene	*5*	450	2500	240
Naphthalene	*10*	50	540	14
n-Butylbenzene	*5*	5.2	42	15
n-Propylbenzene	*5*	69	420	54
o-Xylene	*5*	2.3	160	80
p-Isopropyltoluene	*5*	1.7	8.2	5.1
sec-Butylbenzene	*5*	4.6	31	11
Toluene	*5*	-	53	-
Trichloroethene	*5*	2.7	-	13

The injection wells were lost during site excavation and replaced in March 2017 at the locations shown on **Figure 8b.** Monitoring well MW1403 was reinstalled on June 15, 2017 closer to MW1402. MW1401 was reinstalled in November 3, 2017 and relocated south of MW1403. A second round of injections was performed in May 2017 (see **Figure 8b**). The oxidant injection consisted of 100 gallons of a 10 to 30 percent solution of sodium persulfate and chelated iron activator injected into each of the injection wells.

Quarterly Groundwater Sampling Program

Beginning in March 2018, groundwater samples for VOC analysis have been collected on a quarterly basis from three monitoring wells (MW1401-MW1403) located in the sidewalk along Malcolm X Boulevard. To date there have been six rounds of sampling performed. The results of the quarterly sampling are summarized in the Quarterly Status Reports (EBC 2018 Q1-Q4, 2019

Q1-Q2). The most recent sampling results (Q2-2019) are presented in **Table 3b** and **Figure 6b**. A summary table of groundwater sampling results is provided in **Table 3c**.

Table 3b

Groundwater Results – June 24, 2019 (Post ISCO)

Compound	**NYSDEC Groundwater Quality Standards** µg/L	**MW1401** **6/24/2019** µg/L	**MW1402** **6/24/19** µg/L	**MW1403** **6/24/19** µg/L
1,2,4-Trimethylbenzene	*5*	450	-	8.6
1,3,5-Trimethylbenzene	*5*	49	-	-
Benzene	*1*	1.8	-	-
cis-1,2-Dichloroethene	*5*	6.8	0.98	4.4
Ethylbenzene	*5*	500	-	20
Isopropylbenzene	*5*	72	-	17
Naphthalene	*10*	59	-	2.9
n-Butylbenzene	*5*	6.6	-	2
n-Propylbenzene	*5*	140	-	8.2
o-Xylene	*5*	1.7	-	0.58
p-Isopropyltoluene	*5*	1.2	-	0.34
sec-Butylbenzene	*5*	7	0.4	5.9
Toluene	*5*	2.2	-	-
Tetrachloroethene	*5*	-	7.6	3.7
Trichloroethene	*5*	0.61	9.7	9.9

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Table 3c
Ground Water Analytical Results
Volatile Organic Compounds
Historic

Compound	NYSDEC Groundwater Quality Standards	MW1401													
		12/11/2017		3/12/2018		6/26/2018		9/18/2018		12/6/2018		3/21/2019		6/24/2019	
	µg/L	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1,2-Tetrachlorothane	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	<2.0	2.0
1,1,1-Trichloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
1,1,2,2-Tetrachloroethane	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,1,2-Trichloroethane	1	< 1.0	1.0	< 1.3	1.3	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0
1,1-Dichloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
1,1-Dichloroethene	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,1-Dichloropropene		< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,2,3-Trichlorobenzene		< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,2,3-Trichloropropane	0.04	< 0.50	0.50	< 1.3	1.3	< 0.25	0.25	< 0.25	0.25	< 1.0	1.0	< 0.25	0.25	< 0.50	0.50
1,2,4-Trichlorobenzene		< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,2,4-Trimethylbenzene	5	**43**	2.0	**10**	5.0	< 1.0	1.0	**10**	1.0	< 1.0	1.0	< 1.0	1.0	**450**	20
1,2-Dibromo-3-chloropropane	0.04	< 1.0	1.0	< 2.5	2.5	< 0.50	0.50	< 0.50	0.50	< 1.0	1.0	< 0.50	0.50	< 1.0	1.0
1,2-Dibromoethane		< 0.50	0.50	< 1.3	1.3	< 0.25	0.25	< 0.25	0.25	< 1.0	1.0	< 0.25	0.25	< 0.50	0.50
1,2-Dichlorobenzene	5	< 2.0	2.0	< 4.7	4.7	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,2-Dichloroethane	0.6	< 1.0	1.0	< 2.5	2.5	< 0.60	0.60	< 0.60	0.60	< 0.60	0.60	< 0.60	0.60	< 1.0	1.0
1,2-Dichloropropane	0.94	< 1.0	1.0	< 1.3	1.3	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0
1,3,5-Trimethylbenzene	5	**12**	2.0	< 5.0	5.0	< 1.0	1.0	**1.8**	1.0	< 1.0	1.0	< 1.0	1.0	**49**	2.0
1,3-Dichlorobenzene		< 2.0	2.0	< 3.0	3.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,3-Dichloropropane	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,4-Dichlorobenzene	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
1,4-Dioxane		-	-	< 500	500	< 100	100	< 100	100	< 100	100	< 100	100	<200	200
2,2-Dichloropropane	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
2-Chlorotoluene	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
2-Hexanone (Methyl Butyl Ketone)		< 5.0	5.0	< 13	13	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 5.0	5.0
2-Isopropyltoluene	5	**1.4**	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	**1.3**	2.0
4-Chlorotoluene	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
4-Methyl-2-Pentanone		< 5.0	5.0	< 13	13	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 5.0	5.0
Acetone		< 10	10	< 25	25	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 10	10
Acrolein		< 5.0	5.0	< 13	13	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Acrylonitrile	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Benzene	1	< 0.70	0.70	< 1.3	1.3	< 0.70	0.70	< 0.70	0.70	< 0.70	0.70	< 0.70	0.70	**1.8**	1.4
Bromobenzene	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Bromochloromethane	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Bromodichloromethane		< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Bromoform		< 10	10	< 25	25	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 10	10
Bromomethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Carbon Disulfide	60	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Carbon tetrachloride	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Chlorobenzene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Chloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Chloroform	7	**31**	10	**3.5**	7	< 5.0	5.0	**1.1**	5.0	**0.63**	5.0	**1**	5.0	< 7.0	7.0
Chloromethane	60	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
cis-1,2-Dichloroethene	5	< 2.0	2.0	< 5.0	5.0	**1.2**	1.0	**1.9**	1.0	**1.7**	1.0	**0.8**	1.0	**6.8**	2.0
cis-1,3-Dichloropropene		< 0.50	0.50	< 1.3	1.3	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 0.50	0.50
Dibromochloromethane		< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Dibromomethane	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Dichlorodifluoromethane	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Ethylbenzene	5	**18**	2.0	**5.8**	5.0	< 1.0	1.0	**27**	1.0	< 1.0	1.0	< 1.0	1.0	**500**	20
Hexachlorobutadiene	0.5	< 0.50	0.50	< 1.0	1.0	< 0.50	0.50	< 0.50	0.50	< 0.50	0.50	< 0.50	0.50	< 0.50	0.50
Isopropylbenzene	5	**20**	2.0	**8.1**	5.0	< 1.0	1.0	**2.3**	1.0	< 1.0	1.0	< 1.0	1.0	**72**	20
m&p-Xylenes	5	**17**	2.0	**1.9**	5.0	< 1.0	1.0	**10**	1.0	< 1.0	1.0	< 1.0	1.0	**69**	2.0
Methyl Ethyl Ketone (2-Butanone)		< 5.0	5.0	< 13	13	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 5.0	5.0
Methyl t-butyl ether (MTBE)	10	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Methylene chloride	5	< 5.0	5.0	< 5.0	5.0	< 3.0	3.0	< 3.0	3.0	< 3.0	3.0	< 3.0	3.0	< 5.0	5.0
Naphthalene	10	**8.6**	2.0	< 5.0	5.0	< 1.0	1.0	**3.1**	1.0	< 1.0	1.0	< 1.0	1.0	**59**	20
n-Butylbenzene	5	**13**	2.0	**10**	5.0	< 1.0	1.0	**0.31**	1.0	< 1.0	1.0	< 1.0	1.0	**6.6**	2.0
n-Propylbenzene	5	**50**	2.0	**19**	5.0	< 1.0	1.0	**3.6**	1.0	< 1.0	1.0	< 1.0	1.0	**140**	20
o-Xylene	5	**3.1**	2.0	< 5.0	5.0	< 1.0	1.0	**2.1**	1.0	< 1.0	1.0	< 1.0	1.0	**1.7**	2.0
p-Isopropyltoluene		**3.7**	2.0	**2.5**	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	**1.2**	2.0
sec-Butylbenzene	5	**9.4**	2.0	**9.6**	5.0	**0.55**	1.0	**0.75**	1.0	**0.62**	1.0	< 1.0	1.0	**7**	2.0
Styrene	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
tert-Butylalcohol		-	-	< 250	250	< 50	50	< 50	50	< 50	50	< 50	50	<100	100
tert-Butylbenzene	5	**0.84**	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Tetrachloroethene	5	**4.6**	2.0	**3.6**	5.0	**8.5**	1.0	**7.3**	1.0	**4.8**	1.0	**10**	1.0	**0.54**	2.0
Tetrahydrofuran (THF)		< 10	10	< 25	25	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 10	10
Toluene	5	**1.3**	2.0	< 5.0	5.0	< 1.0	1.0	**0.33**	1.0	< 1.0	1.0	< 1.0	1.0	**2.2**	2.0
trans-1,2-Dichloroethene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
trans-1,3-Dichloropropene	0.4	< 0.50	0.50	< 1.3	1.3	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 0.50	0.50
trans-1,4-dichloro-2-butene	5	< 5.0	5.0	< 13	13	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 5.0	5.0
Trichloroethene	5	**2.8**	2.0	**12**	5.0	**7.7**	1.0	**9.7**	1.0	**9.8**	1.0	**6.4**	1.0	**0.61**	2.0
Trichlorofluoromethane	5	< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Trichlorotrifluoroethane		< 2.0	2.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
Vinyl Chloride	2	< 2.0	2.0	< 2.0	2.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0
BTEX		**39.40**		**7.70**		**0.00**		**39.43**		**0.00**		**0.00**		**574.70**	
Total VOCs		**239.74**		**86.00**		**17.95**		**81.29**		**17.55**		**18.20**		**1,368.75**	
Ferric Iron		-		**27.2**	0.03	**106**	0.03	**12.3**	0.03	-		-		-	

Notes:
RL- Reporting Limit
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

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Table 3c
Ground Water Analytical Results
Volatile Organic Compounds
Historic

Compound	NYSDEC Groundwater Quality Standards	MW1402																	
		8/17/2016		11/9/2016		12/11/2017		3/12/2018		6/26/2018		9/18/2018		12/6/2018		3/21/2019		6/24/2019	
	µg/L	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1,2-Tetrachlorothane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	<1.0	1.0
1,1,1-Trichloroethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
1,1,2,2-Tetrachloroethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,1,2-Trichloroethane	1	< 5	5	< 5.0	5.0	< 5.0	5.0	< 2.5	2.5	< 1.3	1.3	< 1.3	1.3	< 1.0	1.0	< 1.3	1.3	< 1.0	1.0
1,1-Dichloroethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
1,1-Dichloroethene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,1-Dichloropropene		< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,2,3-Trichlorobenzene		< 20	20	< 20	20	< 20	20	< 10	10	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,2,3-Trichloropropane	0.04	< 5	5	< 5.0	5.0	< 5.0	5.0	< 2.5	2.5	< 1.3	1.3	< 1.3	1.3	< 1.0	1.0	< 1.3	1.3	< 0.25	0.25
1,2,4-Trichlorobenzene		< 20	20	< 20	20	< 20	20	< 10	10	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,2,4-Trimethylbenzene	5	**2,900**	200	**2,000**	50	**1,600**	100	**430**	20	**280**	5.0	**740**	25	**420**	50	**290**	20	< 1.0	1.0
1,2-Dibromo-3-chloropropane	0.04	< 10	10	< 10	10	< 10	10	< 5.0	5.0	< 2.5	2.5	< 2.5	2.5	< 1.0	1.0	< 2.5	2.5	< 0.50	0.50
1,2-Dibromoethane		< 5	5	< 5.0	5.0	< 5.0	5.0	< 2.5	2.5	< 1.3	1.3	< 1.3	1.3	< 1.0	1.0	< 1.3	1.3	< 0.25	0.25
1,2-Dichlorobenzene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 4.7	4.7	< 4.7	4.7	< 4.7	4.7	< 1.0	1.0	< 4.7	4.7	< 1.0	1.0
1,2-Dichloroethane	0.6	< 10	10	< 10	10	< 10	10	< 5.0	5.0	< 2.5	2.5	< 2.5	2.5	< 0.60	0.60	< 2.5	2.5	< 0.60	0.60
1,2-Dichloropropane	0.94	< 5	5	< 5.0	5.0	< 5.0	5.0	< 2.5	2.5	< 1.3	1.3	< 1.3	1.3	< 1.0	1.0	< 1.3	1.3	< 1.0	1.0
1,3,5-Trimethylbenzene	5	**460**	20	**410**	5.0	**290**	20	**88**	10	**43**	5.0	**140**	25	**66**	10	**61**	5.0	< 1.0	1.0
1,3-Dichlorobenzene		< 5	5	< 5.0	5.0	< 5.0	5.0	< 3.0	3.0	< 3.0	3.0	< 3.0	3.0	< 1.0	1.0	< 3.0	3.0	< 1.0	1.0
1,3-Dichloropropane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,4-Dichlorobenzene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,4-Dioxane		-	-	-	-	-	-	< 1,000	1,000	< 500	500	< 500	500	< 100	100	< 500	500	<100	100
2,2-Dichloropropane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
2-Chlorotoluene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
2-Hexanone (Methyl Butyl Ketone)		< 50	50	< 50	50	< 50	50	< 25	25	< 13	13	< 13	13	< 2.5	2.5	< 13	13	< 2.5	2.5
2-Isopropyltoluene	5	**5.8**	20	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	**1.2**	1.0	< 5.0	5.0	< 1.0	1.0
4-Chlorotoluene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
4-Methyl-2-Pentanone		< 50	50	< 50	50	< 50	50	< 25	25	< 13	13	< 13	13	< 2.5	2.5	< 13	13	< 2.5	2.5
Acetone		< 50	50	< 50	50	< 50	50	< 50	50	< 25	25	< 25	25	< 5.0	5.0	< 25	25	< 5.0	5.0
Acrolein		< 50	50	< 50	50	< 50	50	< 25	25	< 13	13	< 13	13	< 5.0	5.0	< 13	13	< 5.0	5.0
Acrylonitrile	5	< 5	5	< 50	50	< 50	50	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Benzene	1	**19**	14	**23**	5.0	**20**	14	**8.4**	7.0	**5.4**	1.3	**8.5**	1.3	**11**	0.70	**3.9**	3.5	< 0.70	0.70
Bromobenzene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Bromochloromethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Bromodichloromethane		< 20	20	< 20	20	< 20	20	< 10	10	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Bromoform		< 50	50	< 50	50	< 50	50	< 50	50	< 25	25	< 25	25	< 5.0	5.0	< 25	25	< 5.0	5.0
Bromomethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Carbon Disulfide	60	< 20	20	**7.7**	20	< 20	20	< 10	10	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Carbon tetrachloride	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Chlorobenzene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Chloroethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Chloroform	7	< 5	5	< 7.0	7.0	< 7.0	7.0	< 7.0	7.0	< 7.0	7.0	< 7.0	7.0	< 5.0	5.0	< 7.0	7.0	**2.2**	5.0
Chloromethane	60	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
cis-1,2-Dichloroethene	5	**69**	20	**140**	5.0	**87**	20	**41**	10	**30**	5.0	**34**	5.0	**27**	1.0	**14**	5.0	**0.98**	1.0
cis-1,3-Dichloropropene		< 5	5	< 5.0	5.0	< 5.0	5.0	< 2.5	2.5	< 1.3	1.3	< 1.3	1.3	< 0.40	0.40	< 1.3	1.3	< 0.40	0.40
Dibromochloromethane		< 20	20	< 20	20	< 20	20	< 10	10	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Dibromomethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Dichlorodifluoromethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Ethylbenzene	5	**1,600**	100	**1,600**	50	**1,700**	100	**510**	20	**440**	5.0	**1,700**	25	**1,000**	50	**460**	20	< 1.0	1.0
Hexachlorobutadiene	0.5	< 4	4	< 4.0	4.0	< 4.0	4.0	< 2.0	2.0	< 1.0	1.0	< 1.0	1.0	< 0.50	0.50	< 1.0	1.0	< 0.50	0.50
Isopropylbenzene	5	**170**	20	**160**	5.0	**140**	20	**60**	10	**36**	5.0	**140**	25	**84**	10	**80**	5.0	< 1.0	1.0
m&p-Xylenes	5	**2,500**	100	**2,400**	200	**1,700**	100	**570**	10	**210**	5.0	**670**	100	**260**	10	**180**	5.0	< 1.0	1.0
Methyl Ethyl Ketone (2-Butanone)		< 50	50	< 50	50	< 50	50	< 25	25	< 13	13	< 13	13	< 2.5	2.5	< 13	13	< 2.5	2.5
Methyl t-butyl ether (MTBE)	10	< 20	20	< 20	20	< 20	20	< 10	10	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Methylene chloride	5	< 20	20	< 20	20	< 20	20	< 10	10	< 5.0	5.0	< 5.0	5.0	< 3.0	3.0	< 5.0	5.0	< 3.0	3.0
Naphthalene	10	**540**	20	**500**	20	**360**	20	**140**	10	**58**	5.0	**190**	100	**110**	10	**56**	5.0	< 1.0	1.0
n-Butylbenzene	5	**42**	20	**23**	5.0	**16**	20	**9.7**	10	**3.1**	5.0	**4.5**	5.0	**5**	1.0	**4.4**	5.0	< 1.0	1.0
n-Propylbenzene	5	**420**	20	**330**	5.0	**280**	20	**110**	10	**59**	5.0	**230**	25	**150**	10	**130**	5.0	< 1.0	1.0
o-Xylene	5	**160**	20	**250**	5.0	**250**	20	**140**	10	**34**	5.0	**150**	25	**22**	1.0	**37**	5.0	< 1.0	1.0
p-Isopropyltoluene		**8.2**	20	**6.2**	5.0	**5.1**	20	< 5.0	5.0	< 5.0	5.0	**1.5**	5.0	**1.8**	1.0	< 5.0	5.0	< 1.0	1.0
sec-Butylbenzene	5	**31**	20	**21**	5.0	**15**	20	**9.6**	10	**3.6**	5.0	**4.9**	5.0	**5.6**	1.0	**6.2**	5.0	**0.4**	1.0
Styrene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
tert-Butylalcohol		-	-	-	-	-	-	< 500	500	< 250	250	< 250	250	< 50	50	< 250	250	<50	50
tert-Butylbenzene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Tetrachloroethene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	**0.49**	1.0	< 5.0	5.0	**7.6**	1.0
Tetrahydrofuran (THF)		< 50	50	< 50	50	< 50	50	< 50	50	< 25	25	< 25	25	< 5.0	5.0	< 25	25	< 5.0	5.0
Toluene	5	**53**	20	**69**	5.0	**73**	20	**32**	10	**12**	5.0	**17**	5.0	**18**	1.0	**8.3**	5.0	< 1.0	1.0
trans-1,2-Dichloroethene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
trans-1,3-Dichloropropene	0.4	< 5	5	< 5.0	5.0	< 5.0	5.0	< 2.5	2.5	< 1.3	1.3	< 1.3	1.3	< 0.40	0.40	< 1.3	1.3	< 0.40	0.40
trans-1,4-dichloro-2-butene	5	< 5	5	< 50	50	< 50	50	< 25	25	< 13	13	< 13	13	< 2.5	2.5	< 13	13	< 2.5	2.5
Trichloroethene	5	< 5	5	< 5.0	5.0	< 5.0	5.0	**5.3**	5	< 5.0	5.0	**3.6**	5.0	**0.79**	1.0	**2**	5.0	**9.7**	1.0
Trichlorofluoromethane	5	< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Trichlorotrifluoroethane		< 5	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Vinyl Chloride	2	< 5	5	< 5.0	5.0	< 5.0	5.0	< 2.5	2.5	< 2.0	2.0	< 2.0	2.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0
BTEX		**4,332.00**		**4,342.00**		**3,743.00**		**1,260.40**		**701.40**		**2,545.50**		**1,311.00**		**689.20**		**0.00**	
Total VOCs		**8,978.00**		**7,939.90**		**6,536.10**		**2,154.00**		**1,214.10**		**4,034.00**		**2,182.88**		**1,332.80**		**20.88**	
Ferric Iron		-		**74.5**	0.03	-		**136.2**	0.03	**294**	0.03	**101**	0.03	-		-		-	

Notes:
RL- Reporting Limit
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Former Getty Service Station No. 00564
1107 Dekalb Ave,
Brooklyn NY

Table 3c
Ground Water Analytical Results
Volatile Organic Compounds
Historic

Compound	NYSDEC Groundwater Quality Standards	MW1403																	
		8/17/2016		11/9/2016		12/11/2017		3/12/2018		6/26/2018		9/18/2018		12/6/2018		3/21/2019		6/24/2019	
	µg/L	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1,2-Tetrachlorothane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	<1.0	5.0
1,1,1-Trichloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
1,1,2,2-Tetrachloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,1,2-Trichloroethane	1	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.3	1.3	< 1.0	1.0
1,1-Dichloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
1,1-Dichloroethene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,1-Dichloropropene		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,2,3-Trichlorobenzene		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,2,3-Trichloropropane	0.04	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 0.25	0.25	< 0.25	0.25	< 0.25	0.25	< 1.3	1.3	< 0.25	0.25
1,2,4-Trichlorobenzene		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,2,4-Trimethylbenzene	5	**130**	5.0	**240**	6.3	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	**8.6**	1.0
1,2-Dibromo-3-chloropropane	0.04	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 0.50	0.50	< 0.50	0.50	< 0.50	0.50	< 2.5	2.5	< 0.50	0.50
1,2-Dibromoethane		< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 0.25	0.25	< 0.25	0.25	< 0.25	0.25	< 1.3	1.3	< 0.25	0.25
1,2-Dichlorobenzene	5	< 2.5	2.5	< 4.7	4.7	< 4.7	4.7	< 4.7	4.7	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 4.7	4.7	< 1.0	1.0
1,2-Dichloroethane	0.6	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 0.60	0.60	< 0.60	0.60	< 0.60	0.60	< 2.5	2.5	< 0.60	0.60
1,2-Dichloropropane	0.94	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.3	1.3	< 1.0	1.0
1,3,5-Trimethylbenzene	5	**18**	5.0	**57**	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,3-Dichlorobenzene		< 2.5	2.5	< 3.0	3.0	< 3.0	3.0	< 3.0	3.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 3.0	3.0	< 1.0	1.0
1,3-Dichloropropane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,4-Dichlorobenzene	5	< 2.5	2.5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
1,4-Dioxane		-	-	-	-	-	-	< 500	500	< 100	100	< 100	100	< 100	100	< 500	500	<100	100
2,2-Dichloropropane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
2-Chlorotoluene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
2-Hexanone (Methyl Butyl Ketone)		< 13	13	< 13	13	< 13	13	< 13	13	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 13	13	< 2.5	2.5
2-Isopropyltoluene	5	**1.3**	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	**0.63**	1.0	**0.37**	1.0	< 5.0	5.0	**0.61**	1.0
4-Chlorotoluene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
4-Methyl-2-Pentanone		< 13	13	< 13	13	< 13	13	< 13	13	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 13	13	< 2.5	2.5
Acetone		< 25	25	**46**	25	< 25	25	< 25	25	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 25	25	< 5.0	5.0
Acrolein		< 5.0	5.0	< 13	13	< 13	13	< 13	13	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 13	13	< 5.0	5.0
Acrylonitrile	5	< 5.0	5.0	< 13	13	< 13	13	< 13	13	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Benzene	1	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 0.70	0.70	< 0.70	0.70	< 0.70	0.70	< 1.3	1.3	< 0.70	0.70
Bromobenzene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Bromochloromethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Bromodichloromethane		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Bromoform		< 25	25	< 25	25	< 25	25	< 25	25	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 25	25	< 5.0	5.0
Bromomethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Carbon Disulfide	60	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Carbon tetrachloride	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Chlorobenzene	5	< 2.5	2.5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Chloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
Chloroform	7	< 5.0	5.0	< 7.0	7.0	< 7.0	7.0	< 7.0	7.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 7.0	7.0	< 5.0	5.0
Chloromethane	60	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
cis-1,2-Dichloroethene	5	**2.3**	5.0	**5.9**	5.0	**2.2**	5.0	**2.7**	5.0	**2.2**	1.0	**2.2**	1.0	**2.8**	1.0	**4.6**	5.0	**4.4**	1.0
cis-1,3-Dichloropropene		< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 1.3	1.3	< 0.40	0.40
Dibromochloromethane		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Dibromomethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Dichlorodifluoromethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Ethylbenzene	5	**130**	5.0	**420**	6.3	**8.7**	5.0	**9.6**	5.0	**5.5**	1.0	**11**	1.0	**4.2**	1.0	**2**	5.0	**20**	1.0
Hexachlorobutadiene	0.5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 0.50	0.50	< 0.50	0.50	< 0.50	0.50	< 1.0	1.0	< 0.50	0.50
Isopropylbenzene	5	**22**	5.0	**31**	5.0	**4**	5.0	**4.7**	5.0	**1.8**	1.0	**5.3**	1.0	**1.8**	1.0	**1.7**	5.0	**17**	1.0
m&p-Xylenes	5	**240**	5.0	**960**	25	< 5.0	5.0	< 5.0	5.0	**0.27**	1.0	**0.39**	1.0	< 1.0	1.0	< 5.0	5.0	**2.3**	1.0
Methyl Ethyl Ketone (2-Butanone)		< 13	13	< 13	13	< 13	13	< 13	13	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 13	13	< 2.5	2.5
Methyl t-butyl ether (MTBE)	10	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Methylene chloride	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 3.0	3.0	< 3.0	3.0	< 3.0	3.0	< 5.0	5.0	< 3.0	3.0
Naphthalene	10	**14**	5.0	**43**	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	**2.9**	1.0
n-Butylbenzene	5	**15**	5.0	**2.9**	5.0	**5.6**	5.0	**7.8**	5.0	**0.88**	1.0	**1.9**	1.0	**0.93**	1.0	**1.8**	5.0	**2**	1.0
n-Propylbenzene	5	**54**	5.0	**46**	5.0	**3.5**	5.0	**2.7**	5.0	**0.83**	1.0	**4.2**	1.0	**0.57**	1.0	< 5.0	5.0	**8.2**	1.0
o-Xylene	5	**80**	5.0	**350**	6.3	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	**0.58**	1.0
p-Isopropyltoluene		**5.1**	5.0	< 5.0	5.0	**2.1**	5.0	**3.2**	5.0	**0.45**	1.0	**1**	1.0	**0.5**	1.0	< 5.0	5.0	**0.33**	1.0
sec-Butylbenzene	5	**11**	5.0	**2.9**	5.0	**9.4**	5.0	**12**	5.0	**3.3**	1.0	**5**	1.0	**3.4**	1.0	**3.9**	5.0	**5.9**	1.0
Styrene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
tert-Butylalcohol		-	-	-	-	-	-	< 250	250	< 50	50	< 50	50	< 50	50	< 250	250	<50	50
tert-Butylbenzene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	**0.34**	1.0
Tetrachloroethene	5	< 5.0	5.0	**2.3**	5.0	< 5.0	5.0	**2.6**	5.0	**1.5**	1.0	**3.7**	1.0	**1.8**	1.0	**1.6**	5.0	**3.7**	1.0
Tetrahydrofuran (THF)		< 25	25	< 25	25	< 25	25	< 25	25	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 25	25	**13**	5.0
Toluene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	**0.44**	1.0	**0.38**	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
trans-1,2-Dichloroethene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0
trans-1,3-Dichloropropene	0.4	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 1.3	1.3	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 1.3	1.3	< 0.40	0.40
trans-1,4-dichloro-2-butene	5	< 5.0	5.0	< 13	13	< 13	13	< 13	13	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 13	13	< 2.5	2.5
Trichloroethene	5	**13**	5.0	**13**	5.0	**4.3**	5.0	**6.8**	5.0	**4.6**	1.0	**5.5**	1.0	**5.1**	1.0	**4.6**	5.0	**9.9**	1.0
Trichlorofluoromethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Trichlorotrifluoroethane		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5.0	5.0	< 1.0	1.0
Vinyl Chloride	2	< 1.0	1.0	< 2.0	2.0	< 2.0	2.0	< 2.0	2.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0
BTEX		**450.00**		**1,730.00**		**8.70**		**9.60**		**6.21**		**11.77**		**4.20**		**2.00**		**22.88**	
Total VOCs		**735.70**		**2,220.00**		**39.80**		**52.10**		**21.77**		**41.20**		**21.47**		**20.20**		**99.76**	
Ferric Iron		-		**14.5**	0.03	-		**10.7**	0.03	**36**	0.03	**46.4**	0.03	-		-		-	

Notes:
RL- Reporting Limit
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

2.5.3 Soil Vapor

Soil vapor sampling performed during the Remedial Investigation noted BTEX concentrations were generally low to moderate across the Site, with the exception of SG2 located adjacent to the former tank field. BTEX concentrations ranged from 97.34 µg/m^3 in SG1 (located along the northern property line) to 417.4 µg/m^3 in SG4 (located along the southwestern property line), and 1.66 µg/m^3 in the ambient outdoor sample. Total BTEX concentrations at location SG2, adjacent to the tank field, were 1,213.9 µg/m^3.

CVOCs were reported in five of the six soil gas samples collected as well as the ambient outdoor air sample. CVOC concentrations ranged from 1.317 µg/m^3 in SG3 (located on the central portion of the property) to 6.869 µg/m^3 in SS1 (located within the former service station building), and 3.59 µg/m^3 in the ambient outdoor air sample. Tetrachloroethene (PCE) was reported in five of the six soil gas samples and ranged from 1 µg/m^3 in SG3 to 5.56 µg/m^3 in SS1. Trichloroethene (TCE) and carbon tetrachloride were reported in two of the six soil gas samples at concentrations of 1.88 µg/m^3 in SG5 and 0.806 µg/m^3 in SS1, and 0.314 µg/m^3 in SG3 and 0.503 µg/m^3 in SS1, respectively. **Figure 7** posts all VOC compounds detected in soil vapor during the RI.

The SVE system has been operating since December 11, 2017. As evidenced by the significant reduction in total VOCs and BTEX compounds in the system influent over time, a corresponding reduction in VOCs in soil vapor as well as in soil within the unsaturated zone is expected.

The SVE system effluent, both before treatment and after treatment, is sampled on a quarterly basis. The results of the quarterly sampling are summarized in the Quarterly Status Reports (EBC 2018 Q1-Q4, 2019 Q1-Q2). A summary table of SVE system sampling results is provided in **Table 3d**. As shown, there has been a significant reduction in total VOCs and BTEX compounds in the SVE system influent over time.

Former Gettry Service Station No. 00564 Site
1107 Dekalb Avenue
Brooklyn, New York

Table 3d
SVE SYSTEM INFLUENT
Volatile Organic Compounds
Historic

COMPOUNDS	Pre Carbon (µg/m3)													
	12/11/2017		3/28/2018		6/26/2018		9/18/2018		12/6/2018		3/21/2019		6/24/2019	
	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1,2-Tetrachloroethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,1,1-Trichloroethane	**2.82**	1.00	< 30.0	30.0	< 1.00	1.00	< 9.98	9.98	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,1,2,2-Tetrachloroethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,1,2-Trichloroethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.98	9.98	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,1-Dichloroethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,1-Dichloroethene	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,2,4-Trichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	**66,300**	698	**14,300**	150	**2,080**	30.0	**1,140**	10.0	**94.8**	1.00	**315**	30.0	**147**	1.00
1,2-Dibromoethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.98	9.98	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,2-Dichlorobenzene	-	-	-	-	-	-	-	-	-	-			-	-
1,2-Dichloroethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,2-Dichloropropane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,2-Dichlorotetrafluoroethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,3,5-Trimethylbenzene	**22,300**	698	**4,730**	30.0	**766**	30.0	**446**	10.0	**41.7**	1.00	**78.1**	1.00	**55.5**	1.00
1,3-Butadiene	< 1.00	1.00	< 30.1	30.1	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
1,3-Dichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dioxane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
2-Hexanone	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
4-Ethyltoluene	**47,300**	698	**2,730**	30.0	**1,580**	30.0	**983**	10.0	**34.8**	1.00	**131**	1.00	**76.1**	1.00
4-Isopropyltoluene	**4,130**	50.0	**735**	30.0	**153**	1.00	**29.1**	9.98	**5.54**	1.00	**20.9**	1.00	**6.47**	1.00
4-Methyl-2-pentanone	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Acetone	< 1.00	1.00	< 29.9	29.9	< 1.00	1.00	**59.1**	9.99	< 1.00	1.00	< 1.00	1.00	**176**	6.01
Acrylonitrile	< 1.00	1.00	< 29.9	29.9	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Benzene	**72.2**	1.00	< 30.0	30.0	**16**	1.00	< 9.99	9.99	**7.25**	1.00	**2.66**	1.00	**3.9**	1.00
Benzyl Chloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.98	9.98	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Bromoform	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Bromomethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Carbon Disulfide	**140**	50.1	**34.2**	30.0	**5.91**	1.00	< 9.99	9.99	**3.49**	1.00	< 1.00	1.00	< 1.00	1.00
Carbon Tetrachloride	**0.46**	0.25	< 7.48	7.48	**0.72**	0.25	< 2.50	2.50	**0.69**	0.25	**0.47**	0.25	**0.69**	0.25
Chlorobenzene	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.98	9.98	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Chloroethane	< 1.00	1.00	< 30.1	30.1	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Chloroform	**139**	1.00	**155**	30.0	**158**	1.00	**224**	10.0	**177**	1.00	**94.7**	1.00	**115**	1.00
Chloromethane	< 1.00	1.00	< 29.9	29.9	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
cis-1,2-Dichloroethene	**2.37**	1.00	< 30.0	30.0	**5.11**	1.00	< 9.99	9.99	**2.61**	1.00	**2.25**	1.00	**2.14**	1.00
cis-1,3-Dichloropropene	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.98	9.98	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Cyclohexane	**222**	49.9	**297**	30.0	**53**	1.00	**35.1**	10.0	**36.5**	1.00	**33.8**	1.00	**45.1**	1.00
Dibromochloromethane	< 1.00	1.00	< 30.0	30.0	**2.27**	1.00	< 9.96	9.96	**2.16**	1.00	**1.17**	1.00	< 1.00	1.00
Dichlorodifluromethane	**3.38**	1.00	< 30.0	30.0	**2.4**	1.00	< 9.98	9.98	**2.81**	1.00	**2.21**	1.00	**1.95**	1.00
Ethanol	**29.8**	1.00	**48.8**	29.9	**37.8**	1.00	**18.1**	10.0	**1,080**	1.00	**63.8**	1.00	**18.2**	1.00
Ethyl Acetate	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Ethylbenzene	**3,840**	49.9	**690**	30.0	**74.2**	1.00	**11.5**	9.98	**2.64**	1.00	< 1.00	1.00	**21.3**	1.00
Heptane	**1,190**	50.0	**204**	30.0	**117**	1.00	**75**	9.99	**54.1**	1.00	**43.4**	1.00	**59.4**	1.00
Hexachlorobutadiene	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Hexane	**976**	50.0	**139**	30.0	**276**	30.0	**209**	10.0	**165**	15.0	**105**	1.00	**239**	5.99
Isopropylalcohol	**9.58**	1.00	< 30.0	30.0	**7.17**	1.00	< 10.0	10.0	**4.23**	1.00	**2.48**	1.00	**2.51**	1.00
Isopropylbenzene	**2,270**	50.1	**383**	30.0	**69.8**	1.00	**18.4**	10.0	**1.96**	1.00	< 1.00	1.00	< 1.00	1.00
Xylene (m&p)	**11,600**	49.9	**3,150**	30.0	**651**	30.0	**332**	9.98	**79**	1.00	**38**	1.00	**97.6**	1.00
Methyl Ethyl Ketone	**42.4**	1.00	< 30.1	30.1	< 1.00	1.00	< 9.99	9.99	**10.8**	1.00	< 1.00	1.00	< 1.00	1.00
MTBE	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Methylene Chloride	**6.87**	1.00	< 30.0	30.0	**34.6**	1.00	< 10.0	10.0	**7.26**	1.00	**2.4**	1.00	**5.49**	1.00
n-Butylbenzene	**9.49**	1.00	**2,230**	30.0	**208**	1.00	**110**	9.98	**7.63**	1.00	< 1.00	1.00	< 1.00	1.00
Xylene (o)	**1,670**	49.9	**608**	30.0	**185**	30.0	**117**	9.98	**29.2**	1.00	**17.4**	1.00	**34.4**	1.00
Propylene	**18.1**	1.00	< 29.9	29.9	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
sec-Butylbenzene	< 1.00	1.00	< 30.0	30.0	**54.6**	1.00	**30.7**	9.98	< 1.00	1.00	< 1.00	1.00	**4.64**	1.00
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	**2,790**	12.5	**7,250**	7.52	**4,360**	7.52	**4,190**	5.00	**3,880**	7.52	**3,490**	7.52	**3,280**	7.52
Tetrahydrofuran	< 1.00	1.00	< 30.1	30.1	< 1.00	1.00	< 9.99	9.99	**19.1**	1.00	< 1.00	1.00	< 1.00	1.00
Toluene	**15.7**	1.00	< 30.0	30.0	**14.9**	1.00	**20.6**	10.0	**4.82**	1.00	**6.36**	1.00	**16.2**	1.00
trans-1,2-Dichloroethene	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 9.99	9.99	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
trans-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	**623**	12.5	**967**	7.52	**468**	7.52	**463**	2.50	**308**	3.75	**290**	7.52	**173**	0.25
Trichlorofluoromethane	**28.6**	1.00	**30.5**	30.0	**9.26**	1.00	**14.8**	9.99	**9.66**	1.00	**5.06**	1.00	**5.03**	1.00
Trichlorotrifluoroethane	< 1.00	1.00	< 30.0	30.0	< 1.00	1.00	< 10.0	10.0	< 1.00	1.00	< 1.00	1.00	< 1.00	1.00
Vinyl Chloride	< 0.25	0.25	< 7.51	7.51	< 0.25	0.25	< 2.50	2.50	< 0.25	0.25	< 0.25	0.25	< 0.25	0.25
BTEX	**17,197.90**		**4,448.00**		**941.10**		**481.10**		**122.91**		**64.42**		**152.10**	
Total VOCs	**165,731.77**		**38,681.50**		**11,389.74**		**8,526.40**		**6,072.75**		**4,746.16**		**4,384.68**	

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the Site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by NYSDEC.

This IC/EC plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in **Attachment B**) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and (3) limit the use and development of the site to Restricted Residential use only. Adherence to these ICs on the Site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on **Figure 9**.

These ICs are:

- The remedial party or site owner must complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- The property may be used for, restricted residential, commercial, and industrial uses; The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- Vegetable gardens and farming on the Site are prohibited.

3.3 Engineering Controls

3.3.1 Soil Vapor Extraction System

The RI identified petroleum impacted soil within the source areas from 13 feet to 20 feet below grade and then again at 45 feet, indicating that the entire soil column was impacted. Since excavation of the source areas were performed to a depth of 15 feet below grade, a soil vapor extraction (SVE) system has been installed to remediate the petroleum contaminated soil in the unsaturated zone from a depth of 15 feet to the water table.

The SVE system consists of two, 2-inch diameter soil vapor extraction wells; VE1 installed within the former tank field area source area at depth immediately above the groundwater interface (approximately 46 feet below grade); and VE2 (identified as MW1401) installed within the sidewalk of Malcolm X Boulevard in the vicinity of the southern petroleum hotspot. Extraction well VE-1 consists of a 20 foot 0.010 screened section set immediately above the groundwater table, and riser pipe that raises to the new building's cellar floor. Extraction well VE2 (MW1401) consists of a 25 foot 0.010 screened section set to approximately 55ft below sidewalk grade. No. 00 morie gravel pack paced to a depth of approximately 5 feet above each well screen followed by a hydrated bentonite seal. The soil vapor extraction wells are connected via 2-inch diameter schedule 40 PVC pipe to a 1.5-hp EN454 Rotron regenerative blower with a particulate filter and vapor trap located on the roof of the new building. Soil vapor removed from the extraction wells by the blower passes through two vapor-phase granular activated carbon prior to discharge at the roof. The SVE system was started on December 5, 2017 and operates at all times.

Procedures for operating and maintaining the Soil Vapor Extraction system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included in **Attachment I** – Operations and Maintenance Manual. **Figure 10a** shows the layout of the Soil Vapor Extraction system installed at the Site.

3.3.2 Sub Slab Depressurization Piping

The Decision Document required that all future buildings constructed on the Site be evaluated for the potential for soil vapor intrusion (SVI). The developer has elected to install a sub-slab depressurization (SSD) system piping beneath the cellar slab of the new building which is currently under construction, in the event that an SSDS system is required.

The horizontal subslab piping consists of fabric wrapped, perforated schedule 40 4-inch PVC pipe connected to a 6-inch steel riser pipe. Three SSD system loops were installed within porous granular material. The loops will provide the correct coverage in accordance with USEPA sub-slab depressurization design specifications which recommend a separate vent loop for every 4,000 ft2 of slab area. The loops are each outfitted with a collection point and riser which is capped at the cellar level.

Prior to the occupancy of the building being constructed on the Site, an SVI evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the structure. Alternatively, an SVI mitigation system may be operated without first conducting an investigation. This mitigation system will include a vapor barrier and sub-slab depressurization system (SSDS). Note that operation of the SSD system will not be necessary as long as the SVE system is in continuous operation. The SVI or SSDS will only be needed when the SVE is to be terminated.

Prior to conducting an SVI investigation, a work plan will be developed and submitted to the NYSDEC and NYSDOH for approval. This work plan will be developed in accordance with the most recent NYSDOH “Guidance for Evaluating Vapor Intrusion in the State of New York”. Measures to be employed to mitigate potential vapor intrusion will be evaluated, selected, designed, installed, and maintained based on the SVI evaluation, the NYSDOH guidance, and construction details of the proposed structure.

Preliminary (unvalidated) SVI sampling data will be forwarded to the NYSDEC and NYSDOH for initial review and interpretation. Upon validation, the final data will be transmitted to the agencies, along with a recommendation for follow-up action, such as mitigation. If any indoor air

test results exceed NYSDOH guidelines, relevant NYSDOH fact sheets will be provided to all tenants and occupants of the property within 15 days of receipt of validated data. SVI sampling results, evaluations, and follow-up actions will also be summarized in the subsequent Periodic Review Report.

3.3.3 Site Cover System

A Site Cover system consisting of the 14-inch thick concrete building cellar slab with a 20 mil vapor barrier, and an 8-inch concrete building slab at the rear of the building (first floor) has been installed over the site. The cover system must be maintained and inspected as described in section 4.3 below. The location and detail of the cover system is shown in F**igure 10b**.

3.3.4 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10.

<u>Soil Vapor Extraction System (SVE)</u>

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SVE system may no longer be required, a proposal to discontinue the system will be submitted by the remedial party. Conditions that may warrant discontinuing the SVE system include contaminant concentrations in groundwater and/or soil and soil vapor that: (1) reach levels that are consistently below ambient water quality standards or the site SCGs, as appropriate; (2) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (3) the NYSDEC has determined that the SVE system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

<u>Site Cover System</u>

The site cover system is a permanent control which will not be terminated.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan provided in **Attachment F**.

This Monitoring Plan and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, indoor air, soil vapor, soils);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and Part 375 SCOs for soil; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site–wide Inspection

Site-wide inspections will be performed at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in **Attachment H** – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date; and

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be

given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 Site Cover Inspection

Site Cover inspections will be performed at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site Cover inspections will also be performed after all severe weather conditions. During these inspections, an inspection form will be completed as provided in **Attachment H – Site Management Forms**. The form will compile sufficient information to assess the following:

- Compliance with all ICs;
- An evaluation of the condition and continued effectiveness of the Site Cover;
- General site conditions at the time of the inspection;
- The site management activities being conducted; and
- Confirm that site records are up to date.

Site Cover inspections will be conducted and documented annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether the Site Cover continues to perform as designed;
- If the Site Cover continues to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Reporting requirements are outlined in Section 6.0 of this SMP. Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of the Site Cover system occurs that reduces or has the potential to reduce the

effectiveness of the Site Cover in place at the Site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the Site Cover implemented at the Site by an environmental professional under the direct supervision of a Professional Engineer. Written confirmation must be provided to the NYSDEC within 7 days of the event, and include a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

Unscheduled inspections may take place when a suspected failure of the Site Cover System has been reported or an emergency occurs that is deemed likely to affect the operation of the system. The Site Cover System components to be inspected include, but are not limited to, the components included in **Table 4** below.

Table 4 – Site Cover Remedial System Inspection Requirements and Schedule

Cover Component	Inspection Parameter	Inspection Schedule
Concrete Slab Covering the Site (min 14-inch thick concrete slab under cellar level, 8-inch thick under rear first floor area)	Inspect for damage, and determine if repair/replacement is required.	Annual

A complete list of inspection activities is provided in the Inspection Checklist, provided in **Appendix D - Site Management Forms**. If any penetrations, holes, cracks or other disturbances are noted within the Site Cover system repairs must be made immediately.

4.4 Groundwater Monitoring and Sampling

4.4.1 Groundwater Monitoring

Groundwater monitoring will be performed on a quarterly basis, as identified in **Table 5** - Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the monitoring wells will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when an emergency occurs that is deemed likely to affect the wells. The

groundwater monitoring system components to be monitored include, but are not limited to, the components included in **Table 5** below.

Table 5 – Monitoring Requirements and Schedule

Monitoring System Component	Monitoring Parameter	Monitoring Schedule
Monitoring Wells	Condition, Depth to water, depth to bottom, groundwater sampling.	Quarterly

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Attachment H** - Site Management Forms. If the monitoring wells have been damaged, lost, or require redevelopment, maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

4.4.2 Groundwater Sampling

Groundwater samples will be collected from monitoring wells MW1401-1403 to monitor improvements to groundwater quality. Sampling locations, required analytical parameters and schedule are provided in **Table 6** – Groundwater Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 6 – Groundwater Sampling Requirements and Schedule

Sampling Location	Analytical Parameters		Schedule
	VOCs (EPA Method 8260C)	Persulfate, Fe2, pH, DO	
MW1401	X	X	Quarterly
MW1402	X	X	Quarterly
MW1403	X	X	Quarterly
Container	(3) 40mL VOAs preserved with HCL	-	

Detailed sample collection and analytical procedures and protocols are provided in **Attachment E** – Field Sampling Plan and **Attachment F** – Quality Assurance Project Plan.

Modification to the frequency or sampling requirements will require approval from NYSDEC. The network of monitoring wells has been installed immediately down-gradient of all remediation areas for the purpose of evaluating overall improvements to groundwater quality.

4.4.3 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Attachment H - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Sampling Plan provided as Attachment E of this document.

Table 7 summarizes the wells identification number, location, depths, diameter and screened intervals of the wells. As part of each groundwater monitoring event, the three monitoring wells installed in the sidewalk are to be sampled to monitor groundwater quality. Monitoring well construction logs are included in **Attachment D** of this document.

Table 7 – Monitoring Well Construction Details

MW ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Installation Depth (ft)	
				Riser Interval	Screen Interval
MW1402	In sidewalk immediately west of source area	40º41’38.82”N 73º 55’52.24”W	1	0-46	46-56ft
MW1403	In sidewalk immediately west of source area	40º41’38.31”N 73º 55’52.15”W	2	0-43	43-53ft
MW1401	In sidewalk immediately west of source area	40º41’38.04”N 73º 55’52.09”W	2	0-30	30-55ft

In accordance with the Remedial Action Work Plan, three monitoring wells (MW1401, MW1402 and MW1403) were installed at the Site. Monitoring wells MW1401, MW1402 and MW1403

were installed in the sidewalk immediately west of the source area on August 10, 2016 by C-Squared Environmental Corp. utilizing a Geoprobe. MW1401 and MW1403 were destroyed in the process of Site excavation for the new building. MW1402 remained intact, and will be used for future sampling events. MW1403 was replaced on June 15, 2017 by PAL Environmental Services. MW1401 was reinstalled on November 3, 2017 and also serves as an SVE well (VE2).

Following installation, each of the monitoring wells was surveyed to determine relative casing elevation to the nearest 0.01 ft and horizontal position to the nearest 0.1 ft. A synoptic round of depth-to-groundwater (DTW) measurements was obtained from the monitoring wells on August 17, 2016, to determine the water table elevation and to calculate the volume of standing water in the well. Groundwater was encountered in each of the monitoring wells at an approximate depth of 45 to 46 feet below sidewalk grade.

The three monitoring wells installed within the sidewalk in front of the new building were protected with locking compression-style cap and an 8-inch bolt down manhole cover. The location of each of the monitoring wells is shown on **Figure 6b**. Monitoring well construction logs are included in **Attachment D** of this document.

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced, if an event renders the wells unusable. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available

location, unless otherwise approved by the NYSDEC. The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.5 SVE Monitoring and Sampling

4.5.1 SVE System Monitoring

Monitoring of the SVE system will be performed on a quarterly basis, as identified in **Table 8** – SVE Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete SVE system will be conducted during each monitoring event and groundwater sampling event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SVE system components to be monitored include, but are not limited to, the components included in **Table 8** below.

Table 8 – SVE Monitoring Requirements and Schedule

SVE System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Regenerative Blower	Flow Rate	TBD100-140 CFM	Quarterly
Activated Carbon Drums	Expiration date, damage, labeling, PID readings (at inlet, mid-carbon and outlet)	Replace when breakthrough is noted based on PID readings	Quarterly
Plumbing	Cracks, damage, labeling	-	Quarterly

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Attachment H**- Site Management Forms. If any equipment readings are not within their specified

operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan (**Attachment I**), is required immediately.

4.5.2 SVE System Sampling

Samples shall be collected from the SVE system on a routine basis. The SVE discharge will be field screened with a photo-ionization detector, and an SVE discharge sample will be collected after the carbon units with a 1 L tedlar bag using a vacuum or hand pump. The 1 L tedlar bag will be submitted for laboratory analysis of VOCs via EPA Method 624. The sampling location, required analytical parameters, and schedule are provided in **Table 9** – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 9 – Remedial System Sampling Requirements and Schedule

Sampling Location	**Field Screening Parameters**	**Analytical Parameters**	
	PID	VOC (Method 624)	**Schedule**
SVE Discharge	X	X	Quarterly

Detailed sample collection and analytical procedures and protocols are provided in **Attachment E** – Field Sampling Plan and **Attachment F** – Quality Assurance Project Plan.

Please refer to the Operations and Maintenance Manual in **Attachment I**, for additional sampling procedures.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The Operation and Maintenance Plan (**Attachment I**) provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the SVE system;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SVE system is operated and maintained.

Further details regarding the Operation and Maintenance of the SVE system is provided in **Attachment I- Operation and Maintenance Manual**. A copy of this Operation and Maintenance Manual, along with the complete SMP, is maintained at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

5.2 Remedial System (or other Engineering Control) Performance Criteria

The SVE system consists of a 1.5-hp regenerative blower with a particulate filter and vapor trap connected to a single 2 inch diameter PVC well installed just above the groundwater interface. Prior to discharge, the soil vapor extracted from the SVE well passes through a drum containing vapor-phase granular activated carbon, as well as a water separator. The 1.5-hp regenerative blower operates at all times, and should be operating within an air flow rate range of 100 to 140 CFM.

5.3 Operation and Maintenance of the Soil Vapor Extraction (SVE) System

Cut-sheets and as-built drawings for the soil vapor extraction system are provided in **Attachment I** - Operations and Maintenance Manual. The SVE system is not adjustable and the regenerative blower shall not be serviced or repaired at the Site. If the blower fails, the unit will be replaced with a new/rebuilt 1.5-hp regenerative blower as soon as possible.

5.3.1 System Start-Up and Testing

The system is currently installed and operating. If the blower fails, the unit will be replaced with a new/rebuilt 1.5-hp regenerative blower as soon as possible. Following installation of the new or rebuilt 1.5-hp regenerative blower, the following items will be inspected to ensure proper operation:

1) Check all exposed/visible SVE piping for evidence of damage, cracks, or leaks.
2) Turn system on and off to ensure the audible alarm is functioning properly;
3) Record vacuum readings and pressure readings (discharge prior to carbon drums).

The system testing described above will be conducted if, in the course of the SVE system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

5.3.2 Routine System Operation and Maintenance

The SVE system is not adjustable and the regenerative blower shall not be serviced or repaired at the Site.

Periodic sampling of the soil vapor discharge after the drums containing vapor-phase granular activated carbon will determine if breakthrough has occurred and the drums need to be replaced. To minimize the time the system is turned off, new drums will be ready to be installed when removing/disconnecting the spent drums.

A copy of an Operations and Maintenance Manual specific to the remedial systems is provided in **Attachment I**, which will provide further detail on the above.

5.3.3 System Monitoring Devices and Alarms

The soil vapor extraction system does not utilize any system monitoring devices/alarms. The 1.5-hp regenerative blower operates continuously. In the event the blower fails, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the soil vapor extraction system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focuses on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames.

6.2 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

The Site is located in the northern portion of Brooklyn, NY. It is located at an elevation of 46 feet above the National Geodetic Vertical Datum (NGVD), or approximately 49 feet above sea level. According to the FEMA Flood Map, this site is not located within a flood hazard area. The Site is served by the NYC Municipal sewer system and the completed building will meet all NYC building codes for drainage. Therefore, the Site is not considered to be vulnerable to storm events related to climate change.

6.3 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the Site during site management, and as reported in the Periodic Review Report (PRR).

6.3.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the Project Manager feels appropriate (e.g. during significant maintenance events or in conjunction with storm recovery activities).

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

6.3.2 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

As part of this effort, consideration shall be given to:

- Reduced site visits and system checks;
- Coordination/consolidation of activities to maximize foreman/labor time; and
- Use of mass transit for site visits, where available.

6.3.3 Metrics and Reporting

As discussed in Section 7.0 and as shown in **Attachment H** – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits; a set of metrics has been developed.

7.0 REPORTING REQUIREMENTS

7.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in **Attachment H**. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of **Table 10** and summarized in the Periodic Review Report.

Table 10 – Schedule of Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Periodic Review Report	Annually, or as otherwise determined by the Department
Quarterly Sampling Report	Quarterly

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc);

- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and

- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning sixteen (16) months after the Certificate of Completion (COC) is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in **Attachment C** – Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted.

These will include a presentation of past data as part of an evaluation of contaminant concentration trends.

- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A Site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
  - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.
  - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional or Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*
- *No new information has come to my attention, including groundwater monitoring data from wells located at the site, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*
- *The assumptions made in the qualitative exposure assessment remain valid.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative] (and if

the site consists of multiple properties): *[I have been authorized and designated by all site owners/remedial parties to sign this certification] for the site."*

If the remedy requires only an institutional control, include the following:
At the end of each certifying period, as determined by the NYSDEC, the following certification will be provided to the Department:

"For each institutional identified for the site, I certify that all of the following statements are true:

- *The institutional control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement.*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative] (and if the site consists of multiple properties): [and I have been authorized and designated by all site owners to sign this certification] for the site."

For BCP projects which the Department has determined do not represent a significant threat to public health or the environment, but where contaminants in groundwater exceed drinking water standards, the following should also be included for both IC/EC and IC scenarios listed above:

- *No new information has come to my attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*

For BCP projects, every five years the following certification will be added:

- *The assumptions made in the qualitative exposure assessment remain valid.*

The signed certification will be included in the Periodic Review Report.
The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3) upon completion of an RSO, an RSO report must be submitted to the Department for approval. A general outline for the RSO report is provided in **Attachment J**. The RSO report will document the research/ investigation

and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Limited Phase II Subsurface Investigation. Environmental Business Consultants, March 3, 2013.

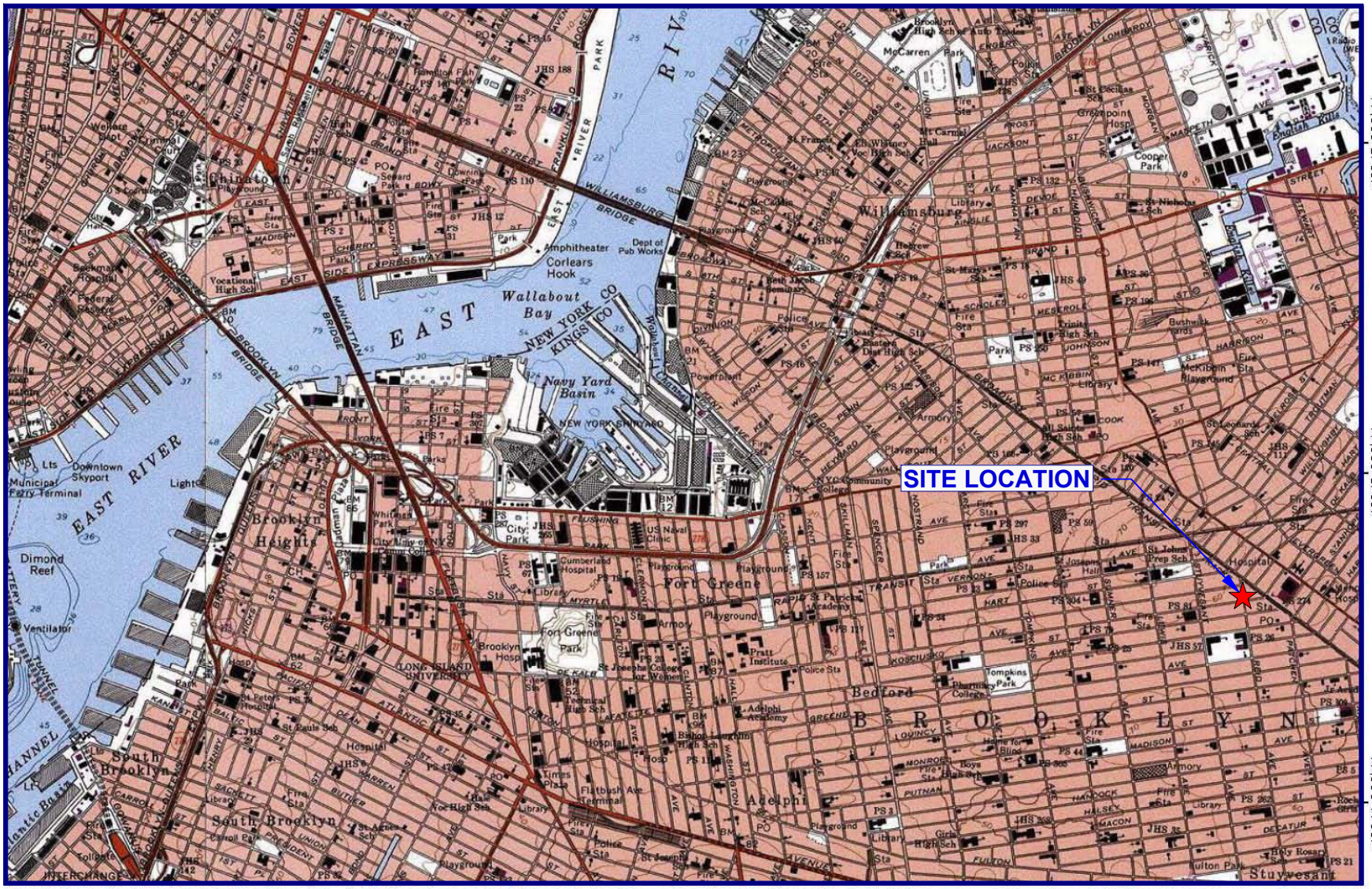
Quarterly Monitoring Report, Former Getty Service Station #00564. Tyree Environmental Corp, September 2011.

Remedial Action Work Plan. Environmental Business Consultants, February 4, 2015.

Remedial Investigation Report. Environmental Business Consultants, October 2014.

Quarterly Sampling Reports. Environmental Business Consultants, 2018 Q1-Q4, 2019 Q1-Q2.

FIGURES

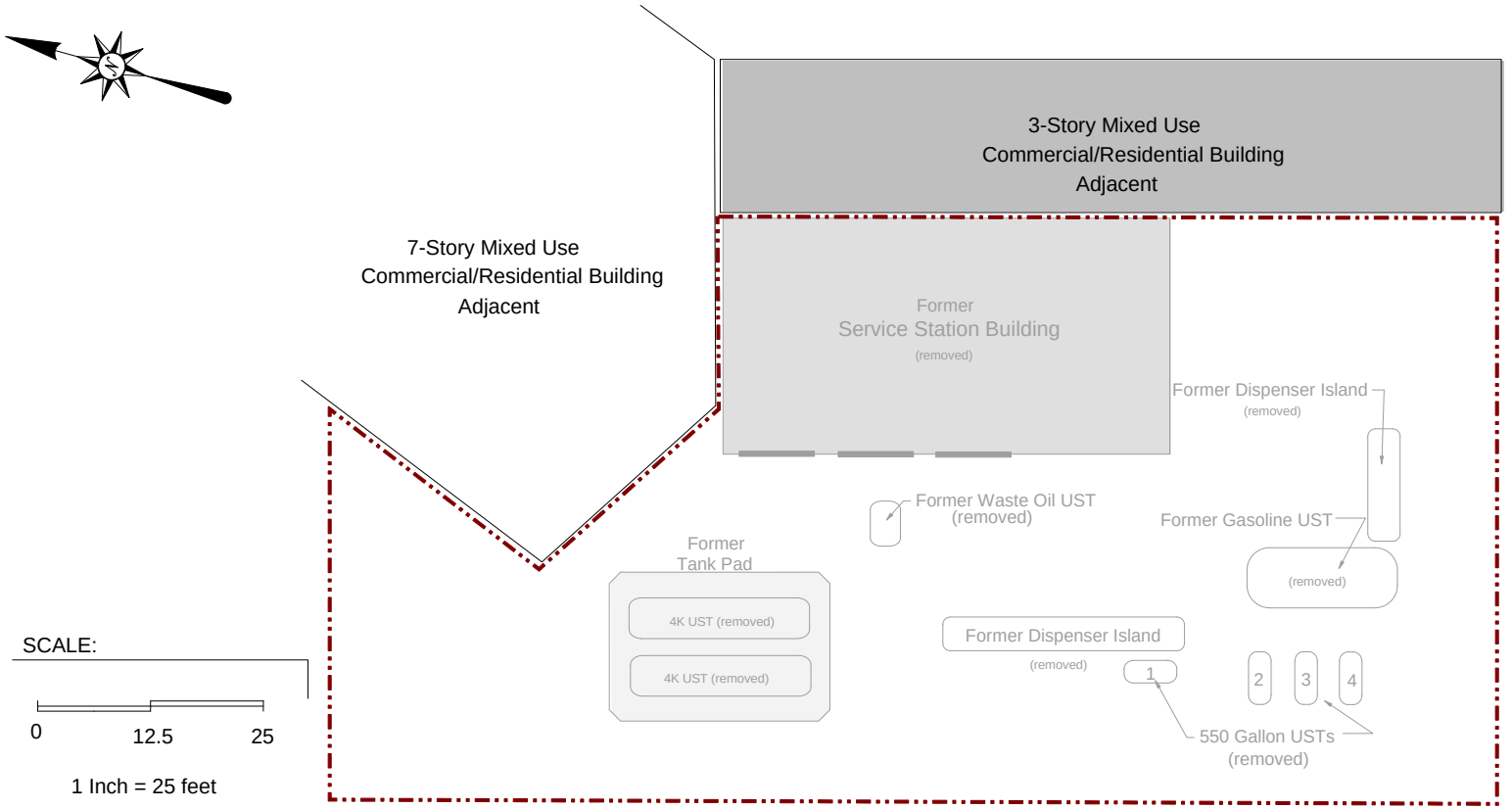


USGS Brooklyn Quadrangle 1995, Contour Interval = 10 feet

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 MIDDLE COUNTRY ROAD. RIDGE. NY 11961
Phone 631.504.6000
Fax 631.924.2780

1103-1107 DEKALB AVENUE
BROOKLYN, NY

FIGURE 1 SITE LOCATION MAP



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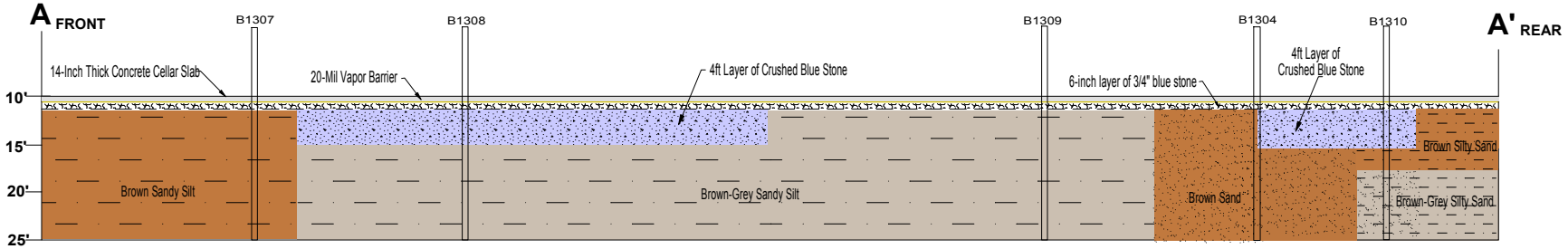
Fax 631. 924 .2870

Figure No. 2

Site Name: FORMER GETTY SERVICE STATION
Site Address: 1103-1107 DEKLB AVENUE, BROOKLYN, NY
Drawing Title: SITE PLAN



KEY:

Site Boundary

10' Depth Below Sidewalk Grade

HORIZONTAL SCALE:

0 6 18

1 Inch = 18 feet

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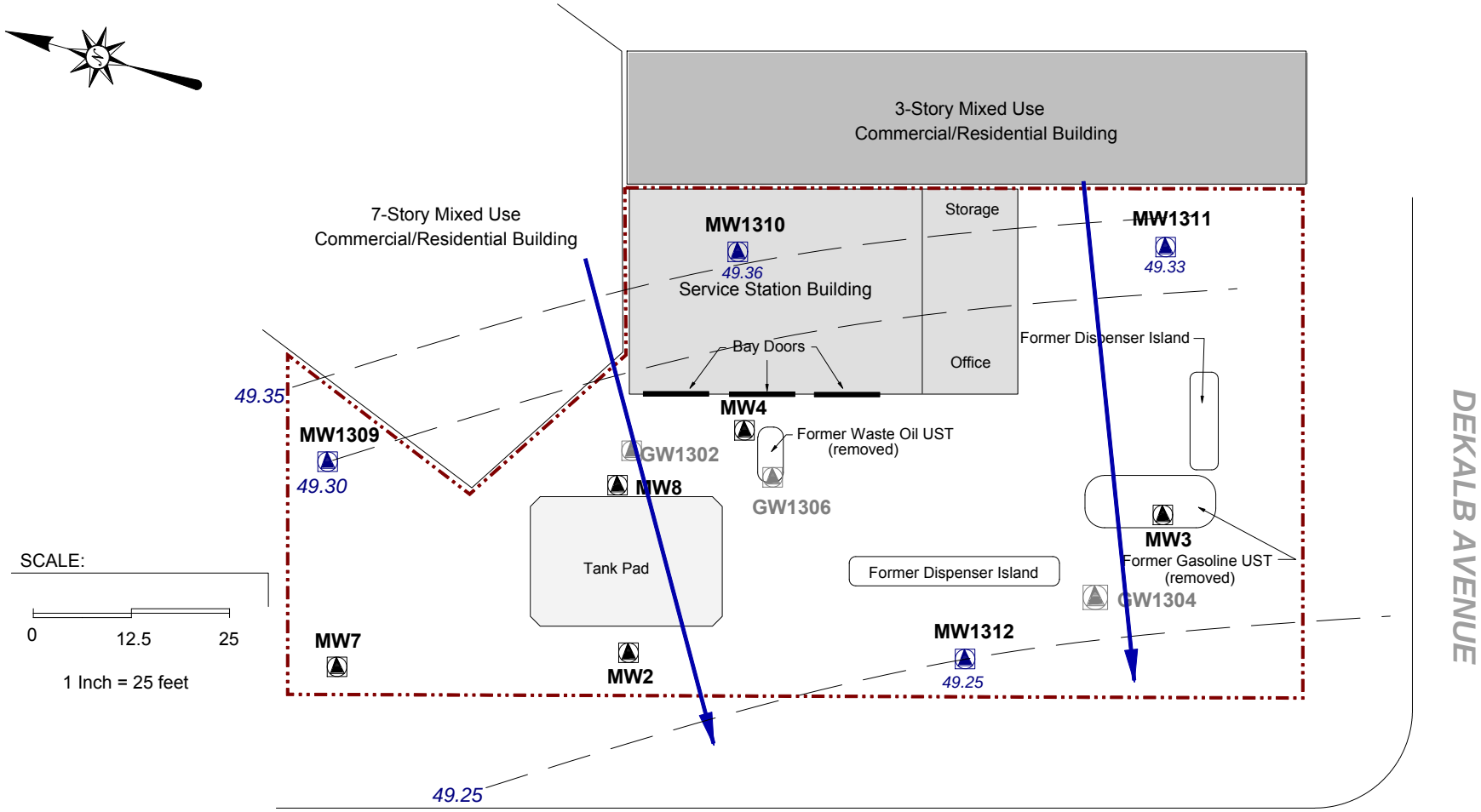
Figure No.
3

DRAWING DATE: 10/16/19

Site Name: FORMER GETTY SERVICE STATION

Site Address: 1103-1107 DEKALB AVENUE, BROOKLYN, NY

Drawing Title: GEOLOGIC CROSS SECTION



KEY:

- Property Boundary
- February 2013 Groundwater Sampling Location
- Abandoned Monitoring Well Location
- Monitoring Well Location
- Groundwater Contour
- Groundwater Flow Direction

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Figure No. 4

Drawing Date: 6/12/14

Site Name: Former Getty Service Station

Site Address: 1103-1107 DeKalb Avenue, Brooklyn, NY

Drawing Title: Groundwater Contour Map 4/7/14

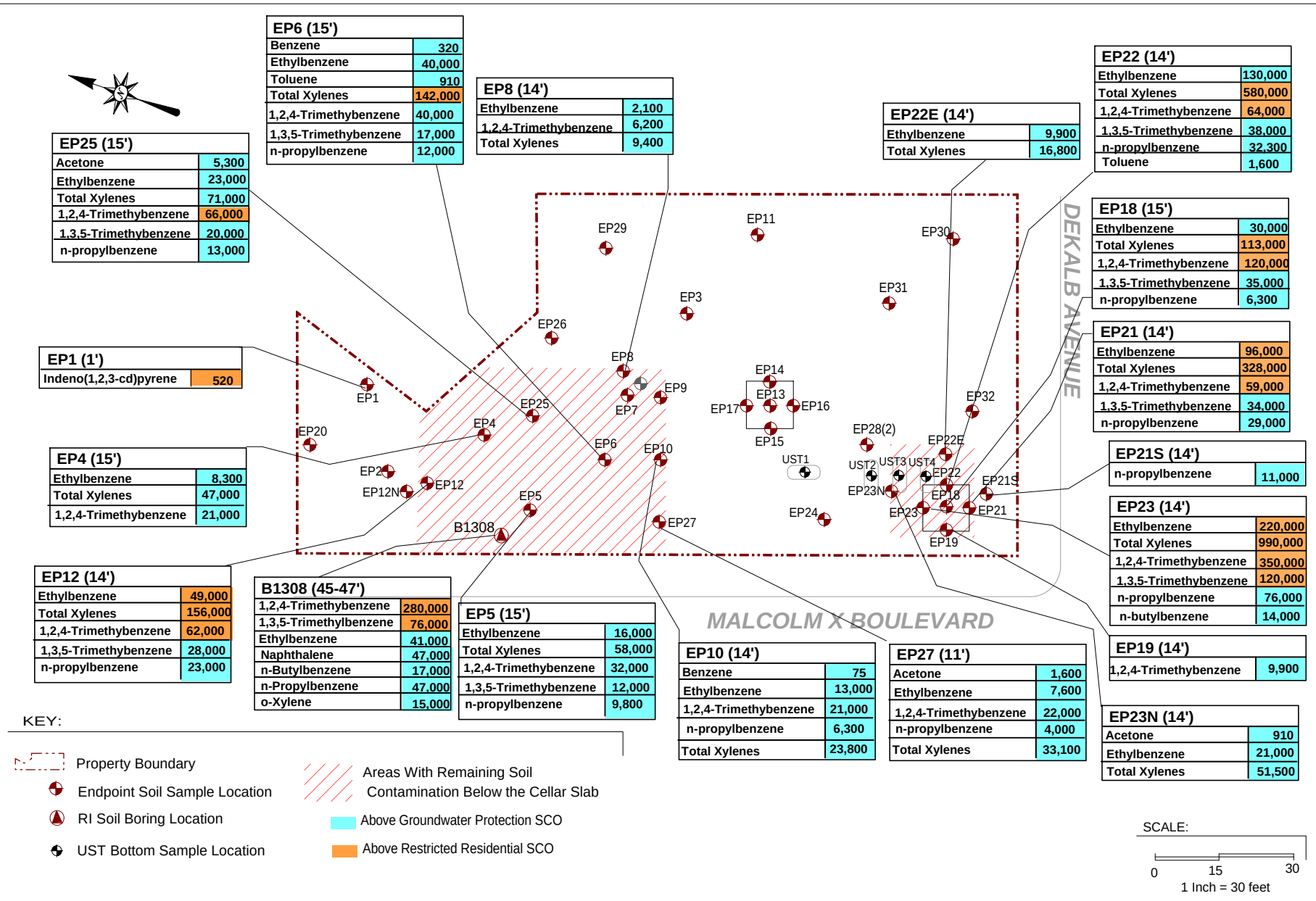

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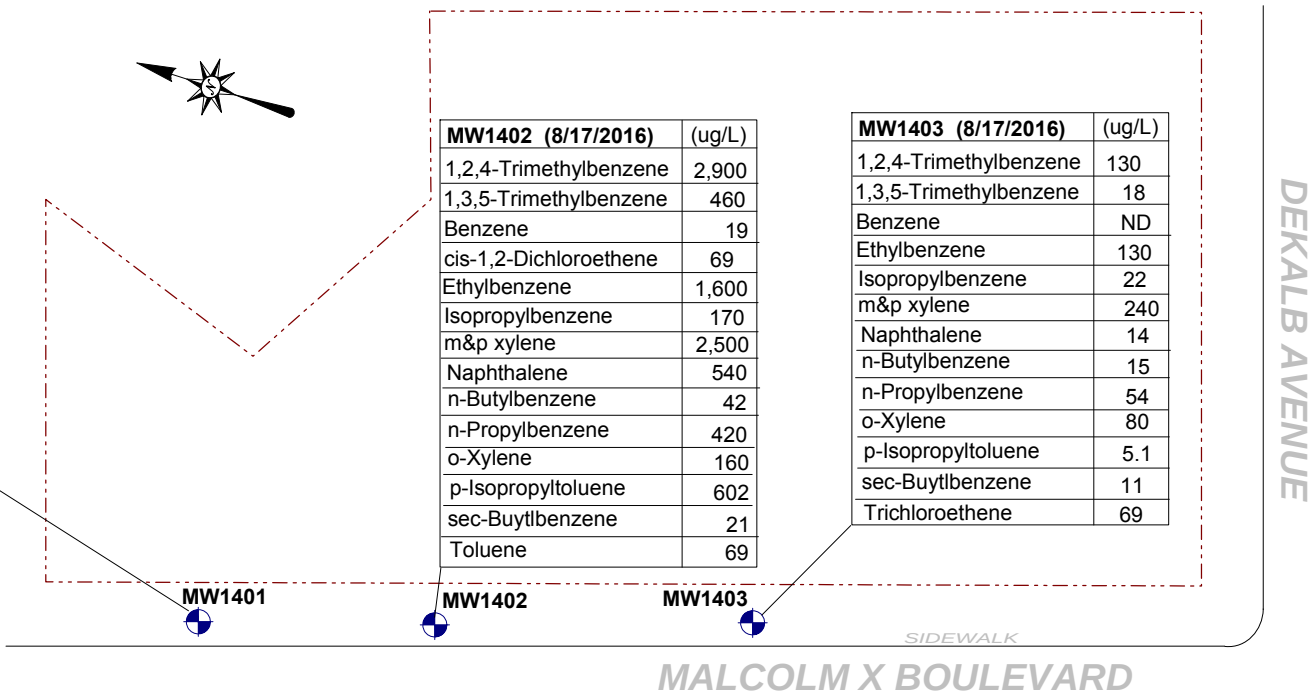
Figure No. 5

Site Name: FORMER GETTY SERVICE STATION
Site Address: 1103-1107 DEKALB AVENUE, BROOKLYN, NY
Drawing Title: REMAINING SOIL ABOVE SCOS



MW1402 (8/17/2016)	(ug/L)
1,2,4-Trimethylbenzene	2,900
1,3,5-Trimethylbenzene	460
Benzene	19
cis-1,2-Dichloroethene	69
Ethylbenzene	1,600
Isopropylbenzene	170
m&p xylene	2,500
Naphthalene	540
n-Butylbenzene	42
n-Propylbenzene	420
o-Xylene	160
p-Isopropyltoluene	602
sec-Buytlbenzene	21
Toluene	69

MW1403 (8/17/2016)	(ug/L)
1,2,4-Trimethylbenzene	130
1,3,5-Trimethylbenzene	18
Benzene	ND
Ethylbenzene	130
Isopropylbenzene	22
m&p xylene	240
Naphthalene	14
n-Butylbenzene	15
n-Propylbenzene	54
o-Xylene	80
p-Isopropyltoluene	5.1
sec-Buytlbenzene	11
Trichloroethene	69

MW1401 (8/17/2016)	(ug/L)
1,2,4-Trimethylbenzene	160
1,3,5-Trimethylbenzene	38
cis-1,2-Dichloroethene	1.9
Ethylbenzene	760
Isopropylbenzene	43
Naphthalene	50
n-Butylbenzene	5.2
n-Propylbenzene	69
p-Isopropyltoluene	17

KEY:

Site Boundary

MWx Performance Monitoring Well Location

SCALE:

0 12.5 25

1 Inch = 25 feet

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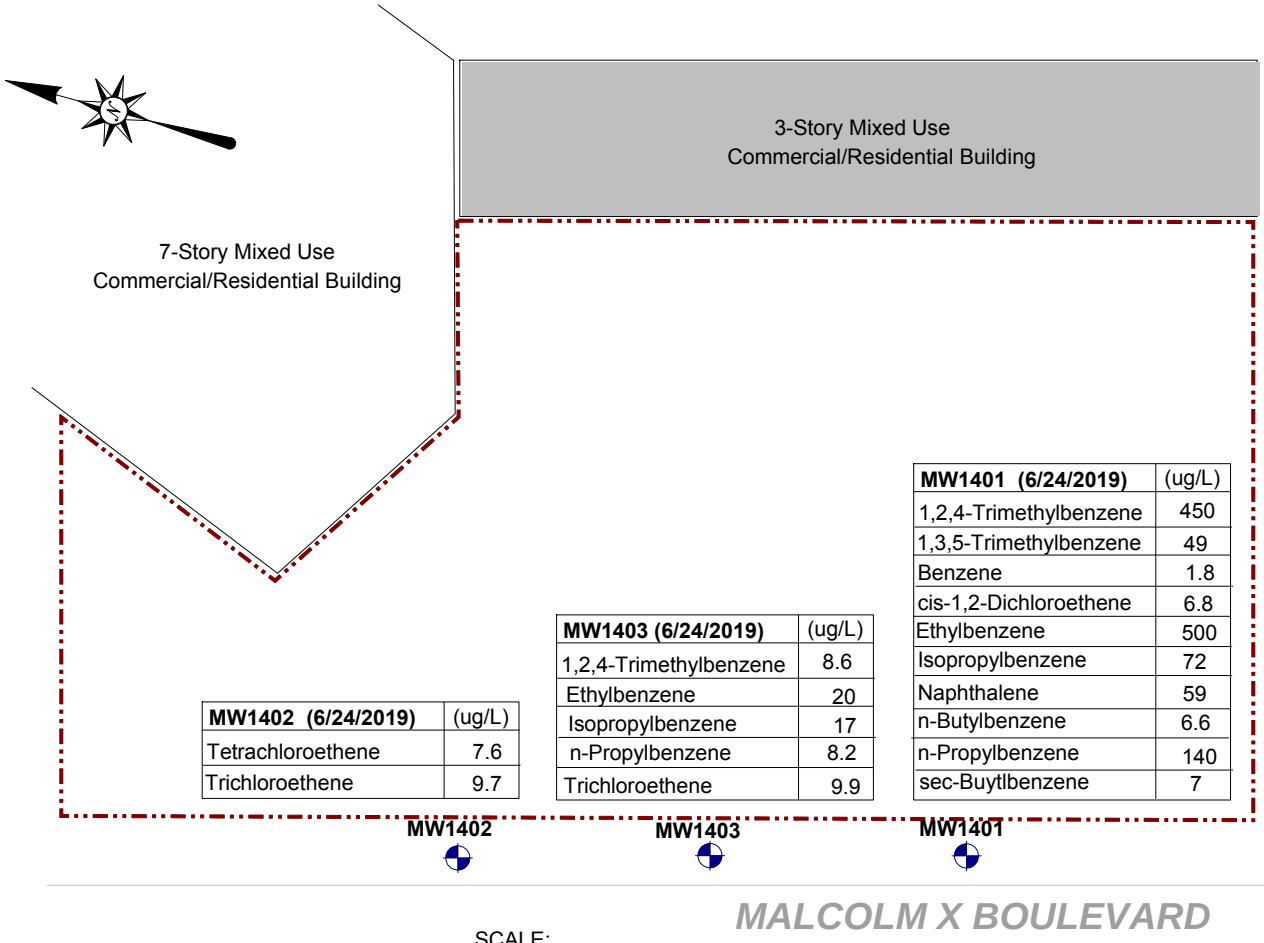
Figure No. 6a

Drawing Date: 9/30/19

Site Name: FORMER GETTY SERVICE STATION

Site Address: 1103-1107 DEKALB AVENUE, BROOKLYN, NY

Drawing Title: GROUNDWATER SAMPLING RESULTS 8-17-16 (PRE-ISCO)



MW1402 (6/24/2019)	(ug/L)
Tetrachloroethene	7.6
Trichloroethene	9.7

MW1403 (6/24/2019)	(ug/L)
1,2,4-Trimethylbenzene	8.6
Ethylbenzene	20
Isopropylbenzene	17
n-Propylbenzene	8.2
Trichloroethene	9.9

MW1401 (6/24/2019)	(ug/L)
1,2,4-Trimethylbenzene	450
1,3,5-Trimethylbenzene	49
Benzene	1.8
cis-1,2-Dichloroethene	6.8
Ethylbenzene	500
Isopropylbenzene	72
Naphthalene	59
n-Butylbenzene	6.6
n-Propylbenzene	140
sec-Buytlbenzene	7

KEY:

Site Boundary

MWx

Performance Monitoring Well Location

SCALE:

0 12.5 25

1 Inch = 25 feet

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Phone 631.504.6000
Fax 631. 924 .2870

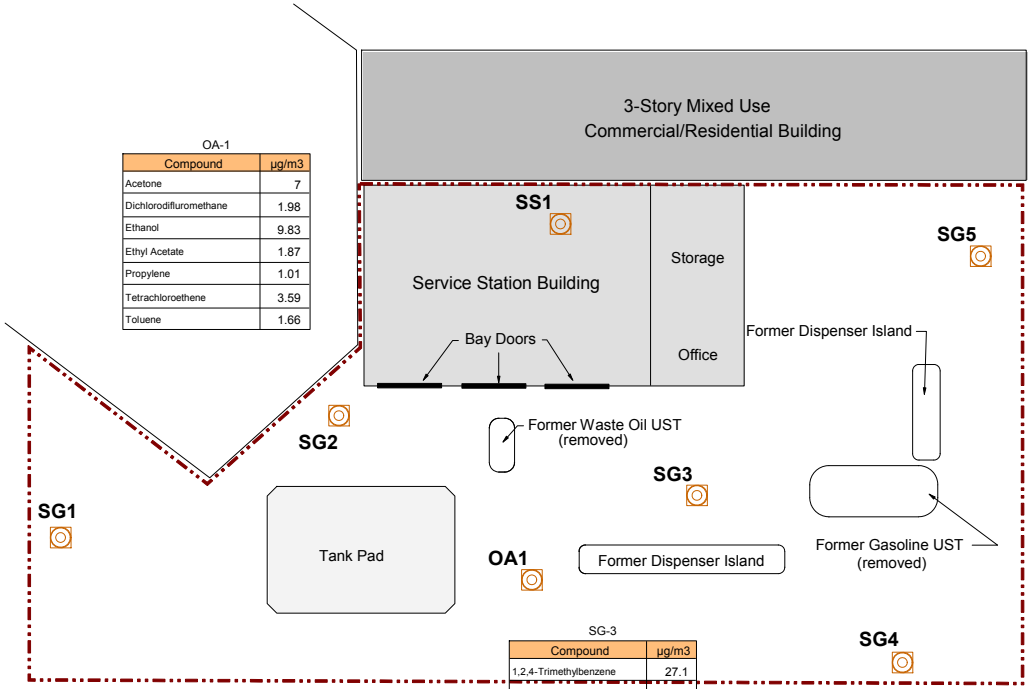
Figure No. 6b

Drawing Date: 10/17/19

Site Name: FORMER GETTY SERVICE STATION

Site Address: 1103-1107 DEKALB AVENUE, BROOKLYN, NY

Drawing Title: GROUNDWATER RESULTS 2ND QUARTER 2019 (6/24/19)



SG-1

Compound	µg/m3
1,2,4-Trimethylbenzene	39.6
1,3,5-Trimethylbenzene	13.6
4-Ethyltoluene	11.2
4-Isopropyltoluene	1.54
4-Methyl-2-pentanone	3.9
Acetone	1,840
Benzene	3.32
Carbon Disulfide	8.28
Chloroform	10.5
Dichlorodifluromethane	1.78
Ethanol	50
Ethyl Acetate	3.28
Ethylbenzene	23.3
Heptane	6.43
Hexane	5.5
Isopropylalcohol	17.3
Isopropylbenzene	5.9
Xylene (m&p)	55.1
Methyl Ethyl Ketone	34.2
MTBE	2.56
n-Butylbenzene	2.91
Xylene (o)	9.03
Propylene	36.5
sec-Butylbenzene	1.15
Tetrachloroethene	1.76
Tetrahydrofuran	1.3
Toluene	6.59

OA-1

Compound	µg/m3
Acetone	7
Dichlorodifluromethane	1.98
Ethanol	9.83
Ethyl Acetate	1.87
Propylene	1.01
Tetrachloroethene	3.59
Toluene	1.66

SS-1

Compound	µg/m3
1,2,4-Trimethylbenzene	26.7
1,3,5-Trimethylbenzene	11
4-Ethyltoluene	9.68
4-Isopropyltoluene	1.26
4-Methyl-2-pentanone	9.62
Acetone	221
Benzene	1.5
Carbon Tetrachloride	0.503
Chloroform	15.6
Cyclohexane	1.48
Dichlorodifluromethane	2.52
Ethanol	60.2
Ethyl Acetate	4.64
Ethylbenzene	27.6
Heptane	10.5
Hexane	3.17
Isopropylalcohol	20.6
Isopropylbenzene	6.93
Xylene (m&p)	70.3
Methyl Ethyl Ketone	39.2
MTBE	7.6
n-Butylbenzene	1.7
Xylene (o)	12.5
Propylene	1.5
Styrene	1.19
Tetrachloroethene	5.56
Tetrahydrofuran	17.1
Toluene	14.7
Trichloroethene	0.806
Trichlorofluoromethane	1.01

SG-2

Compound	µg/m3
1,2,4-Trimethylbenzene	39.6
1,2-Dichloroethane	13.6
1,3,5-Trimethylbenzene	13.6
4-Ethyltoluene	11.2
Acetone	1,840
Carbon Disulfide	8.28
Cyclohexane	10.5
Ethanol	50
Ethylbenzene	23.3
Heptane	6.43
Hexane	5.5
Isopropylalcohol	17.3
Isopropylbenzene	5.9
Xylene (m&p)	55.1
Methyl Ethyl Ketone	34.2
Methylene Chloride	2.56
Xylene (o)	9.03
Propylene	36.5
Tetrachloroethene	1.76
Toluene	6.59

SG-3

Compound	µg/m3
1,2,4-Trimethylbenzene	27.1
1,3,5-Trimethylbenzene	9.63
4-Ethyltoluene	8.11
4-Isopropyltoluene	1.04
Acetone	1,280
Benzene	10.3
Carbon Disulfide	187
Carbon Tetrachloride	0.314
Chloromethane	1.51
Dichlorodifluromethane	1.14
Ethanol	30.1
Ethylbenzene	23.4
Heptane	60.3
Hexane	84.2
Isopropylbenzene	4.67
Xylene (m&p)	58.1
Methyl Ethyl Ketone	55.4
n-Butylbenzene	2.14
Xylene (o)	10.7
Propylene	1,140
Tetrachloroethene	1
Toluene	31
Trichlorofluoromethane	1.18

SG-4

Compound	µg/m3
1,2,4-Trimethylbenzene	81.6
1,2-Dichloroethane	39.4
1,3,5-Trimethylbenzene	33.2
4-Ethyltoluene	22.8
Benzene	73.8
Carbon Disulfide	88.4
Cyclohexane	3,230
Ethanol	20.9
Ethylbenzene	173
Heptane	4,710
Hexane	4,190
Isopropylbenzene	32.4
Xylene (m&p)	126
Xylene (o)	16.9
Propylene	151
Toluene	27.7

SG-5

Compound	µg/m3
1,2,4-Trimethylbenzene	33.1
1,3,5-Trimethylbenzene	11
4-Ethyltoluene	11.5
4-Isopropyltoluene	1.32
4-Methyl-2-pentanone	1.76
Acetone	736
Benzene	4.4
Carbon Disulfide	20
Dichlorodifluromethane	1.88
Ethanol	24.1
Ethylbenzene	17.7
Heptane	18.1
Hexane	6.9
Isopropylalcohol	8.28
Isopropylbenzene	4.32
Xylene (m&p)	48.6
Methyl Ethyl Ketone	69
n-Butylbenzene	2.47
Xylene (o)	10.5
Propylene	23
Tetrachloroethene	3.18
Tetrahydrofuran	1.62
Toluene	33.7
Trichloroethene	1.88
Trichlorofluoromethane	8.37

SCALE:

0 15 30

1 Inch = 30 feet

KEY:

Property Boundary

Soil Gas/Air Sampling Location

Outdoor Air Sampling Location

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
Phone 631.504.6000
Fax 631. 924 .2870

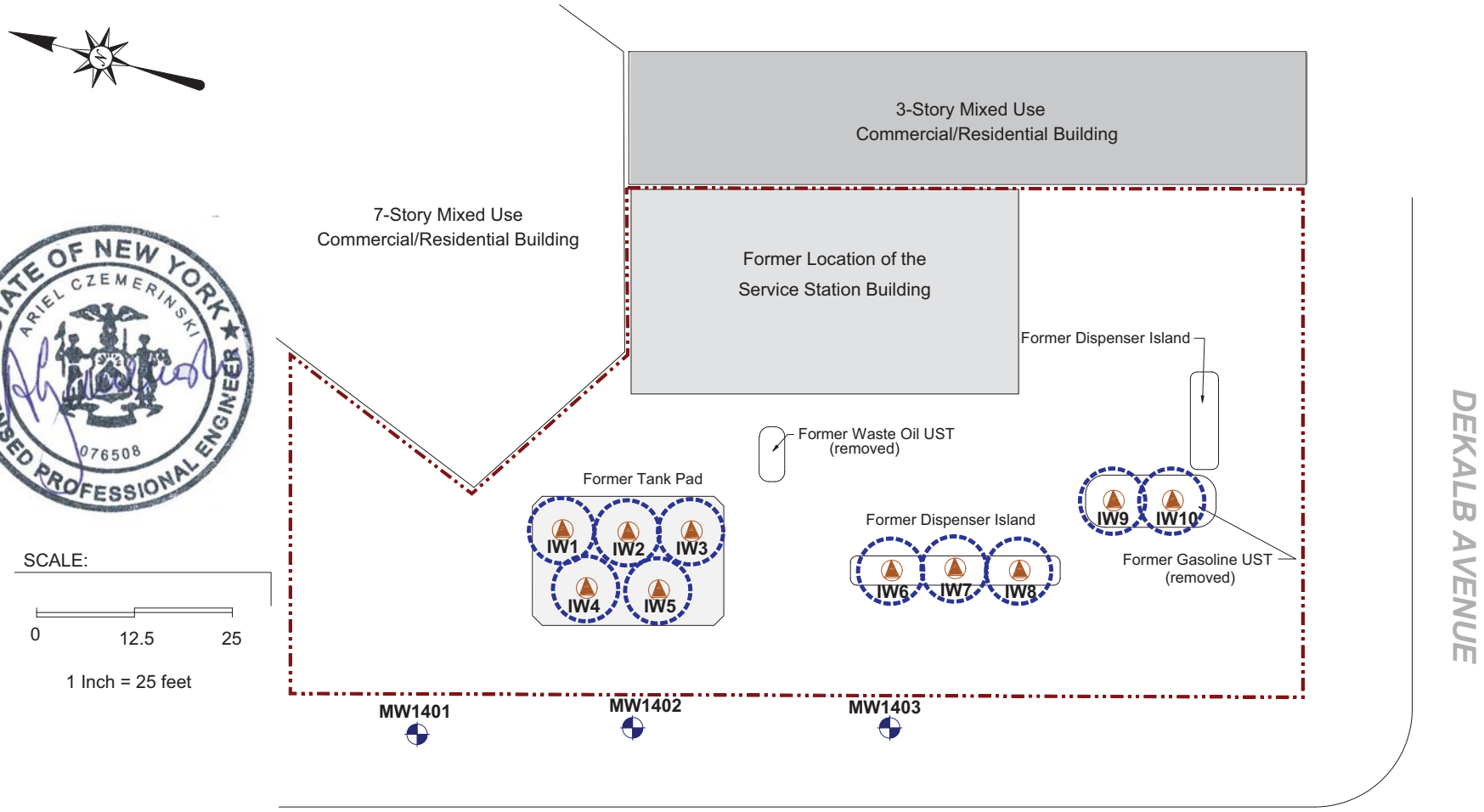
Figure No. 7

Drawing Date: 9/30/19

Site Name: FORMER GETTY SERVICE STATION

Site Address: 1103-1107 DEKALB AVENUE, BROOKLYN, NY

Drawing Title: RI SOIL VAPOR SAMPLE RESULTS



STATE OF NEW YORK
ARIEL CZEMERINSKI
076508
LICENSED PROFESSIONAL ENGINEER

SCALE:

0 12.5 25

1 Inch = 25 feet

KEY:

Site Boundary

MWx Performance Monitoring Well Location

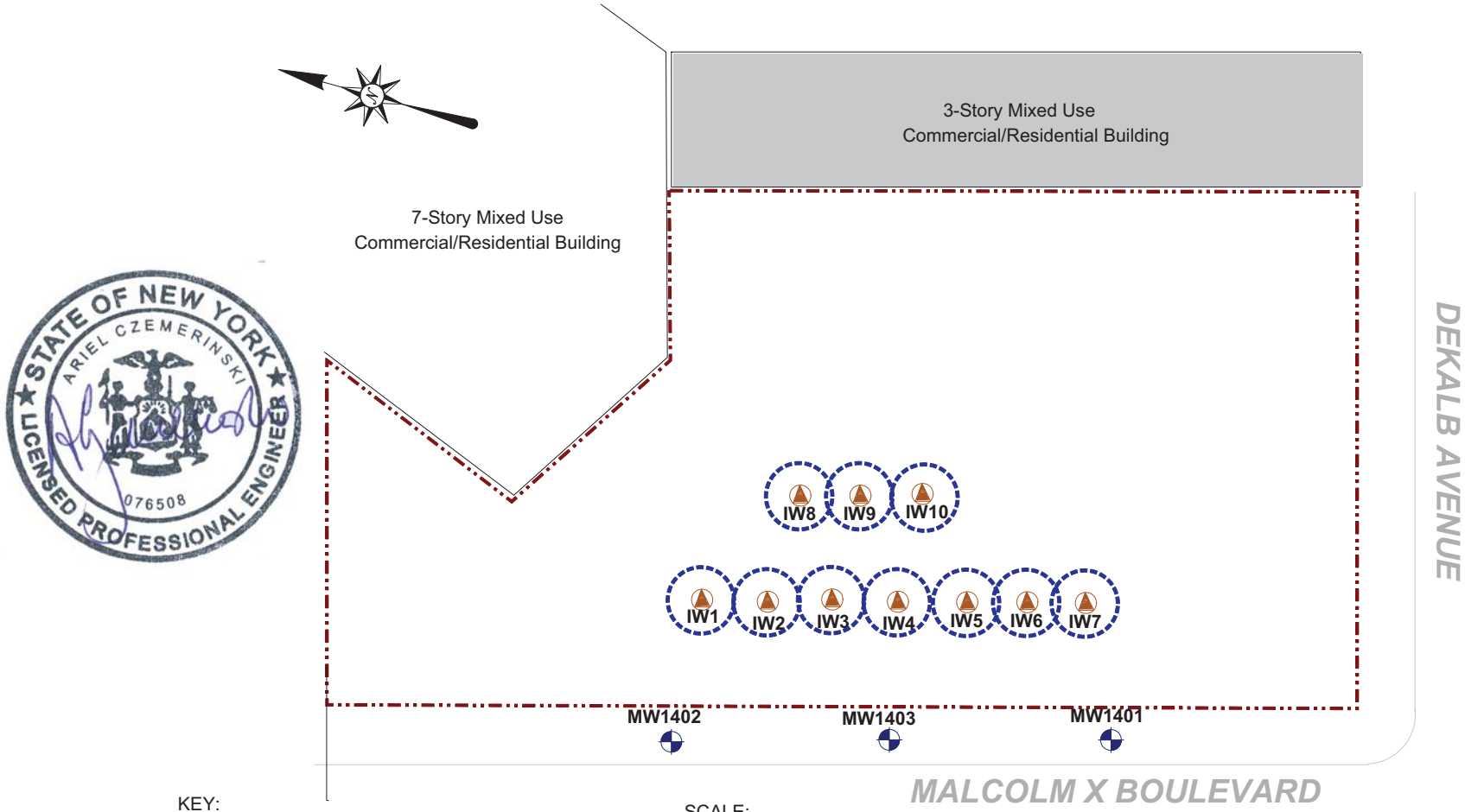
IWx Chemical Injection Well / Inj. Radius

Note: Shown are the original well locations
Wells were removed during construction.

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No.
8a
Drawing Date: 9/30/19

Site Name: Former Getty Service Station
Site Address: 1103-1107 DeKalb Avenue, Brooklyn, NY
Drawing Title: Original Monitoring Well / Injection Well Locations



STATE OF NEW YORK
ARIEL CZEMERINSKI
076508
LICENSED PROFESSIONAL ENGINEER

KEY:

- Site Boundary
- MWx — Performance Monitoring Well Location
- IWx — Chemical Injection Well / Inj. Radius

Note: MW1401 Damaged during excavation to be reinstalled

SCALE:

0 12.5 25

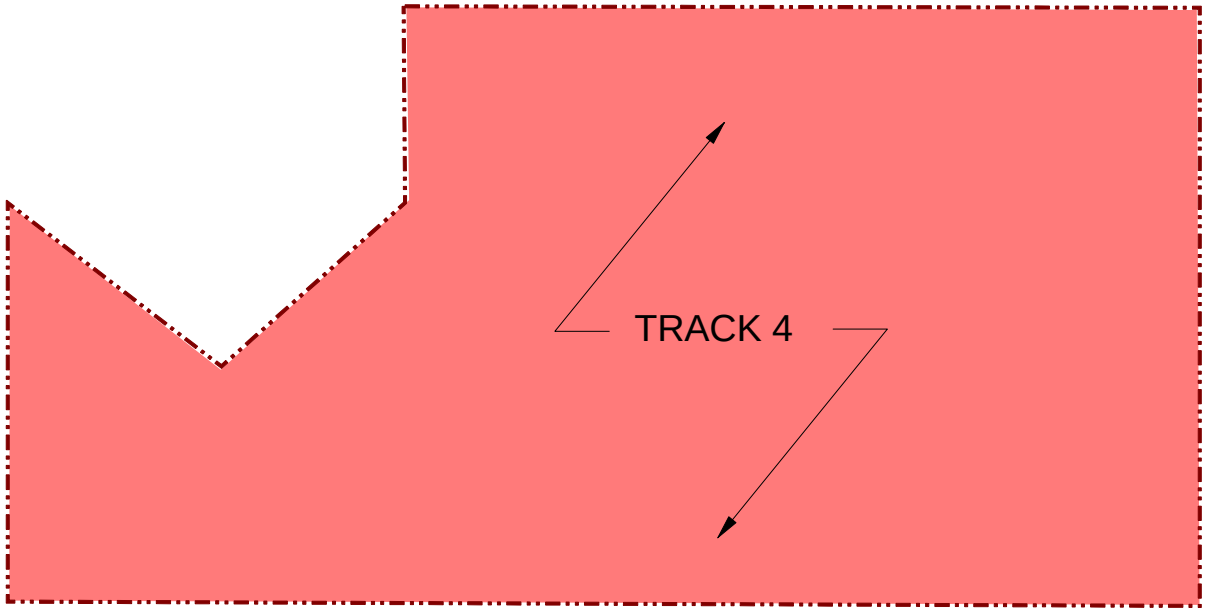
1 Inch = 25 feet

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No. **8b**

Drawing Date: 10/17/19

Site Name: Former Getty Service Station
Site Address: 1103-1107 DeKalb Avenue, Brooklyn, NY
Drawing Title: Replacement Monitoring Well / Injection Well Locations



DEKALB AVENUE

MALCOLM X BOULEVARD

KEY:

Site Boundary

Track 4 Boundary

SCALE:

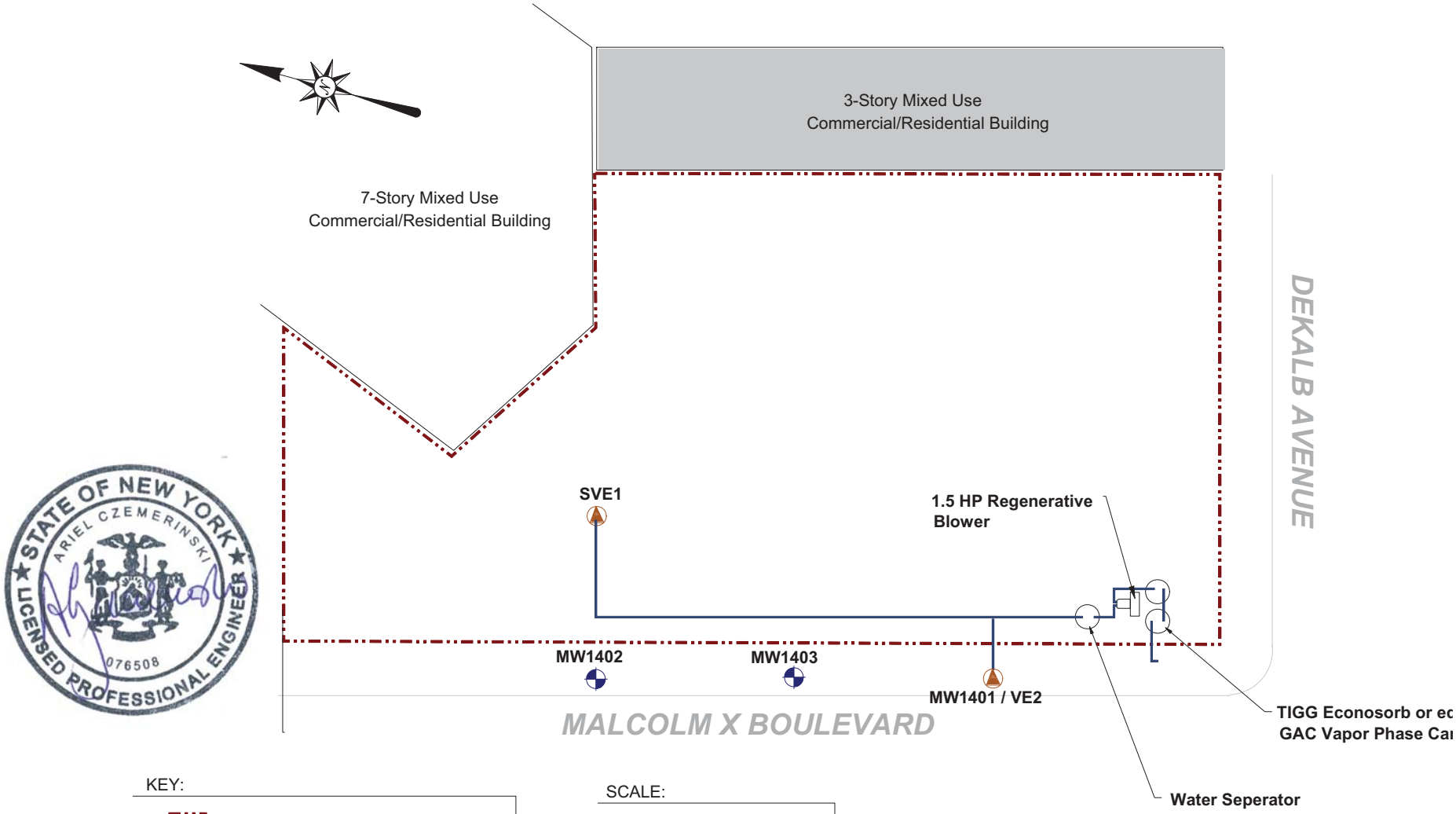
0 12.5 25

1 Inch = 25 feet

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No.
9
Drawing Title: 9/30/19

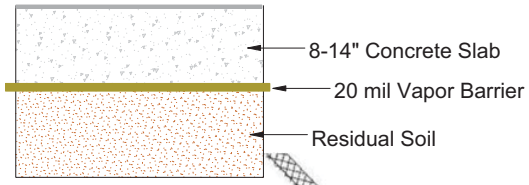
Site Name: FORMER GETTY SERVICE STATION
Site Address: 1103-1107 DEKALB AVENUE, BROOKLYN, NY
Drawing Title: INSTITUTIONAL CONTROL BOUNDARIES

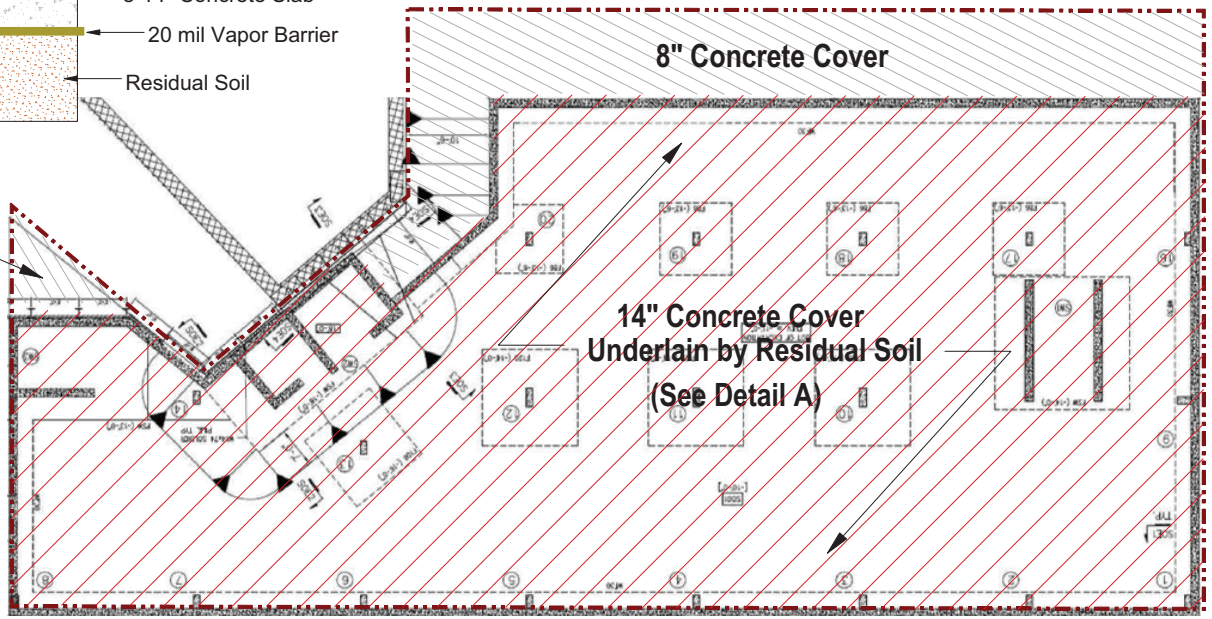


STATE OF NEW YORK
ARIEL CZEMERINSKI
076508
LICENSED PROFESSIONAL ENGINEER

AMC Engineeting, PLLC 18-36 42nd Street Astoria, NY 11105	*Figure No.* **10a**	Site Name:	Former Getty Service Station
		Site Address:	1103-1107 DeKalb Avenue, Brooklyn, NY
	Drawing Date: 10/17/19	Drawing Title:	Engineering Controls - SVE System

Detail A





DEKALB AVENUE

MALCOLM X BOULEVARD

STATE OF NEW YORK
ARIEL CZEMERINSKI
076508
LICENSED PROFESSIONAL ENGINEER

KEY:

- Site Boundary
- 14" Concrete Cover
- 8" Concrete Cover

SCALE:

0 12.5 25

1 Inch = 25 feet

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No.
10b

Site Name: FORMER GETTY SERVICE STATION
Site Address: 1103-1107 DEKALB AVENUE, BROOKLYN, NY
Drawing Title: ENGINEERING CONTROL - SITE COVER

ATTACHMENT A
Site Contacts

LIST OF SITE CONTACTS

Name	Phone/Email Address
Site Owner and Remedial Party 1107 D LLC Moris Yeroshalmie	 212-221-5000 Moris@AbcBY.com
Qualified Environmental Professional Environmental Business Consultants Charles Sosik	 631.504.6000 csosik@ebcincny.com
Remedial Engineer AMC Engineering Ariel Czemerinski, P.E.	 516.417.8588 ariel@amc-engineering.com
NYSDEC DER Project Manager Shaun Bollers	718-482-4096 Shaun.bollers@dec.ny.gov
NYSDEC Regional HW Engineer Jane O'Connell	718-482-4599 jane.oconnell@dec.ny.gov
NYSDOH Project Manager Stephanie Selmer	518-402-7860 stephanie.selmer@health.ny.gov
Remedial Party Attorney Schnapf LLC Lawrence Schnapf	212-876-3189 larry@schnapfLaw.com
NYSDEC Site Control Kelly Lewandowski	718-402-9581 kelly.lewandowski@dec.ny.gov

ATTACHMENT B
Excavation Work Plan

EXCAVATION WORK PLAN (EWP)

B-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. Table B-1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in **Attachment A**.

Table B-1: Notifications*

Name	Contact Information
Jane O'Connell	718-482-4599, Jane.Oconnell@dec.ny.gov
Shaun Bollers	718-482-4096, Shaun.Bollers@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in **Attachment G** of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

B-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section B-5 of this Attachment.

B-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

B-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

B-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are as follows:

ENTERING SITE - from the Brooklyn Queens Expressway take the Flushing Avenue exit (30). Merge onto Classon Avenue, and turn right onto Flushing Avenue. Turn right onto Broadway and continue 11 blocks to DeKalb Avenue. Make a right onto DeKalb Avenue. The Site entrance will be on the right.

EXITING SITE – Head west on DeKalb Avenue. Make the first right onto Malcolm X Boulevard. Turn left onto Broadway. Proceed 10 blocks and turn left onto Flushing Avenue. Continue on Flushing Avenue and turn left after passing under the Brooklyn Queens Expressway. Follow the signs for the Brooklyn Queens Expressway on-ramp.

All trucks loaded with site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

B-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this Site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

B-7 MATERIALS REUSE ON-SITE

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This soil will undergo a testing program to confirm that it meets unrestricted SCOs prior to unregulated disposal or reuse on-site. Confirmation testing of clean soils will be in accordance with DER-10 as follows:

Contaminant	**VOCs**	**SVOCs, Inorganics, PCBs/Pesticides & ECs***	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	Each composite sample for analysis is created from 3-5 discrete samples from representative locations in the fill.
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Emergent contaminants. 21 PFAS compounds or as per current NYSDEC guidance.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

B-8 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

B-9 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 1. Soils that meet ‘exempt’ fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

B-10 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

B-11 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

B-12 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

ATTACHMENT C
Environmental Easement / Notice / Deed Restriction

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument.The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2017090100771001001E4F38

RECORDING AND ENDORSEMENT COVER PAGE **PAGE 1 OF 10**

Document ID: 2017090100771001 Document Date: 08-07-2017 Preparation Date: 09-01-2017
Document Type: EASEMENT
Document Page Count: 9

PRESENTER:
CORNERSTONE LAND ABSTRACT
248-52 JERICHO TURNPIKE
CL-17307-K
BELLEROSE VILLAGE, NY 11001
516-327-5400
CLIFTON@CLTITLE.COM

RETURN TO:
1107D LLC
45 NORTH STATION PLAZA
SUITE 315
GREAT NECK, NY 11021

PROPERTY DATA

Borough	Block	Lot	Unit	Address
BROOKLYN	1600	28	Entire Lot	1103-1107 DEKALB AVENUE

Property Type: NON-RESIDENTIAL VACANT LAND

CROSS REFERENCE DATA

CRFN_____ *or* DocumentID_____ *or* _____ Year_____ Reel____ Page_____ *or* File Number_____

PARTIES

GRANTOR/SELLER:
1107D LLC
45 NORTH STATION PLAZA, SUITE 315
GREAT NECK, NY 11021

GRANTEE/BUYER:
THE PEOPLE OF THE STATE OF NEW YORK
625 BROADWAY, THE PEOPLE OF THE STATE OF NEW
ALBANY, NY 12233

FEES AND TAXES

Mortgage :

Mortgage Amount:	$	0.00
Taxable Mortgage Amount:	$	0.00
Exemption:		
TAXES: County (Basic):	$	0.00
City (Additional):	$	0.00
Spec (Additional):	$	0.00
TASF:	$	0.00
MTA:	$	0.00
NYCTA:	$	0.00
Additional MRT:	$	0.00
TOTAL:	$	0.00
Recording Fee:	$	82.00
Affidavit Fee:	$	0.00

Filing Fee: $ 100.00

NYC Real Property Transfer Tax: $ 0.00

NYS Real Estate Transfer Tax: $ 0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK
Recorded/Filed 09-05-2017 14:05
City Register File No.(CRFN): **2017000329643**

City Register Official Signature

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 7th day of August, 2017 between Owner(s) 1107D LLC, having an office at 45 North Station Plaza, Suite 315, Great Neck, New York 11021, County of Nassau, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 1103-1107 DeKalb Avenue in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 1600 Lot 28, being the same as that property conveyed to Grantor by deed dated March 20, 2014 and recorded in the City Register of the City of New York as CRFN # 2014000112537. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.2184 +/- acres, and is hereinafter more fully described in the Land Title Survey dated February 7, 2017 prepared by Szczepan H. Roguski, L.L.S. of Roguski Land Surveying, P.C., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is

extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C224176-05-13, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement")

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation

pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved b the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C224176
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

1107D LLC:

By: _____

Print Name: Moris Yeroshalmy

Title: member Date: 6.20.17

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Nassau)

On the 20 day of June, in the year 2017, before me, the undersigned, personally appeared Moris Yeroshalmy, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

SHOUB AVIHU
Notary Public State of New York
Qualified in Nassau County
No. 01SH6355132
My Commission Expires Feb 27, 2021

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 7th day of August, in the year 2017 before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2018

SCHEDULE "A" PROPERTY DESCRIPTION

All that certain piece or parcel of land, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the easterly side of Malcolm X Boulevard (formerly Reid Avenue) and the northerly side of DeKalb Avenue; running

THENCE easterly along the said northerly side of DeKalb Avenue 75 feet;

THENCE northerly parallel with said Malcolm X Boulevard (formerly Reid Avenue) 100 feet;

THENCE westerly parallel with DeKalb Avenue 25 feet;

THENCE northwesterly along a line forming an exterior angle of 125 degrees 23 minutes 4 seconds with the previous course, 15 feet 4 inches;

THENCE northwesterly along a line forming an interior angle of 175 degrees 8 minutes 53 seconds with the previous course, 16 feet 11 inches to the division line between land formerly of Charles B. Hart and land formerly of J. Struthers;

THENCE northeasterly along said division line 31 feet 5-3/8 inches to a point therein distant 49 feet 10 inches easterly from the easterly side of Malcolm X Boulevard (formerly Reid Avenue) on a line drawn at right angles thereto;

THENCE westerly parallel with DeKalb Avenue 49 feet 10 inches to the easterly side of Malcolm X Boulevard (formerly Reid Avenue); and

THENCE southerly along the said easterly side of Malcolm X Boulevard (formerly Reid Avenue) 150 feet to the corner first mentioned at the point or place of BEGINNING.

FOR INFORMATION ONLY
PREMISES DESCRIBED HEREON CONSISTS OF AN AREA OF 9513.9 SQ. FT. or 0.2184 ACRES

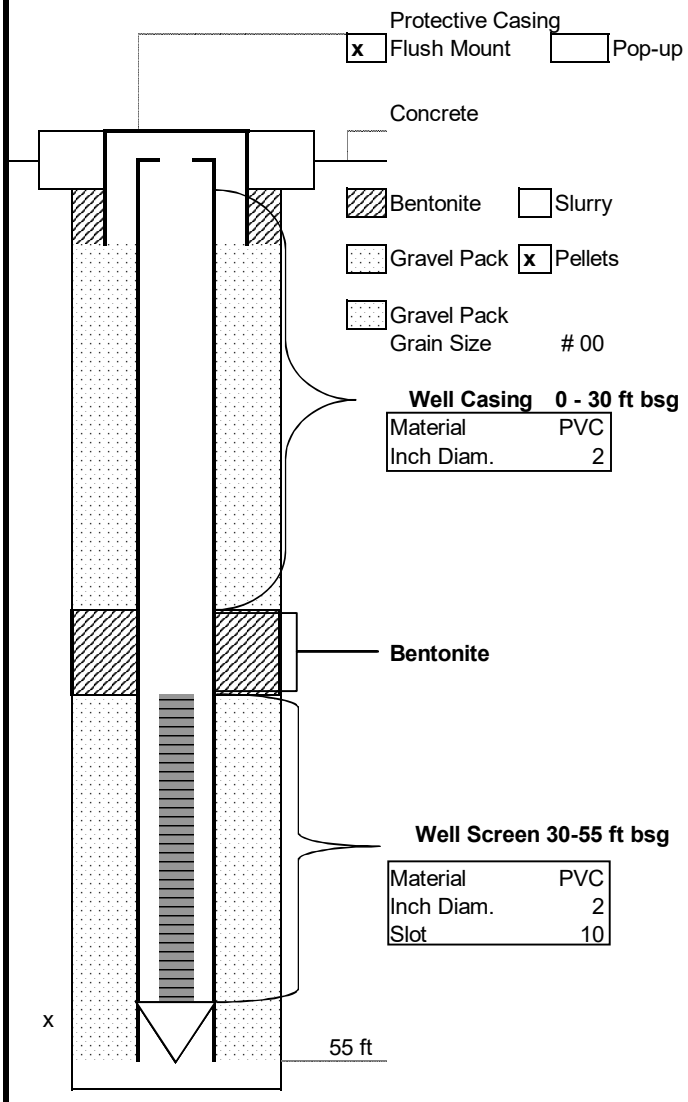
ATTACHMENT D
Monitoring Well Boring and Construction Logs

MONITORING WELL/SOIL VAPOR EXTRACTION WELL

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

CONSTRUCTION LOG

MW1401/VE-2



Note: Drawing is not to scale.
Depths are given in feet below land surface.

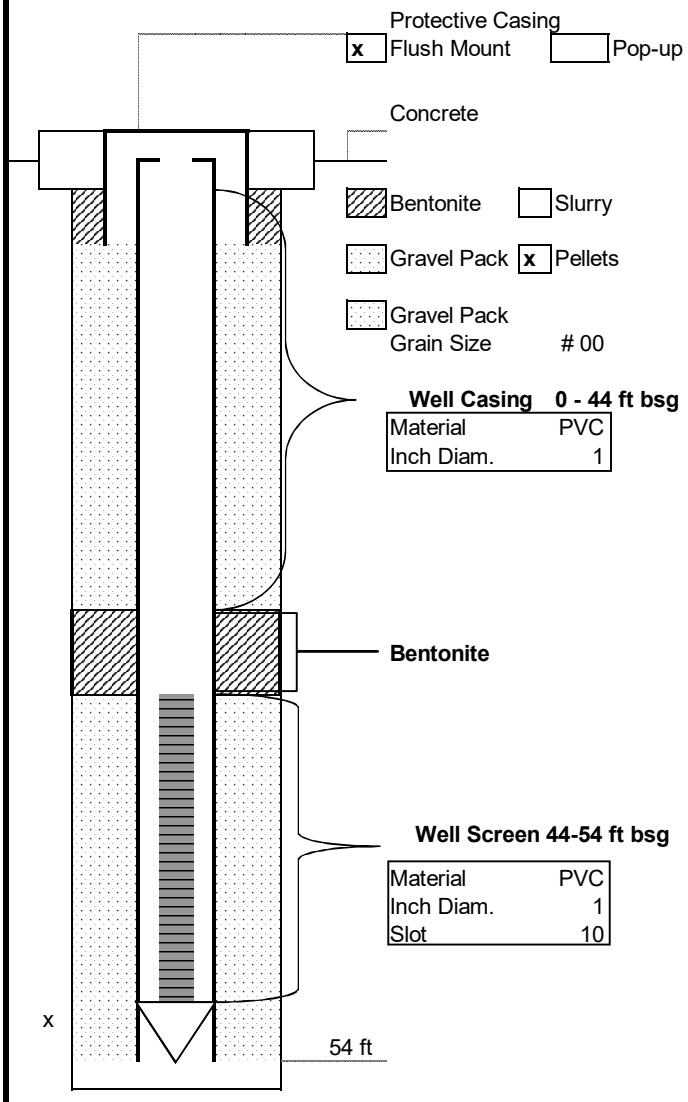
Monitoring Well/Vapor Extraction No:	MW1401/VE-2
Project:	1107 DeKalb Ave Brooklyn NY
Depth to Groundwater:	45 ft
Installation Depth:	55ft bgs
Survey Point Elevation:	
Installation Date:	11/3/2017
Drilling Contractor:	PAL Environmental
Installation Method:	Hollow Geoprobe Rods
Water Removed During Development:	
Hydrogeologist:	Anthony Balado
Company Name:	EBC

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

MONITORING WELL

CONSTRUCTION LOG

MW1402



Note: Drawing is not to scale.
Depths are given in feet below land surface.

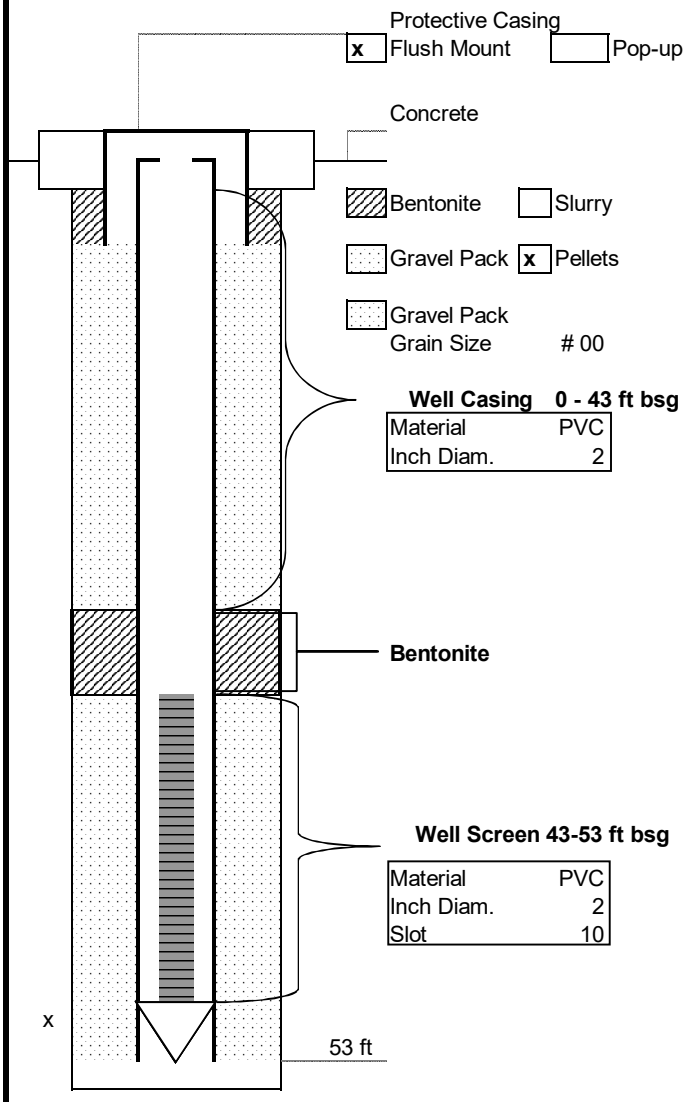
Monitoring Well No:	MW1402
Project:	Former Getty Service Station 1107 DeKalb Avenue, Brooklyn, NY
Depth to Groundwater:	N/A
Installation Depth:	54 ft bsg
Survey Point Elevation:	
Installation Date:	8/10/2016
Drilling Contractor:	C2 Environmental
Installation Method:	Hollow Geoprobe Rods
Water Removed During Development:	
Hydrogeologist:	Kevin Waters
Company Name:	EBC

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

MONITORING WELL

CONSTRUCTION LOG

MW1403



Note: Drawing is not to scale.
Depths are given in feet below land surface.

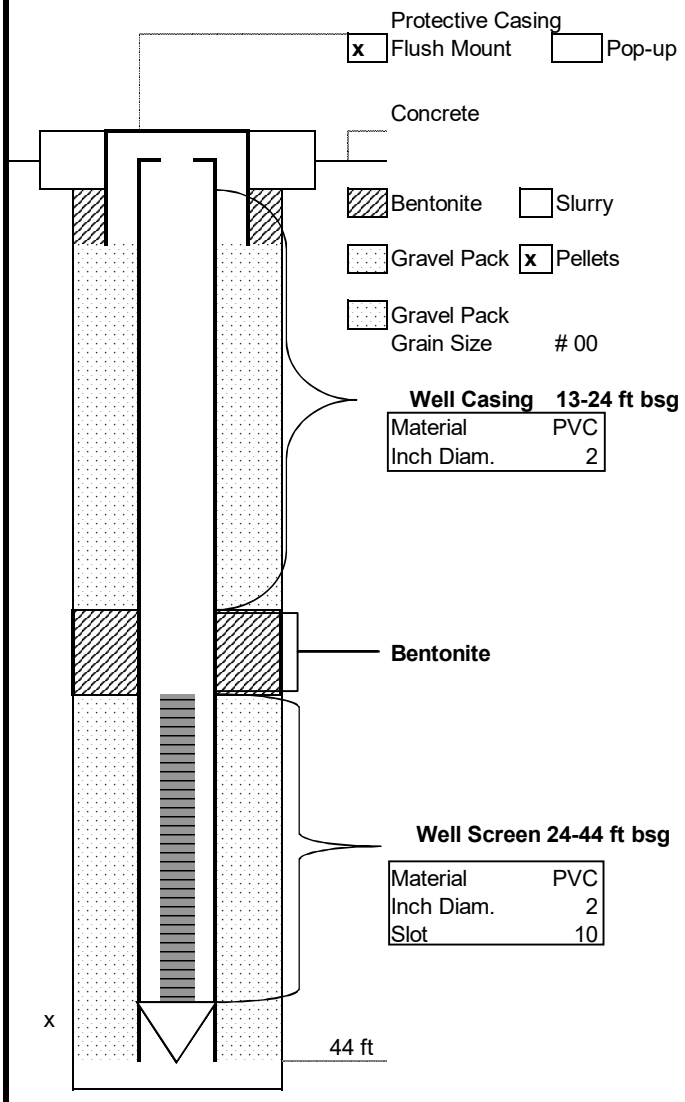
Monitoring Well No:	MW1403
Project:	1107 DeKalb Ave Brooklyn NY
Depth to Groundwater:	45 ft
Installation Depth:	53 ft bgs
Survey Point Elevation:	
Installation Date:	6/15/2017
Drilling Contractor:	PAL Environmental
Installation Method:	Hollow Geoprobe Rods
Water Removed During Development:	
Hydrogeologist:	Kevin Waters
Company Name:	EBC

SOIL VAPOR EXTRACTION WELL

CONSTRUCTION LOG

VE-1

ENVIRONMENTAL BUSINESS CONSULTANTS



Note: Drawing is not to scale.
Depths are given in feet below land surface.

Vapor Extraction Well No:	VE-1
Project:	1107 DeKalb Ave Brooklyn NY
Depth to Groundwater:	N/A
Installation Depth:	44.5ft bgs
Survey Point Elevation:	
Installation Date:	3/30/2017
Drilling Contractor:	PAL Environmental
Installation Method:	Hollow Geoprobe Rods
Water Removed During Development:	
Hydrogeologist:	Anthony Balado
Company Name:	EBC

ATTACHMENT E
Field Sampling Plan

Former Getty Service Station #00564
1107 Dekalb Avenue
Brooklyn, New York
Block 1600 Lot 28

FIELD SAMPLING PLAN

NYSDEC Site Number: **C224176**

Prepared for:
1107D LLC
45 North Station Plaza, Suite 315
Great Neck, NY 11021

Prepared by:

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 Middle Country Road
Ridge, NY 11961

OCTOBER 2019

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FIELD SAMPLING PLAN

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FORMER GETTY SERVICE STATION #00564
FIELD SAMPLING PLAN

TABLES

FIGURES

APPENDICES

LIST OF ACRONYMS

AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Green House Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study

ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

1.0 INTRODUCTION

1.1 General

This Field Sampling Plan is a part of the Site Management Plan for the Former Getty Service Station #0564 Site located at 1107 Dekalb Avenue, Brooklyn, New York (hereinafter referred to as the "Site").

1107D LLC (the Volunteer) entered into a Brownfield Cleanup Agreement with the New York State Department of Environmental Conservation (NYSDEC) on May 30, 2014 to remediate a 0.218-acre parcel located in Brooklyn, Kings County, New York (Site No. C224176). The Site was remediated to Restricted Residential Use and will be used for restricted residential use.

The Site is located at 1107 Dekalb Avenue, in Brooklyn, Kings County, New York and is identified as Section 1900 Block 1600 and Lot 28 on the Brooklyn Tax Map. The Site is an approximately 0.229-acre area (10,000 square feet) located on the northeast corner of Dekalb Avenue and Malcolm X Boulevard. The Site is bounded by a 7-story mixed-use apartment building (Block 1600, Lot 4 – 1080 Broadway) to the north, a 2-story mixed-use apartment building with a first floor store (Block 1600, Lot 10 – 1086 Broadway) and a 3-story mixed-use apartment building with a first floor store (Block 1600, Lot 27 – 1009 Dekalb Avenue) to the east, Dekalb Avenue to the south, and Malcolm X Boulevard to the west.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination". The Site will be limited to Restricted Residential Use, groundwater use is prohibited, and future excavation will be handled as per the SMP. A soil vapor extraction system has been installed to control exposure to remaining contamination to ensure protection of public health and the environment. Additionally, an in-situ chemical oxidation (ISCO) program utilizing chemical injections has been prepared for the Site. This Field Sampling Plan (FSP) outlines the necessary

methods to monitor the installed SVE system and the groundwater conditions as per ISCO plan. This plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

2.0 MONITORING PLAN

2.1 Treatment System Monitoring and Sampling

2.1.1 SVE System Monitoring

SVE system components to be monitored include, but are not limited to, the components included in Table 1. Monitoring of the SVE system will be performed on a routine basis, as identified in Table 2. Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system.

Table 1 – Remedial System Monitoring Requirements and Schedule

SVE System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Regenerative Blower	Flow Rate	100-140 cfm	Quarterly
Activated Carbon Drums	Expiration date, damage, labeling, PID readings (at inlet, mid-carbon and outlet)	-	Quarterly
Plumbing	Cracks, damage, labeling	-	Quarterly

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Attachment H of the SMP. If any readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair is required immediately.

2.1.2 SVE System Sampling

Samples shall be collected from the SVE system on a variable schedule. Sampling locations, required analytical parameters, and schedule are provided in Table 2, below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 2– Remedial System Sampling Requirements and Schedule

Sampling Location	Sampling	Schedule
Pre-carbon and post-carbon locations	VOCs by Method 624 (tedlar bag)	Quarterly
Spent carbon	VOCs, SVOCs, pH, and ignitability by TCLP method Or as required for disposal / regeneration (4 oz. and 8 oz. jars)	As needed

2.1.3 Groundwater Monitoring

Groundwater monitoring will be performed on a quarterly basis, as identified in Table 3. Modification to the frequency or sampling requirements will require approval from NYSDEC. A visual inspection of the injection wells and monitoring wells will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when an emergency occurs that is deemed likely to affect the monitoring well system. Monitoring requirements include, but are not limited to, the components included in Table 3.

Table 3 – Groundwater Monitoring Requirements and Schedule

ISCO System Component	Monitoring Parameter	Monitoring Schedule
Monitoring Wells	Visual Inspection of Condition PID Screen Depth to water measurement Depth to bottom measurement	Quarterly

A complete list of components to be inspected is provided in the Inspection Checklist, provided in the SMP as Attachment H - Site Management Forms. If the monitoring wells have been damaged, lost, or require redevelopment, maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

2.1.4 Groundwater Sampling

Groundwater samples will be collected from monitoring wells MW1401-1403 to monitor overall improvements in groundwater quality. Sampling locations, required analytical

parameters and schedule are provided in Table 4. Modification to the frequency or sampling requirements will require approval from NYSDEC.

Table 4 – Groundwater Sampling Requirements and Schedule

Sampling Location	**Schedule**	
	VOCs (EPA Method 8260C)	
MW1401	X	Quarterly
MW1402	X	Quarterly
MW1403	X	Quarterly
Container	(3) 40mL VOAs preserved with HCL	

Groundwater samples will be collected on a quarterly basis. Modification to the frequency or sampling requirements will require approval from NYSDEC. The monitoring wells (MW1401 through MW1403) were installed within the sidewalk of Malcolm X Boulevard immediately downgradient of the former petroleum source area.

Table 5 summarizes the wells identification number, location, depths, diameter and screened intervals of the wells. As part of each groundwater monitoring event, the three monitoring wells are to be sampled to monitor groundwater quality.

Table 5 – Monitoring Well Construction Details

MW ID	**Well Location**	**Coordinates (longitude/ latitude)**	**Well Diameter (inches)**	**Installation Depth (ft)**	
				Riser Interval	**Screen Interval**
MW1402	In sidewalk immediately west of source area	40º41’38.82”N 73º 55’52.24”W	1	0-44	44-54ft
MW1403	In sidewalk immediately west of source area	40º41’38.31”N 73º 55’52.15”W	2	0-43	43-53ft
MW1401	In sidewalk immediately west of source area	40º41’38.04”N 73º 55’52.09”W	2	0-30	30-55ft

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced, if an event renders the wells unusable. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "*CP-43: Groundwater Monitoring Well Decommissioning Procedures*." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC. The sampling frequency may only be modified with the approval of NYSDEC.

3.0 SVE SAMPLING PROTOCOL

3.1 Monitoring Procedure

An inspection form has been attached that details the information to be collected during each monitoring event. The following list is followed by environmental professionals where monitoring the SVE System at this Site:

1. Verify that the SVE system is operating.
2. Visually inspect all PVC pipes, connections, wellheads, carbon canisters, and the blower. If there are any critical issues with the integrity of the system, shut off the blower and notify the site operator and remedial engineer.
3. Record the pressure at each extraction well (4 total) as indicated on the vacuum gauge at each wellhead.
4. Record the pressure at the blower and carbon canisters as indicated on the vacuum gauge.

3.2 Sampling Procedure

Influent air (pre-carbon treatment) samples will be collected on a quarterly basis to evaluate the effectiveness of the system. Samples will be collected in accordance with the following procedure:

1. Using a peristaltic pump (or equivalent), collect a soil vapor sample at each extraction well. Attach the peristaltic pump to each brass sampling port (on each wellhead) and connect a tedlar bag. Fill the tedlar bag with as much air as possible. Insert the PID in the tedlar bag to collect a VOC reading. Record.
2. Using the PID and available sampling locations, collect VOC measurements at the pre-carbon and post-carbon locations. The pre- and post-carbon do not need the use of the peristaltic pump due to the positive pressure that is created after the pump.

All samples will be submitted to Phoenix Environmental Laboratories (Phoenix) of 587 East Middle Turnpike, Manchester, CT 06040, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301). Transport to the laboratory will be through a Phoenix courier under strict chain-of custody documentation. The samples will be analyzed for VOCs by EPA Method 624. See Appendix B for a sample chain of custody.

3.3 Standard Protocol

All sampling activities will be recorded in a field book and will be documented with photos. Other observations (e.g., well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. The field sampler is expected to report on the entire site and take immediate action if necessary.

4.0 GROUNDWATER SAMPLING PROTOCOL

Three monitoring wells (MW1401, MW1402 and MW1403) are located at the Site. The monitoring wells were installed to evaluate the performance of the remedial effort and monitor improvements to groundwater quality.

Each monitoring wells is constructed of 2-inch diameter pvc casing and 0.010 inch slotted pvc well screen. The wells have 10 feet of screen from approximately 45-55 feet below grade. A No. 00 Morie or equivalent filer sand is installed in the borehole to within 2 feet above the top of the screen. A 1-foot hydrated bentonite seal was placed on top of the filter sand and the remainder of the borehole was backfilled to grade.

4.1 Groundwater Sampling

Groundwater samples will be collected from all three monitoring wells. Sample procurement will be achieved through the use of dedicated polyethylene tubing and a peristaltic pump. The location of the monitoring wells are shown on **Figure 1**.

All groundwater sampling activities will be recorded in the project dedicated field book. This will include a description of:

- Date and time of sample collection
- Sample location
- Purging time, duration and volume;
- Sample appearance
- Analytical methodology:

Groundwater samples will be collected using dedicated polyethylene tubing, a persistaltic pump and check valve in accordance with standard low-flow sampling procedures as follows:

- Record pump make & model on sampling form.

- Wear appropriate health and safety equipment as outlined in the Health and Safety Plan
- Inspect each well for any damage or evidence of tampering and note condition in field logbook.
- Remove the well cap
- Lay out plastic sheeting and place the monitoring, purging and sampling equipment on the sheeting.
- To avoid cross-contamination, do not let any downhole equipment touch the ground.
- A synoptic water level measurement round should be performed (in the shortest possible time) before any purging and sampling activities begin. Measure and record the depth to water using a water level meter or interface probe to the nearest 0.01 ft. Record the measurement in the field logbook. Do not measure the depth to the bottom of the well at this time (to avoid disturbing any sediment that may have accumulated). Obtain depth to bottom information from installation information in the field logbook or soil boring logs.
- Collect samples in order from wells with lowest contaminant concentration to highest concentration based on previous results.
- Connect the polyethylene tubing to the peristaltic pump and lower the tubing into the well to approximately the middle of the screen. The tubing should be a minimum of 2 feet above the bottom of the well as this may cause mobilization of any sediment present in the bottom of the well.
- Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Check water level. Adjust pump speed until there is little or no water level drawdown (less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet but remains stable, continue purging until indicator field parameters stabilize.
- There should be at least 1 foot of water over the top of the pump so there is no risk of entrapment of air in the sample. Pumping rates should be reduced to the minimum capabilities of the pump, if needed, to avoid purging the well dry. However, if the recharge rate of the well is very low and the well is purged dry,

then wait until the well has recharged to a sufficient level and collect the appropriate volume of sample.

- During well purging, monitor indicator field parameters (temperature, specific conductance, pH and turbidity) every three to five minutes (or less frequently, if appropriate) and record on a groundwater sampling log (Appendix A). Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings, taken at three (3) to five (5) minute intervals, are within the following limits:
    - specific conductance (3%),
    - temperature (3%),
    - pH (± 0.1 unit)
    - turbidity (≤50 ntu)
    - If stability is not reached within a reasonable time period purging may be stopped and the sample collected. This should be noted on the sampling log.
- VOC samples should be collected directly into pre-preserved sample containers. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. Fill each container with sample to just overflowing so that no air bubbles are entrapped inside. Cap each bottle as it is filled.
- Label the samples, and record them on the chain of custody form (template COC provided in **Appendix B**). Place immediately into a cooler for shipment and maintain at 4^{o}C.
- Remove the tubing from the well. The polyethylene tubing must either be dedicated to each well or discarded. If dedicated the tubing should be placed in a large plastic garbage bag, sealed, and labeled with the appropriate well identification number.
- Close and lock the well.

- Decontaminate pump either by changing the surgical pump tubing between wells or as follows:
    1. Flush the equipment/pump with potable water.
    2. Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.
    3. Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.
    4. Flush with isopropyl alcohol (pesticide grade). If equipment blank data from the previous sampling event show that the level of contaminants is insignificant, then this step may be skipped.
    5. Flush with distilled/deionized water. The final water rinse must not be recycled.

Samples will be collected in pre-cleaned laboratory supplied glassware, stored in a cooler with ice and submitted to a New York State ELAP certified environmental laboratory. Groundwater samples from each monitoring well will be submitted for laboratory analysis of VOCs and SVOCs.

4.2 Groundwater Sample QA/QC

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-pak(s) to maintain a temperature of 4oC.

Dedicated disposable sampling materials will be used for groundwater samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, field rinsate blanks will be prepared at the rate of 1 for every eight samples collected.

Each groundwater sample will be properly labeled and documented on the Chain of Custody and within the bound log book, placed in a zip-lock plastic bag and placed in a

cooler with ice to maintain a temperature of 4°C, until pickup by the sample courier. Courier service is provided by Phoenix Environmental Laboratories, Inc. Sample receipt by the laboratory (Phoenix Environmental Laboratories, Inc.) shall be considered as signed receipt by Phoenix Environmental Laboratories, Inc. courier.

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated. Laboratory specific QA/QC information is provided within the QAPP.

4.3 Sampling Documentation Requirements

All sample jars will be marked and identified with a legible sample label which shall indicate (1) project address (1107 DeKalb Avenue, Brooklyn), (2) sample location (MW1401, MW1402, etc.), (3) the date and time the sample was collected, (4) and any preservative(s) utilized (HCL/ice). Additional sample information may be marked on the sample label and/or Chain of Custody if needed. Chain of Custody shall be tracked from laboratory issuance of sample containers through laboratory receipt of the samples.

A bound sample logbook will be maintained by EBC during sampling collection activities. The following information will be recorded (at a minimum) within the log book:

a) Sample Identification Number
b) Sample Location
c) Field Observations
d) Sample type
e) Analyses
f) Date and time of collection
g) Collector's name
h) Sample procedures and equipment utilized
i) Date sent to laboratory and name of laboratory

4.4 Analytical Methodology

Sample analysis will be provided by a New York State certified environmental laboratory; Phoenix Environmental Laboratories, Inc. of Manchester, Connecticut (NYSDOH Lab I.D. No. 11301). Groundwater samples will be analyzed for the following parameters.

- Volatile organic Compounds (VOCs) by EPA Method 8260C

4.5 Investigation-Derived Waste Handling Procedure

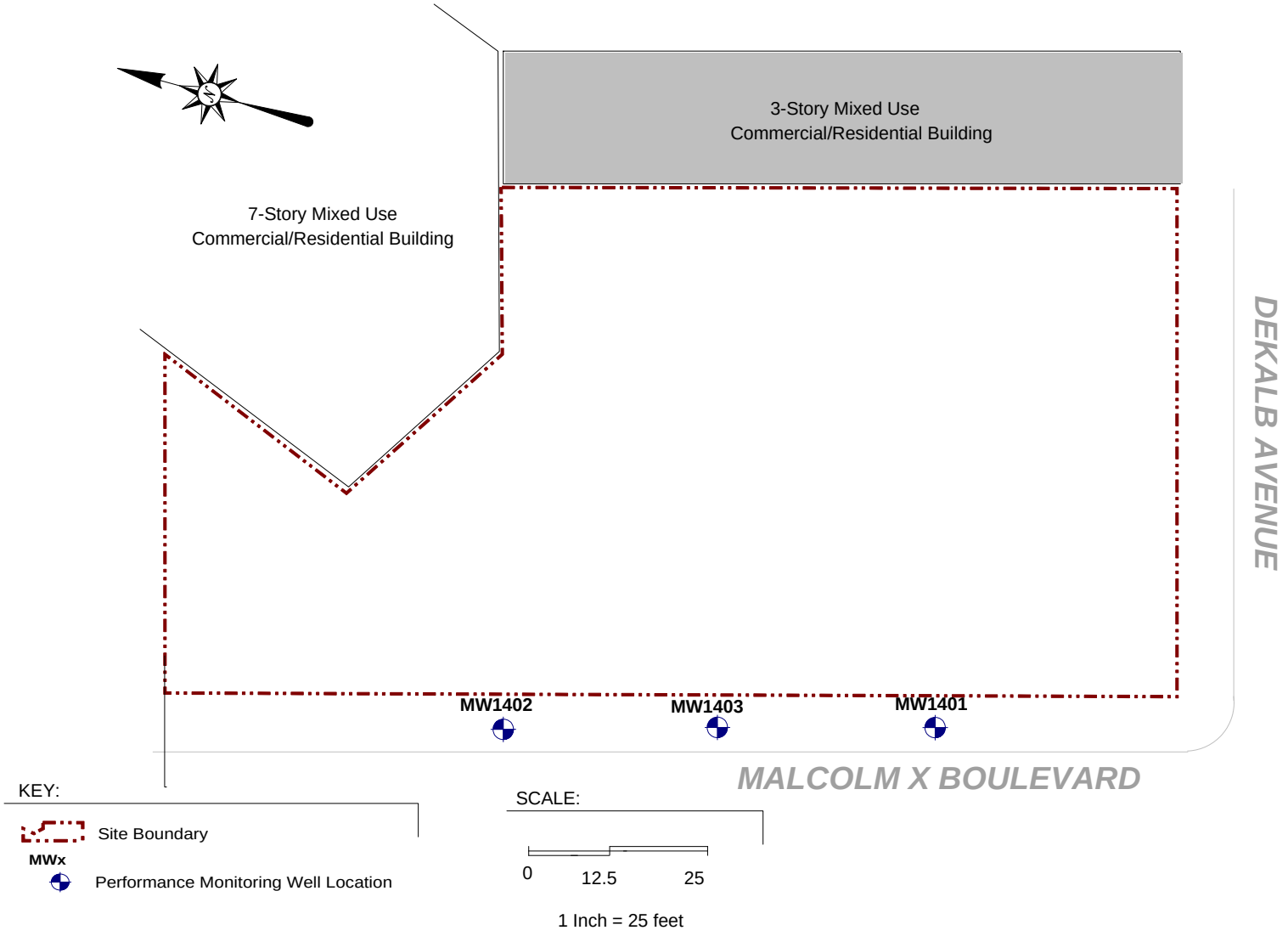
Investigation derived wastes that will be generated during groundwater sampling at the Site will consist of the following: groundwater, decontamination fluids, PPE and other miscellaneous disposables. Groundwater purged from the monitoring wells and all decontamination fluids are to be containerized in USDOT-approved 55-gallon drums. Each drum is to be labeled with a "Non-Hazardous Waste" label **(Appendix C)** which is to be affixed to the side of the drum. The following information must be written on each label.

Shipper: 1107D LLC
Address: 1107 DeKalb Avenue
City, State, Zip: Brooklyn, NY 11221
Contents: Non-Hazardous, Non-RCRA Regulated Liquid
Emergency Contact: Tom Gallo - EBC – 631.504.6000

After each drum is filled or at completion of work, each drum must be securely closed and stored within the new building until waste characterization sampling has been performed. Final classification and disposal of purge water will be based on the results of this analysis and upon approval of the NYSDEC Project Manager.

All PPE and other miscellaneous sampling disposables (polyethylene tubing, plastic sheeting) shall be placed in a plastic garbage bag and disposed in the on-site dumpster.

FIGURES



EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 1

Drawing Date: 10/17/19

Site Name: Former Getty Service Station

Site Address: 1103-1107 DeKalb Avenue, Brooklyn, NY

Drawing Title: Replacement Monitoring Well / Injection Well Locations

APPENDIX A

Inspection Forms

Former Getty Service Station No. 00564
1107 Dekalb Avenue, Brooklyn

SOIL VAPOR EXTRACTION SYSTEM INSPECTION FORM

Date:_____

Time:_____

Weather:_____

Inspector: _____

Extraction Point	Vacuum (iwc)	PID Reading (ppb)
SVE-1		
Blower inlet		
Before Carbon		
After Carbon		

Inspection:	Yes / No	Comments
Blower Operating?		
Spare Carbon Drums?		
System Integrity?		

Comments/Actions taken:

Former Getty Service Station #00564 Site
1107 Dekalb Avenue, Brooklyn, NY
ISCO Monitoring Form

Date / Time : _____ Technician Name: _____

Injection Wells	Condition*	PID SCREENING	DTW	DTB
IW1				
IW2				
IW3				
IW4				
IW5				
IW6				
IW7				
IW8				
IW9				
IW10				

Monitoring Wells	Condition*	PID SCREENING	DTW	DTB
MW1401				
MW1402				
MW1403				

Legend:

DTB: Depth to Bottom

DTW: Depth to Water

*Conditions:

- Good (no repairs)
- Needs Repair
- Cannot Be Found

Needed Repairs And/or Other Comments (Specify):

APPENDIX B

Sample Chain of Custody

PHOENIX Environmental Laboratories, Inc.

NY/NJ CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp Pg of

Data Delivery:
- [ ] Fax #: ______
- [x] Email: ______

Customer: ______ Project: ______ Project P.O: ______
Address: ______ Report to: ______ Phone #: ______
______ Invoice to: ______ Fax #: ______

Client Sample - Information - Identification

Sampler's Signature ______ Date:

Analysis Request

Matrix Code:
DW=drinking water **WW**=wastewater **S**=soil/solid **O**=oil
GW=groundwater **SL**=sludge **A**=air **X**=other

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	x	x	x	x	x	x	x	x	x	x	x	x	Soil VOA [ ] Methanol [ ] S. Bisulfate [ ] H2O	GL Soil container (8) oz	GL Soil container (2) oz	40 ml VOA Vial [ ] As is [x] HCl	GL Amber 1000ml [x] As is [ ] H2SO4	PL As is [ ] 250ml [x] 500ml [x] 1000ml	PL H2SO4 [x] 250ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle

Relinquished by:	Accepted by:	Date:	Time:

Comments, Special Requirements or Regulations:

Turnaround:
- [ ] 1 Day*
- [ ] 2 Days*
- [ ] 3 Days*
- [ ] Standard
- [ ] Other 5 DAYS

* **SURCHARGE APPLIES**

NJ
- [ ] Res. Criteria
- [ ] Non-Res. Criteria
- [ ] Impact to GW Soil Cleanup Criteria
- [ ] GW Criteria

NY
- [ ] TAGM 4046 GW
- [ ] TAGM 4046 SOIL
- [ ] NY375 Unrestricted Soil
- [ ] NY375 Residential Soil
- [ ] NY375 Restricted Non-Residential Soil

Data Format
- [ ] Phoenix Std Report
- [ ] Excel
- [ ] PDF
- [ ] GIS/Key
- [ ] EQuIS
- [ ] NJ Hazsite EDD
- [ ] NY EZ EDD (ASP)
- [ ] Other

Data Package
- [ ] NJ Reduced Deliv. *
- [ ] NY Enhanced (ASP B) *
- [ ] Other

State where samples were collected: NY

ATTACHMENT F
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN
Former Getty Service Station #00564
1107 Dekalb Avenue, Brooklyn, NY

Prepared on behalf of:

1107D LLC
45 North Station Plaza, Suite 315
Great Neck, NY 11021

Prepared by:

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 Middle Country Road
Ridge, NY 11961

OCTOBER 2019

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QUALITY ASSURANCE PROJECT PLAN
Former Getty Service Station #00564
1107 Dekalb Avenue, Brooklyn, NY

TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared in accordance with DER-10 to detail procedures to be followed during the course of the sampling and analytical portion of the Site Management Plan.

To ensure the successful completion of the project each individual responsible for a given component of the project must be aware of the quality assurance objectives of his / her particular work and of the overall project. The EBC Project Director, Charles Sosik will be directly responsible to the client for the overall project conduct and quality assurance/quality control (QA/QC) for the project. The Project Director will be responsible for overseeing all technical and administrative aspects of the project and for directing QA/QC activities. As Project Director Mr. Sosik will also serve as the Quality Assurance Officer (QAO) and in this role may conduct:

- conduct periodic field and sampling audits;
- interface with the analytical laboratory to resolve problems; and
- interface with the data validator and/or the preparer of the DUSR to resolve problems.

Kimberly Somers will serve as the Project Manager and will be responsible for implementation of each groundwater sampling event and coordination with field sampling crews and subcontractors. Reporting directly to the Project Manager will be the Field Operations Officer, Kevin Waters; who will serve as the on-Site qualified environmental professional who will record observations, direct the sampling crew and be responsible for the collection and handling of all samples.

1.1 Organization

Project QA will be maintained under the direction of the Project Manager, in accordance with this QAPP. QC for specific tasks will be the responsibility of the individuals and organizations listed below, under the direction and coordination of the Project Manager.

GENERAL RESPONSIBILITY	SCOPE OF WORK	RESPONSIBILITY OF QUALITY CONTROL
Field Operations	Supervision of Field Crew, sample collection and handling	Thomas Gallo, EBC
Project Manager	Implementation of each of the quarterly groundwater sampling events specified in the Site Management Plan	Keith Butler, EBC
Laboratory Analysis	Analysis of groundwater samples by NYSDEC ASP methods Laboratory	NYSDOH-Certified Laboratory – Phoenix Environmental Labs
Data review	Review for completeness and compliance	3rd party validation – Sherri Pullar, KGS LLC

2.0 QUALITY ASSURANCE PROJECT PLAN OBJECTIVES

2.1 Overview

Overall project goals are defined through the development of Data Quality Objectives (DQOs), which are qualitative and quantitative Statements that specify the quality of the data required to support decisions; DQOs, as described in this section, are based on the end uses of the data as described in the work plan.

In this plan, Quality Assurance and Quality Control are defined as follows:

- Quality Assurance - The overall integrated program for assuring reliability of monitoring and measurement data.

- Quality Control - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

2.2 QA / QC Requirements for Analytical Laboratory

Samples will be analyzed by a New York State Department of Health (NYSDOH) certified laboratory. Data generated from the laboratory will be used to evaluate contaminants such as metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and pesticides / PCBs in groundwater. The QA requirements for all subcontracted analytical laboratory work performed on this project are described below. QA elements to be evaluated include accuracy, precision, sensitivity, representativeness, and completeness. The data generated by the analytical laboratory for this project are required to be sensitive enough to achieve detection levels low enough to meet required quantification limits as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP, 07/2005. The analytical results meeting the required quantification limits will provide data sensitive enough to meet the data quality objectives of this remedial program as described in the work plan. Reporting of the data must be clear, concise, and comprehensive. The QC elements that are important to this project are completeness of field data, sample custody, sample holding times, sample preservation, sample storage, instrument calibration and blank contamination.

2.2.1 Instrument Calibration

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of NYSDEC ASP 07/2005).

2.2.2 Continuing Instrument Calibration

The initial calibration curve will be verified every 12 hrs by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then corrective action must be taken as provided in the specific methodology.

2.2.3 Method Blanks

Method blank or preparation blank is prepared from an analyte-free matrix which includes the same reagents, internal standards and surrogate standards as me related samples. II is carried through the entire sample preparation and analytical procedure. A method blank analysis will be performed once for each 12 hr period during the analysis of samples for volatiles. An acceptable method blank will contain less than two (2) times the CRQL of methylene chloride, acetone and 2-butanone. For all other target compounds, the method blank must contain less than or equal to the CRQL of any single target compound. For non-target peaks in the method blank, the peak area must be less than 10 percent of the nearest internal standard. The method blank will be used to demonstrate the level of laboratory background and reagent contamination that might result from the analytical process itself.

2.2.4 Trip Blanks

Trip blanks consist of a single set of sample containers filled at the laboratory with deionized laboratory-grade water. The water used will be from the same source as that used for the laboratory method blank. The containers will be carried into the field and handled and transported in the same way as the samples collected that day. Analysis of the trip blank for VOCs is used to identify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the trip blanks will be not opened during this procedure.) A complete set of trip blanks will be provided with each shipment of samples to the certified laboratory.

2.2.5 Surrogate Spike Analysis

For organic analyses, all samples and blanks will be spiked with surrogate compounds before purging or extraction in order to monitor preparation and analyses of samples. Surrogate spike recoveries shall fall within the advisory limits in accordance with the NY5DEC ASP protocols for samples falling within the quantification limits without dilution.

2.2.6 Matrix Spike / Matrix Spike Duplicate / Matrix Spike Blank (MS/MSDIMSB) Analysis

MS, MSD and MSB analyses will be performed to evaluate the matrix effect of the sample upon the analytical methodology along with the precision of the instrument by measuring recoveries. The MS / MSD / MSB samples will be analyzed for each group of samples of a similar matrix at a rate of 5% (one for every 20 field samples). The RPD will be calculated from the difference between the MS and MSD. Matrix spike blank analysis will be performed to indicate the appropriateness of the spiking solution(s) used for the MS/MSD.

2.3 Accuracy

Accuracy is defined as the nearness of a real or the mean (x) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries. Accuracy includes both precision and recovery and is expressed as percent recovery (% REC). The MS sample is used to determine the percent recovery. The matrix spike percent recovery (% REC) is calculated by the following equation:

$$\%REC = \frac{SSR - SR}{SA} \times 100$$

Where:
SSR = spike sample results
SR = sample results
SA = spike added from spiking mix

2.4 Precision

Precision is defined as the measurement of agreement of a set of replicate results among themselves without a Precision is defined as the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analyses.

Analytical precision is expressed in terms of RPD. The RPD is calculated using the following formula:

$$RPD = \frac{D^1 - D^2}{(D^1 - D^2)/2} \times 100$$

Where:
RPD = relative percent difference
D^1 = first sample value
D^2 = second sample value (duplicate)

2.5 Sensitivity

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve quantification levels low enough to meet the required detection limits specified by NYSDEC ASP and to meet all site-specific standards, criteria and guidance values (SGCs) established for this project.

2.6 Representativeness

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of that site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on site. The representativeness of samples is assured by adherence to sampling procedures described in the Remedial Investigation Work Plan.

2.7 Completeness

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers, and should be between 70 and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form of summaries, QC data, and raw analytical data. The laboratory will be required to submit data packages that follow NYSDEC ASP reporting format which, at a minimum, will include the following components:

1. All sample chain-of-custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analytes in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.

5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate/matrix spike blank results.
7. QC check sample and standard recovery results
8. Blank results (field, trip, and method).
9. Internal standard area and RT summary.

2.8 Laboratory Custody Procedures

The following elements are important for maintaining the field custody of samples:

- Sample identification
- Sample labels
- Custody records
- Shipping records
- Packaging procedures

Sample labels will be attached to all sampling bottles before field activities begin; each label will contain an identifying number. Each number will have a suffix that identifies the site and where the sample was taken. Approximate sampling locations will be marked on a map with a description of the sample location. The number, type of sample, and sample identification will be entered into the field logbook. A chain-of-custody form, initiated at the analytical laboratory will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first received blank space. After each sample is collected and appropriately identified, entries will be made on the chain-of-custody form that will include:

- Site name and address
- Samplers' names and signatures

3.0 ANALYTICAL PROCEDURES

3.1 Laboratory Analysis

Samples will be analyzed by the NYSDOH ELAP laboratory for one or more of the following parameters: VOCs in groundwater by USEPA Method 8260, SVOCs in groundwater by USEPA Method 8270BN. If any modifications or additions to the standard procedures are anticipated, and if any nonstandard sample preparation or analytical protocol is to be used, the modifications and the nonstandard protocol will be explicitly defined and documented. Prior approval by EBC's PM will be necessary for any nonstandard analytical or sample preparation protocol used by the laboratory, i.e., dilution of samples or extracts by greater than a factor of five (5).

4.0 DATA REDUCTION, REVIEW, AND REPORTING

4.1 Overview

The process of data reduction, review, and reporting ensures the assessments or a conclusion based on the final data accurately reflects actual site conditions. This plan presents the specific procedures, methods, and format that will be employed for data reduction, review and reporting of each measurement parameter determined in the laboratory and field. Also described in this section is the process by which all data, reports, and work plans are proofed and checked for technical and numerical errors prior to final submission.

4.2 Data Reduction

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Analytical results shall be presented on standard NYSDEC ASP-B forms or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used. Note that if waste characterization samples are analyzed they will be in results only format and will not be evaluated in the DUSR.

Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data. Specifics on internal laboratory data reduction protocols are identified in the laboratory's SOPs.

Following receipt of the laboratory analytical results by EBC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

4.3 Laboratory Data Reporting

All sample data packages submitted by the analytical laboratory will be required to be reported in conformance to the NYSDEC ASP (7/2005), Category B data deliverable requirements as applicable to the method utilized. All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Note that waste characterization samples if analyzed will be in results only format and will not be evaluated in the DUSR.

5.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the EBC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable).

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During each of the groundwater sampling events, all changes to the sampling program will be documented in field logs/sheets and the EBC PM advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify the PM, who will consult with other project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PM shall be responsible for controlling, tracking, implementing and distributing identified changes.

TABLE 1
SUMMARY OF
SAMPLING PROGRAM RATIONALE AND ANALYSIS

Matrix	Location	Approximate Number of Samples	Rationale for Sampling	Laboratory Analysis
Groundwater (water table)	From three monitoring wells located in the sidewalk along Malcolm X Boulevard	3	To evaluate the effectiveness of the in-site chemical oxidation injection program.	VOCs EPA Method 8260B,
Total (Groundwater)		3		
MS/MSD	Matrix spike and Matrix spike duplicates at the rate 5%	1	To meet requirements of QA / QC program	1 MS/MSD for VOCs EPA Method 8260B
Trip Blanks	One laboratory prepared trip blank to accompany samples each time they are delivered to the laboratory.	1	To meet requirements of QA / QC program	VOCs EPA Method 8260B
Total (QA / QC Samples)		2		

TABLE 2
SAMPLE COLLECTION AND ANALYSIS PROTOCOLS

Sample Type	Matrix	Sampling Device	Parameter	Sample Container	Sample Preservation	Analytical Method#	CRQL / MDLH	Holding Time
Groundwater	Water	Dedicated tubing	VOCs	(3) 40 ml vials	Cool to 4^{o} C	EPA Method 8260	Compound specific (1-5 ug/L)	14 days

Notes:
All holding times listed are from Verified Time of Sample Receipt (VTSR) unless noted otherwise. * Holding time listed is from time of sample collection.
The number in parentheses in the "Sample Container" column denotes the number of containers needed.
Triple volume required when collected MS/MSD samples
The number of trip blanks are estimated.
CRQL / MDL = Contract Required Quantitation Limit / Method Detection Limit.
MCAWW = Methods for Chemical Analysis of Water and Wastes.
NA = Not available or not applicable.

ATTACHMENT G
Health and Safety Plan

FORMER GETTY SERVICE STATION

1103-1107 DEKALB AVENUE
BROOKLYN, NEW YORK
Block 1600 Lots 1 and 28
Site No. C-224176

CONSTRUCTION HEALTH AND SAFETY PLAN

October 2019

Prepared for::
1107D LLC
45 North Station Plaza, Suite 315
Great Neck, NY 11021

Prepared By:

EBC
Environmental Business Consultants

1808 Middle Country Road
Ridge, NY 11961

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CONSTRUCTION HEALTH AND SAFETY PLAN
Former Getty Service Station
1103-1107 DeKalb Avenue, Brooklyn, New York

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CONSTRUCTION HEALTH AND SAFETY PLAN
Former 110th Street Service Station
2040 Frederick Douglas Boulevard, Harlem, New York

FIGURES

APPENDICES

STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Action at 1103-1107 DeKalb Avenue, Brooklyn, New York.

This HASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees.

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for the planned Remedial Action at 1103-1107 DeKalb Avenue, Brooklyn, New York to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during remedial activities. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to excavation, loading and other soil disturbance activities and is based on the best information available. The CHASP may be revised by EBC at the request of the client and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

1.1 Training Requirements

Personnel entering the exclusion zone or decontamination zone are required to be certified in health and safety practices for hazardous waste site operations as specified in the Federal OSHA Regulations CFR 1910.120e (revised 3/6/90).

Paragraph (e - 3) of the above referenced regulations requires that all on-site management personnel directly responsible for or who supervise employees engaged in hazardous waste operations, must initially receive 8 hours of supervisor training related to managing hazardous waste work.

Paragraph (e - 8) of the above referenced regulations requires that workers and supervisors receive 8 hours of refresher training annually on the items specified in Paragraph (e-1) and/or (e-3).

Additionally all on-site personnel must receive adequate site-specific training in the form of an on-site Health and Safety briefing prior to participating in field work with emphasis on the following:

- Protection of the adjacent community from hazardous vapors and / or dust which may be released during intrusive activities.
- Identification of chemicals known or suspected to be present on-site and the health effects and hazards of those substances.
- The need for vigilance in personnel protection, and the importance of attention to proper use, fit and care of personnel protective equipment.
- Decontamination procedures.
- Site control including work zones, access and security.
- Hazards and protection against heat or cold.
- The proper observance of daily health and safety practices, such as entry and exit of work zones and site. Proper hygiene during lunch, break, etc.
- Emergency procedures to be followed in case of fire, explosion and sudden release of hazardous gases.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

Health and Safety meetings will be conducted on a daily basis and will cover protective clothing and other equipment to be used that day, potential and chemical and physical hazards, emergency procedures, and conditions and activities from the previous day.

1.2 Medical Monitoring Requirements

Field personnel and visitors entering the exclusion zone or decontamination zone must have completed appropriate medical monitoring required under OSHA 29 CFR 1910.120(f) if respirators or other breathing related PPE is needed. Medical monitoring enables a physician to monitor each employee's health, physical condition, and his fitness to wear respiratory protective equipment and carry out on-site tasks.

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in **Appendix B**.

1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Ms. Kristen DiScenza	EBC – Project Manager	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000 (516) 652-8338
Ms. Chawinie Miller	Health & Safety Manager	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000
Mr. Kevin Waters	Site Safety Officer	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this CHASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this CHASP and other safety requirements to

be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.

2. Coordinating site safety decisions with the project manager.

3. Designating exclusion, decontamination and support zones on a daily basis.

4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.

5. Maintaining the work zone entry/exit log and site entry/exit log.

6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

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Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

2.0 SITE BACKGROUND AND SCOPE OF WORK

The address for the subject property is 1103-1107 DeKalb Avenue, Brooklyn, New York 11211. The subject property is designated as Block 1600, Lots 1 and 28 by the New York City Department of Assessment. The subject property is located in the City of New York and Borough of Brooklyn (Kings County). The lot has 75 feet of frontage on DeKalb Avenue and 150 feet of frontage on Malcolm X Boulevard for a total area of 9,498 square feet (0.218 acres).

The Lot is currently developed with a one-story vacant service station building. The remainder of the Lot consists of a paved parking area, formerly used to store both derelict and functioning vehicles awaiting sale or repair.

The elevation of the property is approximately 58 feet above the National Geodetic Vertical Datum (NGVD) feet. based upon regional groundwater contour maps, and measurements made at the property, the depth to groundwater beneath the site is approximately 46 feet below existing grade and flows southwest.

2.1 Previous Investigations

2.1.1 July 2011 - September 2011 - Quarterly Monitoring Report (Tyree)

This report documents and summarizes the results of on-going monitoring at the Site which began in July 2000. According to the report there were six monitoring wells within the property boundaries and two monitoring wells in the adjacent sidewalk along Malcolm X Boulevard during the reporting period. The wells were sampled for STARs list volatile organic compounds (VOCs) by EPA method 8260. VOCs were reported above standards in 4 of the 7 wells with total VOCs ranging from 828 µg/L to 3,812 µg/L.

2.1.2 February 2013 - Limited Phase II Subsurface Investigation (EBC)

On February 12, 2013, a limited Phase II investigation began at the subject site as part of the due diligence to complete the purchase of the property. Although eight borings and groundwater samples were planned, only four borings were installed due to accessibility issues and scheduling constraints. A total of four soil samples and six groundwater samples including three from the borings and three from existing monitoring wells were collected. Soil samples were submitted for analysis of VOCs, PCBs and metals. Groundwater samples were submitted for analysis of VOCs only.

The results of this limited investigation showed elevated petroleum VOC levels in two of the four soil samples with total VOCs ranging from 184,000 µg/kg to 705,600 µg/kg. Xylenes, naphthalene, and n-propylbenzene were reported above unrestricted soil cleanup objectives (SCOs) while 1,2,4-trimthylbenzene, 1,3,5-trimethylbenzene and ethylbenzene were all reported above restricted residential SCOs. In addition to the VOCs, chromium was also reported in two soil samples above unrestricted SCOs.

Petroleum VOCs were reported above standards in four of six groundwater samples ranging from 605 µg/L to 7,993 µg/L. Chlorinated VOCs were reported above standards in five of the six samples and ranged from 22 µg/L to 34 µg/L

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2.2 Redevelopment Plans

The development project consists of redeveloping the property with a new 8-story mixed use building. The building will have 7,627 sq. ft. cellar which will be utilized for storage, mechanical rooms, and retail/commercial space. The cellar will have both stair and elevator access, and will require excavation of 80% of the property to a depth of approximately 11 feet below grade. The first floor will contain retail/commercial space as well as the residential lobby and floors 2 through 8 will contain residential apartments. The remaining portions of the property will be capped and utilized for outdoor recreation.

2.3 Description of Remedial Action

Site activities included within the Remedial Action that are included within the scope of this HASP include the following:

1. Removal of underground storage tanks
2. Excavation of soil/fill exceeding Track 2 restricted residential SCOs as listed in Table 1 to a depth as great as 15 feet below grade;
3. Excavation of VOC and metal hotspot areas to depths ranging from 32 to 37ft below grade;
4. Treatment of residual groundwater contamination via injection of chemical oxidants;
5. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
6. Collection and analysis of end-point soil samples and post-remedial groundwater samples to evaluate the performance of the remedy with respect to attainment of unrestricted SCOs and groundwater standards;
7. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
8. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in **Table 1**, (2) all Federal, State and local rules and regulations for handling and transport of material.
9. Installation of a site cover system consisting of the concrete building slab and paved outdoor recreation area.
10. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
11. An Environmental Easement will be filed against the Site to ensure implementation of the SMP.

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Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

3.0 HAZARD ASSESSMENT

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3.1 Physical Hazards

3.1.1 Tripping Hazards

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

3.1.2 Climbing Hazards

During site activities, workers may have to work on excavating equipment by climbing. The excavating contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

3.1.3 Cuts and Lacerations

Field activities that involve excavating activities usually involve contact with various types of machinery. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

3.1.4 Lifting Hazards

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the excavation program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

3.1.5 Utility Hazards

Before conducting any excavation, the excavation contractor will be responsible for locating and verifying all existing utilities at each excavation.

3.1.6 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with

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Fax 631.924.2870

NYCDOT guidelines. The excavation contractor shall carry on his operations without undue interference or delays to traffic. The excavation contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention
    a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
    b. Work in Pairs. Individuals should avoid undertaking any activity alone.
    c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
    d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

2. Recognition and Treatment
    a Heat Rash (or prickly heat):
        Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.
        Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.
        Treatment: Remove source or irritation and cool skin with water or wet cloths.

    b. Heat Cramps (or heat prostration)
        Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
        Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.
        Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical

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1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
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facility.

c. Heat Stroke

Cause: Same as heat exhaustion. This is also an extremely serious condition.

Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

3.2.2 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated but reactive to light and numbing of the toes and fingers.

3.3 Chemical Hazards

"Urban fill" materials, present throughout the New York City area typically contain elevated levels of semi-volatile organic compounds and metals. These "contaminants" are not related to a chemical release occurring on the site, but are inherent in the reworked fill material in the area which contains ash and bits of tar and asphalt. Considering the previous sampling results and the past and present use of the site, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyl's (PCBs), and heavy metals such as arsenic, chromium, lead and mercury.

Based on the findings of the Remedial Investigation and the inherent properties of urban fill, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVCOs) and heavy metals.

Volatile organic compounds reported to be present in soil, soil gas and/or groundwater include the following:

1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Ethylbenzene
m&p xylenes	naphthalene	o-xylenes	n-propylbenzene
Cis-1,2-Dichloroethene	Isopropylbenzene	trichloroethene	
n-Butylbenzene	tetrachloroethene	Sec-Butylbenezene	
Toluene			

Semi-volatile organic compounds reported to be present in soil, soil gas and/or groundwater include the following:

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Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene
Chrysene	Dibenzo(a,h)anthracene	Indeno(1,2,3-cd)pyrene
Naphthalene	Benzo(b)fluoranthene	

Metals reported to be present in soil and / or groundwater include the following

Arsenic	Chromium	Copper	Lead	Mercury
Zinc				

The primary routes of exposure to these contaminants are inhalation, ingestion and absorption.

Appendix C includes information sheets for suspected chemicals that may be encountered at the site.

3.3.1 Respirable Dust

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils or groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 $\mu g/m^3$ over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

3.3.3 Organic Vapors

Elevated levels of VOCs were detected in both soil and groundwater samples collected during previous investigations at the site. Therefore, excavation activities may cause the release of organic vapors to the atmosphere. The site safety officer will periodically monitor organic vapors with a Photoionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

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Environmental Business Consultants
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Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work uniform, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

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Ridge, NY 11961
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Fax 631.924.2870

- chemical resistant coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves;
- disposable outer gloves;
- hard hat; and,
- ankles/wrists taped.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of drilling locations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

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Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

5.1 Air Monitoring Requirements

If excavation work is performed, air will be monitored for VOCs with a portable ION Science 3000EX photoionization detector, or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRam Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage are exceeded:

1 The SSO will be consulted immediately
2 All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (eg from the exclusion zone).
3 Monitoring will be continued until intrusive work resumes.

5.3 Action Levels During Excavation Activities

Instrument readings will be taken in the breathing zone above the excavation pit unless otherwise noted. Each action level is independent of all other action levels in determining responses.

Organic Vapors (PID)	LEL %	Responses
0-1 ppm above background	0%	• Continue excavating • Level D protection • Continue monitoring every 10 minutes

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1-5 ppm Above Background, Sustained Reading	1-10%	• Continue excavating • Go to Level C protection or employ engineering controls • Continue monitoring every 10 minutes
5-25 ppm Above Background, Sustaineed Reading	10-20%	• Discontinue excavating, unless PID is only action level exceeded. • Level C protection or employ engineering controls • Continue monitoring for organic vapors 200 ft downwind • Continuous monitoring for LEL at excavation pit
>25 ppm Above Background, Sustained Reading	>20%	• Discontinue excavating • Withdraw from area, shut off all engine ignition sources. • Allow pit to vent • Continuous monitoring for organic vapors 200 ft downwind.

Notes: Air monitoring will occur in the breathing zone 30 inches above the excavation pit. Readings may also be taken in the excavation pit but will not be used for action levels.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right hand column should be taken. If instrument readings do not return to acceptable levels after the excavation pit has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the pit with suppressant foam.

If, during excavation activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, excavation will stop until sustained levels are less then 5 ppm (see Community Air Monitoring Plan).

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Environmental Business Consultants
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Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

6.0 SITE CONTROL

6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book.

It is expected that an exclusion zone, decontamination zone, and support zone will only be established during the remedial work required to excavate the SVOC hotspot area. A licensed Environmental Contractor with relative hazardous material handling experience and training is required to perform any soil disturbing activities within the hotspots identified within the Remedial Action Work Plan. All onsite workers must provide evidence of OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training to conduct work within the exclusion zone established by the site safety officer. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

6.1 General Site Work

Upon completion of the SVOC hotspot remedial activities by an Environmental Contractor, a general excavation contractor may continue with site excavation/grading as needed for basement excavation, shoring, other building requirements, or as necessary to excavate petroleum related VOC contaminated soil as deemed necessary by the Remedial Action Work Plan and/or Project Manager. All onsite employees must have obtained OSHA 24-hour Hazardous Waste Operations and Emergency Response Operations training prior to performing soil disturbing activities.

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1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

7.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

7.2 Emergency Telephone Numbers

General Emergencies	911
NYPD	911
NYC Fire Department	911
Woodhull Medical Center	(718) 963-8000
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	(718) 482-4096
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
Project Manager	1-631-504-6000
Site Safety Officer	1-631-504-6000

7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;

- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;

- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,

- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager — Ms. Kristen DiScenza (631) 504-6000
- Construction Superintendent — To be added
- Site Safety Officer — Mr. Kevin Waters (631) 504-6000

7.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**).and information on the chemical(s) to which they may have been exposed (**Appendix C**).

7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

7.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.

- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.

- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.

- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

7.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

APPENDIX A

SITE SAFETY ACKNOWLEDGEMENT FORM

1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

DAILY BREIFING SIGN-IN SHEET

Date:_____ Person Conducting Briefing:_____

Project Name and Location:_____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc…):

_____

_____

_____

_____

2. OTHER ISSUES (HASP changes, attendee comments, etc…):

_____

_____

_____

3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

APPENDIX B

SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: _____

Site Name: _____

Reason for Amendment: _____

_____

_____

_____

Alternative Procedures: _____

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Required Changes in PPE: _____

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_____ _____

Project Superintendent (signature) **Date**

_____ _____

Health and Safety Consultant (signature) **Date**

_____ _____

Site Safety Officer (signature) **Date**

APPENDIX C

CHEMICAL HAZARDS

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

1,1,2-Trichloroethylene
Trichloroethene
Ethylene trichloride
Acetylene trichloride
C_2HCl_3 / $ClCH=CCl_2$
Molecular mass: 131.4

ICSC # 0081
CAS # 79-01-6
RTECS # KX4550000
UN # 1710
EC # 602-027-00-9
April 10, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. See Notes.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION		Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION	Dizziness. Drowsiness. Headache. Weakness. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment.	Separated from metals (see Chemical Dangers), strong bases, food and feedstuffs . Dry. Keep in the dark. Ventilation along the floor. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. T symbol R: 45-36/38-52/53-67 S: 53-45-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0081 OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (phosgene , hydrogen chloride). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metal powders such as magnesium, aluminium, titanium, and barium. Slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 50 ppm as TWA; 100 ppm as STEL; A5; BEI issued; (ACGIH 2004).
MAK:
Carcinogen category: 1; Germ cell mutagen group: 3B; (DFG 2007).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)
NIOSH REL: Ca See Appendix A See Appendix C
NIOSH IDLH: Ca 1000 ppm See: 79016

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes and the skin . Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system , resulting in respiratory failure . Exposure could cause lowering of consciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system , resulting in loss of memory. The substance may have effects on the liver and kidneys (see Notes). This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 87°C
Melting point: -73°C
Relative density (water = 1): 1.5
Solubility in water, g/100 ml at 20°C: 0.1
Vapour pressure, kPa at 20°C: 7.8
Relative vapour density (air = 1): 4.5
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3
Auto-ignition temperature: 410°C
Explosive limits, vol% in air: 8-10.5
Octanol/water partition coefficient as log Pow: 2.42
Electrical conductivity: 800pS/m

ENVIRONMENTAL DATA

The substance is harmful to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

NOTES

Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.

Transport Emergency Card: TEC (R)-61S1710

NFPA Code: H2; F1; R0;
Card has been partially updated in October 2004: see Occupational Exposure Limits, EU Classification, Emergency Response.
Card has been partially updated in April 2010: see Occupational Exposure Limits, Ingestion First Aid, Storage.

ADDITIONAL INFORMATION

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

1,1,2,2-Tetrachloroethylene
Perchloroethylene
Tetrachloroethene
C_2Cl_4 / $Cl_2C=CCl_2$
Molecular mass: 165.8

ICSC # 0076
CAS # 127-18-4
RTECS # KX3850000
UN # 1897
EC # 602-028-00-4
April 13, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		STRICT HYGIENE! PREVENT GENERATION OF MISTS!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles , face shield .	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Separated from metals ,(see Chemical Dangers), food and feedstuffs . Keep in the dark. Ventilation along the floor.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 40-51/53 S: (2-)23-36/37-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0076

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. Reacts with metals such as aluminium, lithium, barium, beryllium.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 25 ppm as TWA, 100 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004).
MAK: skin absorption (H);
Carcinogen category: 3B;
(DFG 2004).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours)
NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A
NIOSH IDLH: Ca 150 ppm See: 127184

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes , the skin and the respiratory tract . If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 121°C
Melting point: -22°C
Relative density (water = 1): 1.6
Solubility in water, g/100 ml at 20°C: 0.015

Vapour pressure, kPa at 20°C: 1.9
Relative vapour density (air = 1): 5.8
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09
Octanol/water partition coefficient as log Pow: 2.9

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1897

NFPA Code: H2; F0; R0;

ADDITIONAL INFORMATION

IMPORTANT LEGAL NOTICE:

International Chemical Safety Cards

TOLUENE

ICSC: 0078

Methylbenzene
Toluol
Phenylmethane
$C_6H_5CH_3$ / C_7H_8
Molecular mass: 92.1

ICSC # 0078
CAS # 108-88-3
RTECS # XS5250000
UN # 1294
EC # 601-021-00-3
October 10, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Cough. Sore throat. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in large spill! Consult an expert in large spill! Remove all ignition sources. Ventilation. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: self-contained breathing apparatus	Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-38-48/20-63-65-67 S: 2-36/37-46-62 UN Hazard Class: 3 UN Packing Group: II

ICSC: 0078

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TOLUENE

ICSC: 0078

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour mixes well with air, explosive mixtures are formed easily. As a result of flow, agitation, etc., electrostatic charges can be generated.

CHEMICAL DANGERS:
Reacts violently with strong oxidants causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 50 ppm as TWA (skin) A4 BEI issued (ACGIH 2004).
MAK: 50 ppm 190 mg/m³ H
Peak limitation category: II(4) Pregnancy risk group: C (DFG 2004).
OSHA PEL†: TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)
NIOSH REL: TWA 100 ppm (375 mg/m^3) ST 150 ppm (560 mg/m^3)
NIOSH IDLH: 500 ppm See: 108883

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes and the respiratory tract The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure at high levels may result in cardiac dysrhythmiaandunconsciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The liquid defats the skin. The substance may have effects on the central nervous system Exposure to the substance may enhance hearing damage caused by exposure to noise. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 111°C
Melting point: -95°C
Relative density (water = 1): 0.87
Solubility in water: none
Vapour pressure, kPa at 25°C: 3.8
Relative vapour density (air = 1): 3.1
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01
Flash point: 4°C c.c.
Auto-ignition temperature: 480°C
Explosive limits, vol% in air: 1.1-7.1
Octanol/water partition coefficient as log Pow: 2.69

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms.

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. Use of alcoholic beverages enhances the harmful effect.

Transport Emergency Card: TEC (R)-30S1294
NFPA Code: H 2; F 3; R 0;

ADDITIONAL INFORMATION

Material Safety Data Sheet

Normal-Butylbenzene, 99+%

ACC# 55434

Section 1 - Chemical Product and Company Identification

MSDS Name: Normal-Butylbenzene, 99+%
Catalog Numbers: AC107850000, AC107850050, AC107850250, AC107850500, AC107851000, AC107852500 AC107852500
Synonyms: 1-Phenylbutane
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
104-51-8	n-Butylbenzene	>99	203-209-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 59 deg C.
Warning! Flammable liquid and vapor. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. The toxicological properties of this material have not been fully investigated.
Target Organs: Liver, nervous system.

Potential Health Effects

Eye: May cause eye irritation. The toxicological properties of this material have not been fully investigated.
Skin: May cause skin irritation. The toxicological properties of this material have not been fully investigated.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.
Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. Vapors may cause dizziness or suffocation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Use agent most appropriate to extinguish fire. Do NOT use straight streams of water.
Flash Point: 59 deg C (138.20 deg F)
Autoignition Temperature: 412 deg C (773.60 deg F)
Explosion Limits, Lower:.80 vol %
Upper: 5.80 vol %
NFPA Rating: (estimated) Health: 1; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
n-Butylbenzene	none listed	none listed	none listed

OSHA Vacated PELs: n-Butylbenzene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions. Follow the OSHA respirator regulations found in 29

CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: None reported.
pH: Not available.
Vapor Pressure: 1.33 hPa @ 23 C
Vapor Density: 4.6
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 183 deg C @ 760.00mm Hg
Freezing/Melting Point:-88 deg C
Decomposition Temperature:> 183 deg C
Solubility: insoluble
Specific Gravity/Density:.8600g/cm3
Molecular Formula:C10H14
Molecular Weight:134.22

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, excess heat, strong oxidants.
Incompatibilities with Other Materials: Oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 104-51-8: CY9070000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 104-51-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: Rapidly volatilizes into the atmosphere where it is photochemically degraded by hydroxyl radicals.

Physical: No information available.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	BUTYL BENZENES	No information available.
Hazard Class:	3	
UN Number:	UN2709	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 104-51-8 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 104-51-8: Effective 6/1/87, Sunset 12/19/95
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 104-51-8: immediate, fire.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 104-51-8 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

R 10 Flammable.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 24/25 Avoid contact with skin and eyes.
S 33 Take precautionary measures against static discharges.
S 37 Wear suitable gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 9 Keep container in a well-ventilated place.
S 28A After contact with skin, wash immediately with plenty of water
.

WGK (Water Danger/Protection)

CAS# 104-51-8: 1

Canada - DSL/NDSL

CAS# 104-51-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B3, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 4/15/1998
Revision #4 Date: 3/16/2007

International Chemical Safety Cards

ETHYLBENZENE

ICSC: 0268

Ethylbenzol
Phenylethane
EB
C_8H_{10} / $C_6H_5C_2H_5$
Molecular mass: 106.2

ICSC # 0268
CAS # 100-41-4
RTECS # DA0700000
UN # 1175
EC # 601-023-00-4
March 13, 1995 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION	Cough. Dizziness. Drowsiness. Headache.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain. Blurred vision.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	(Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking liquid in covered containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: A filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-20 S: 2-16-24/25-29 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

ETHYLBENZENE

ICSC: 0268

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH AROMATIC ODOUR. **PHYSICAL DANGERS:** The vapour mixes well with air, explosive mixtures are easily formed. **CHEMICAL DANGERS:** Reacts with strong oxidants. Attacks plastic and rubber. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 100 ppm as TWA 125 ppm as STEL A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 3A; (DFG 2004). OSHA PEL†: TWA 100 ppm (435 mg/m^3) NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 125 ppm (545 mg/m^3) NIOSH IDLH: 800 ppm 10%LEL See: 100414 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes the skin and the respiratory tract Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system Exposure far above the OEL could cause lowering of consciousness. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis.
PHYSICAL PROPERTIES	Boiling point: 136°C Melting point: -95°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 20°C: 0.015 Vapour pressure, kPa at 20°C: 0.9 Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 18°C c.c. Auto-ignition temperature: 432°C Explosive limits, vol% in air: 1.0-6.7 Octanol/water partition coefficient as log Pow: 3.2
ENVIRONMENTAL DATA	The substance is harmful to aquatic organisms. 

N O T E S

The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-30S1175 or 30GF1-I+II
NFPA Code: H2; F3; R0

ADDITIONAL INFORMATION

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZENE

ICSC: 0015

Cyclohexatriene
Benzol
C_6H_6
Molecular mass: 78.1

ICSC # 0015
CAS # 71-43-2
RTECS # CY1400000
UN # 1114
EC # 601-020-00-8
May 06, 2003 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive. Risk of fire and explosion: see Chemical Dangers.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Shortness of breath. Convulsions. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin. Redness. Pain. (Further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES	Redness. Pain.	Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Sore throat. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: complete protective clothing including self-contained breathing apparatus.	Fireproof. Separated from food and feedstuffs oxidants halogens	Do not transport with food and feedstuffs. Note: E F symbol T symbol R: 45-46-11-36/38-48/23/24/25-65 S: 53-45 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0015

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZENE

ICSC: 0015

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated.

CHEMICAL DANGERS:
Reacts violently with oxidants, nitric acid, sulfuric acid and halogens causing fire and explosion hazard. Attacks plastic and rubber.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.5 ppm as TWA 2.5 ppm as STEL (skin) A1 BEI (ACGIH 2004).
MAK: H
Carcinogen category: 1 Germ cell mutagen group: 3A (DFG 2004).
OSHA PEL: 1910.1028 TWA 1 ppm ST 5 ppm See Appendix F
NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A
NIOSH IDLH: Ca 500 ppm See: 71432

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation through the skin and by ingestion

INHALATION RISK:
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes the skin and the respiratory tract Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system , resulting in lowering of consciousness Exposure far above the occupational exposure limit value may result in unconsciousness death

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The liquid defats the skin. The substance may have effects on the bone marrow immune system , resulting in a decrease of blood cells. This substance is carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 80°C
Melting point: 6°C
Relative density (water = 1): 0.88
Solubility in water, g/100 ml at 25°C: 0.18
Vapour pressure, kPa at 20°C: 10
Relative vapour density (air = 1): 2.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2
Flash point:
-11°C c.c.
Auto-ignition temperature: 498°C
Explosive limits, vol% in air: 1.2-8.0
Octanol/water partition coefficient as log Pow: 2.13

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms.

NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-30S1114 / 30GF1-II
NFPA Code: H2; F3; R0

ADDITIONAL INFORMATION

ICSC: 0015 **BENZENE**

International Chemical Safety Cards

1,3,5-TRIMETHYLBENZENE

ICSC: 1155

Mesitylene
C_9H_{12}
Molecular mass: 120.2

ICSC # 1155
CAS # 108-67-8
RTECS # OX6825000
UN # 2325
EC # 601-025-00-5
March 06, 2002 Peer reviewed


TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
EXPLOSION	Above 50°C explosive vapour/air mixtures may be formed.	Above 50°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness. Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Marine pollutant. Xi symbol N symbol R: 10-37-51/53 S: 2-61 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1155

International Chemical Safety Cards

1,3,5-TRIMETHYLBENZENE

ICSC: 1155

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on burning producing toxic and irritating fumes. Reacts violently with strong oxidants causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV (as mixed isomers): 25 ppm; (ACGIH 2001). MAK (all isomers): 20 ppm; 100 mg/m^3; class II 1 © (2001) OSHA PEL†: none NIOSH REL: TWA 25 ppm (125 mg/m^3) NIOSH IDLH: N.D. See: IDLH INDEX	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes the skin and the respiratory tract If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure, resulting in chronic bronchitis. The substance may have effects on the central nervous system blood See Notes.
PHYSICAL PROPERTIES	Boiling point: 165°C Melting point: -45°C Relative density (water = 1): 0.86 Solubility in water: very poor Vapour pressure, kPa at 20°C: 0.25	Relative vapour density (air = 1): 4.1 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 50°C (c.c.) Auto-ignition temperature: 550°C Octanol/water partition coefficient as log Pow: 3.42
ENVIRONMENTAL DATA	The substance is harmful to aquatic organisms. Bioaccumulation of this chemical may occur in fish. 	

N O T E S

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. See ICSC 1433 1,2,4-Trimethylbenzene (Pseudocumene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethyl benzene (mixed isomers).

Transport Emergency Card: TEC (R)-30S2325
NFPA Code: H0; F2; R0

ADDITIONAL INFORMATION

International Chemical Safety Cards

1,2,4-TRIMETHYLBENZENE

ICSC: 1433

Pseudocumene

C_9H_{12}

Molecular mass: 120,2

ICSC # 1433
CAS # 95-63-6
RTECS # DC3325000
UN # 1993
EC # 601-043-00-3
March 06, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
EXPLOSION	Above 44°C explosive vapour/air mixtures may be formed.	Above 44°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness. Dry skin.	Protective gloves.	Rinse skin with plenty of water or shower.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Xn symbol N symbol R: 10-20-36/37/38-51/53 S: 2-26-61 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1433

International Chemical Safety Cards

1,2,4-TRIMETHYLBENZENE

ICSC: 1433

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on burning producing toxic and irritating fumes Reacts violently with strong oxidants causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (as mixed isomers) 25 ppm as TWA (ACGIH 2004). MAK: (as mixed isomers) 20 ppm 100 mg/m³ Peak limitation category: II(2) Pregnancy risk group: C (DFG 2004). OSHA PEL†: none NIOSH REL: TWA 25 ppm (125 mg/m^3) NIOSH IDLH: N.D. See: IDLH INDEX **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes the skin and the respiratory tract If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure , resulting in chronic bronchitis The substance may have effects on the central nervous system blood See Notes.
PHYSICAL PROPERTIES	Boiling point: 169°C Melting point: -44°C Relative density (water = 1): 0.88 Solubility in water: very poor Relative vapour density (air = 1): 4.1 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 44°C c.c. Auto-ignition temperature: 500°C Explosive limits, vol% in air: 0.9-6.4 Octanol/water partition coefficient as log Pow: 3.8
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish. 

N O T E S

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. See also ICSC 1155 1,3,5-Trimethylbenzene (Mesitylene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethyl benzene (mixed isomers). 1,3,5-Trimethylbenzene (Mesitylene) is classified as a marine pollutant.

Transport Emergency Card: TEC (R)-30GF1-III
NFPA Code: H0; F2; R0;

ADDITIONAL INFORMATION

International Chemical Safety Cards

m-XYLENE

ICSC: 0085

meta-Xylene
1,3-Dimethylbenzene
m-Xylol
$C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2

ICSC # 0085
CAS # 108-38-3
RTECS # ZE2275000
UN # 1307
EC # 601-022-00-9
August 03, 2002 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0085

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

m-XYLENE

ICSC: 0085

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** As a result of flow, agitation, etc., electrostatic charges can be generated. **CHEMICAL DANGERS:** Reacts with strong acids strong oxidants **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m³ Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL†: TWA 100 ppm (435 mg/m^3) NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3) NIOSH IDLH: 900 ppm See: 95476 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. The substance may have effects on the central nervous system Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 139°C Melting point: -48°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.8 Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 527°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.20
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. 

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0086 p-Xylene.

NFPA Code: H 2; F 3; R 0;
Transport Emergency Card: TEC (R)-30S1307-III

ADDITIONAL INFORMATION

ICSC: 0085 **m-XYLENE**

International Chemical Safety Cards

p-XYLENE

ICSC: 0086

para-Xylene
1,4-Dimethylbenzene
p-Xylol
$C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2

ICSC # 0086
CAS # 106-42-3
RTECS # ZE2625000
UN # 1307
EC # 601-022-00-9
August 03, 2002 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants, strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0086

International Chemical Safety Cards

p-XYLENE

ICSC: 0086

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** As a result of flow, agitation, etc., electrostatic charges can be generated. **CHEMICAL DANGERS:** Reacts with strong acids strong oxidants **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m³ Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL†: TWA 100 ppm (435 mg/m^3) NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3) NIOSH IDLH: 900 ppm See: 95476 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. The substance may have effects on the central nervous system. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 138°C Melting point: 13°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.9 Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 528°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.15
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. 

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0085 m-Xylene.

Transport Emergency Card: TEC (R)-30S1307-III
NFPA Code: H 2; F 3; R 0;

ADDITIONAL INFORMATION

ICSC: 0086 **p-XYLENE**

International Chemical Safety Cards

MERCURY

ICSC: 0056

Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

ICSC # 0056
CAS # 7439-97-6
RTECS # OV4550000
UN # 2809
EC # 080-001-00-0
April 22, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed.	Special material. Do not transport with food and feedstuffs. T symbol N symbol R: 23-33-50/53 S: 1/2-7-45-60-61 UN Hazard Class: 8 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

MERCURY

ICSC: 0056

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 0.025 mg/m³ as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 0.1 mg/m³ Sh Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003). OSHA PEL†: C 0.1 mg/m^3 NIOSH REL: Hg Vapor: TWA 0.05 mg/m^3 skin Other: C 0.1 mg/m^3 skin NIOSH IDLH: 10 mg/m^3 (as Hg) See: 7439976 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its vapour and through the skin , also as a vapour! **INHALATION RISK:** A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous systemandkidneys. The effects may be delayed. Medical observation is indicated. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may have effects on the central nervous system kidneys , resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.
PHYSICAL PROPERTIES	Boiling point: 357°C Melting point: -39°C Relative density (water = 1): 13.5 Solubility in water: none Vapour pressure, Pa at 20°C: 0.26 Relative vapour density (air = 1): 6.93 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish. 

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

ADDITIONAL INFORMATION

ICSC: 0056 **MERCURY**

International Chemical Safety Cards

LEAD

ICSC: 0052

Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)

ICSC # 0052
CAS # 7439-92-1
RTECS # OF7525000
October 08, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.	Separated from food and feedstuffs incompatible materials See Chemical Dangers.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0052

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

LEAD

ICSC: 0052

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.05 mg/m³ A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004).
MAK:
Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004).
EU OEL: as TWA 0.15 mg/m³ (EU 2002).
OSHA PEL*: 1910.1025 TWA 0.050 mg/m^3 See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH REL*: TWA 0.050 mg/m^3 See Appendix C *Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH IDLH: 100 mg/m^3 (as Pb) See: 7439921

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES	Boiling point: 1740°C Melting point: 327.5°C	Density: 11.34 g/cm3 Solubility in water: none
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment. 	

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-51S1872

ADDITIONAL INFORMATION

ICSC: 0052 **LEAD**

APPENDIX D
HOSPITAL INFORMATION AND MAP
FIELD ACCIDENT REPORT

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME _____ PROJECT. NO._____

Date of Accident _____ Time _____ Report By _____

Type of Accident (Check One):

( ) Vehicular ( ) Personal ( ) Property

Name of Injured _____ DOB or Age _____

How Long Employed _____

Names of Witnesses _____

_____

Description of Accident _____

_____

_____

Action Taken _____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

_____

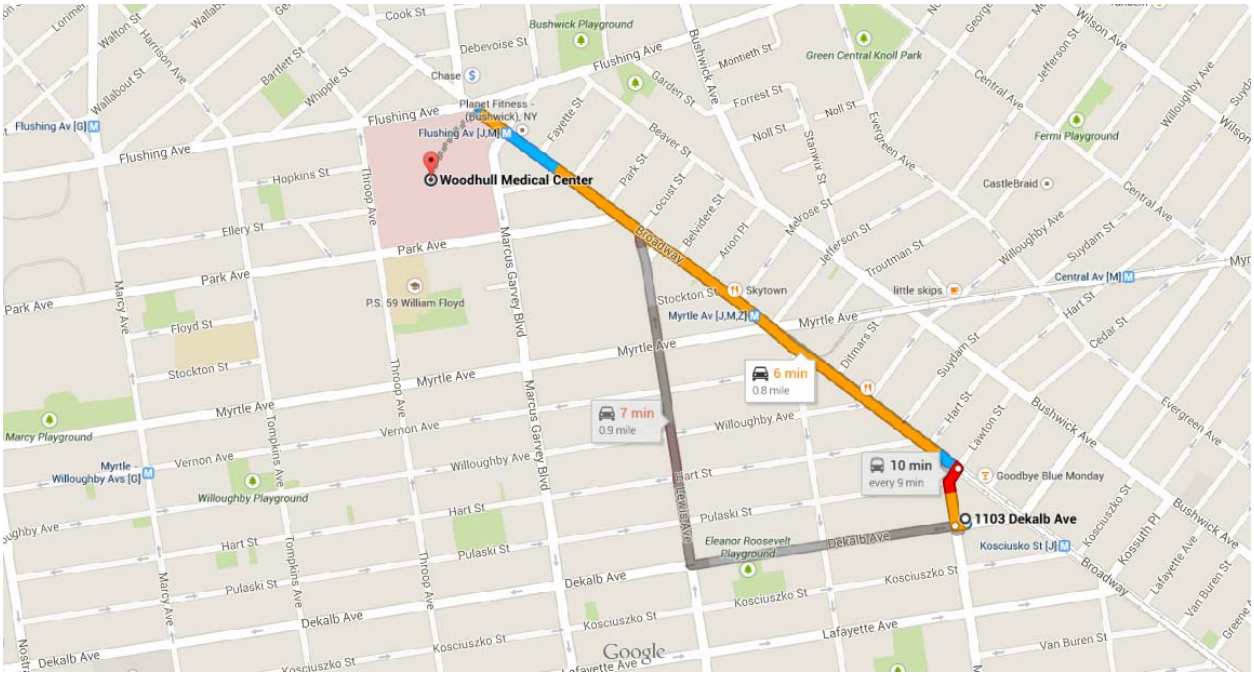
(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

WOODHUL MEDICAL CENTER
760 Broadway, Brooklyn, New York 11206
718-963-8000
0.8 Miles – About 3 Minutes



1103 Dekalb Ave
Brooklyn, NY 11221

1. Head west on Dekalb Ave toward Malcolm X Blvd — 69 ft
2. Take the 1st right onto Malcolm X Blvd — 371 ft
3. Turn left onto Broadway
   Destination will be on the left — 0.7 mi

Woodhull Medical Center
760 Broadway, Brooklyn, NY 11206

ATTACHMENT H
Site Management Forms

SITE INSPECTION CHECKLIST

Site Inspection Checklist - Cover System
Former Getty S/S
1103 Dekalb Avenue, Brooklyn, NY

Date: _____ Time: _____

Inspector Name/Organization: _____

Visual Inspection of Concrete Slabs

Inspect concrete for cracks, perforations and patching

Describe General Condition of Concrete _____

_____

Describe any Cracks or New Penetrations _____

_____

Describe any Patching _____

_____

Repairs Needed and / or Maintenance at this time?

_____

_____

_____

_____

Signature: _____ Date: _____

1103-1107 Dekalb Avenue, Brookjlyn, NY
SVE System Monitoring Form

Date / Time: _____
Technician: _____

System Operating (Yes / No)

System Parameters

Influent Flow Meter	_____	SCFM
Influent Vacuum	_____	"H2O
Bleed valve position	_____	

Sample Ports

	PID (ppm)	Sampled	Analysis / Comments
Pre-GAC			
Mid-GAC			
Post-GAC			

Repairs / Modifications / Comments

1103-1107 Dekalb Avenue, Brooklyn, NY
Groundwater Monitoring Well Checklist

Date / Time: _____
Technician: _____

MW1401

Properly secured/locked?	Y/N
Casing intact?	Y/N
Evidence of tampering?	Y/N
Functioning?	Y/N

MW1402

Properly secured/locked?	Y/N
Casing intact?	Y/N
Evidence of tampering?	Y/N
Functioning?	Y/N

MW1403

Properly secured/locked?	Y/N
Casing intact?	Y/N
Evidence of tampering?	Y/N
Functioning?	Y/N

Repairs / Modifications / Comments

ATTACHMENT I
O&M Manual

AMC Engineering PLLC
18-36 42nd Street
Astoria, NY 11105
718.545.0474
Fax 516 706-3214

OPERATION AND MAINTENANCE PLAN

1.0 INTRODUCTION

This Operation and Maintenance Plan describes the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the steps necessary to allow individuals unfamiliar with the site to operate and maintain the SVE system;
- Includes an operation and maintenance contingency plan; and,
- Will be updated periodically to reflect changes in site conditions or the manner in which the SVE systems are operated and maintained.

A copy of this Operation and Maintenance Plan will be kept at the site.

1.1 SVE System Scope

The SVE systems at the site will operate 24/7 with no maintenance requirements. Periodic inspections will be performed to assure that the system is continuing to operate properly.

1.2 SVE System Start-Up and Testing

The start-up test has already been completed by the remedial engineer. If the system is shut down, the following procedure will be followed:

1. Inspect each component of the system as follows:
    a. Visual inspection the PVC extraction line for any visible cracks or separations.
    b. Verify that the blower is attached to the PVC extraction line and carbon canisters.
    c. Ensure that the carbon canisters are arranged in series with connections to the blower and the effluent line. If there are any obvious odors from the canisters, the carbon may be spent and requires replacement. Additionally, an environmental professional will be estimating breakthrough from their records. See below for the replacement procedure.

If there are any structural issues with the SVE system, repairs must be performed before the system can be started up.

2. Turn on the Rotron blower located outside the building. Wait 15 minutes.
3. Using a manometer, check the monitoring wells for a vacuum reading. There is a gauge attached to each wellhead for easy monitoring. If vacuum is not produced at the wellhead, inspect the extraction line again. If there are any structural deficiencies, turn off the blower and perform repairs. If there are no structural issues, wait another 15 minutes and check for a vacuum reading again. After 30 minutes, if the monitoring wells do not produce a vacuum reading, turn off the system and contact AMC Engineering., PLLC
4. The vacuum readings need to be verified at the the following day.

1.3 SVE System Operation: Non-Routine Equipment Maintenance

Non-routine maintenance is expected if any component of the system is damaged or fails. During each inspection, the system will be checked for structural integrity. Component damage or failure includes a broken valve, damaged pipe, or blower malfunction. Additionally, if a hissing sound is noted in the first floor, this could be a sign of extraction line damage. In any case of component damage or failure, the system should be shut off and repairs/replacements should be made. The owner should contact AMC Engineering with any issues.

The system will not be restarted until all repairs are made. When the repairs are completed, the system should be started up as listed above.

2.0 SVE SYSTEM PERFORMANCE MONITORING

An SVE system has been installed to remediate impacted soils within the source area. A cut sheet with details of the SVE system can be found in **Figure 7**.

2.1 SVE Monitoring Schedule

The components of the SVE system will be inspected by a qualified environmental professional or technician on a quarterly basis to assure that the system is functioning properly.

Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system.

2.2 SVE General Equipment Monitoring

A visual inspection of the complete system will be conducted during the monitoring event. SVE system components to be monitored include, but are not limited to, the following:

- Vacuum blower;
- General system piping;
- Vacuum gauges;
- Control switches and system alarms;
- PID Readings from influent line, between carbon drums, and at the discharge stack.

A complete list of components to be checked is provided in the Inspection Checklist (attached in the SVE Remedial Design Work Plan). If any equipment is observed to be malfunctioning or the system is not performing within specifications, maintenance and repairs must be performed immediately. After the repairs are completed, the SVE system can be restarted as outlined in Section 1.2.

Rotron is the manufacturer for the 1.5 HP blower. If there are any issues with the equipment, the inspector can reach the manufacturer's technical customer service line for troubleshooting. In any case, repairs should be performed when the SVE system has been shut off. Once the repairs are completed, the start-up process must be followed.

2.3 SVE Sampling Event Protocol

PID readings and air samples will be collected on a quarterly basis to evaluate the performance of the system. Air samples will be collected annually after approval from the NYSDEC. Samples will be collected from the SVE system discharge (after carbon). Air samples will be submitted to a NYSDOH certified environmental laboratory for analysis of VOCs by USEPA method 624.

2.4 SVE Carbon Vessels Replacement Procedure

The 55-gallon GAC canisters will require replacement when breakthrough occurs. Breakthrough is identified as the time when elevated PID readings are detected post-carbon. PID readings will be taken quarterly to determine breakthrough. If the effluent stream produces an obvious odor, AMC should be called to determine if the carbon is spent. A set of replacement drums will be kept on Site and labeled "New" with their date of delivery.

The procedure to change out the carbon vessels can be found below:

1. Halt SVE system operations by turning off the power to the blower.
2. Open the first carbon vessel (lead) in series, and remove the carbon. This material is to be shipped back to the supplier for regeneration.
3. Open the second carbon vessel (lag) in series, and remove the carbon.
4. Add the carbon from the lag vessel into the lead vessel.
5. Close the lead vessel.
6. Add fresh / new carbon to the lag vessel.
7. Close the lag vessel.
8. Restart the SVE system and measure concentrations with a PID.

In the unlikely case both carbon vessels achieved their break though times, both vessels will need to be supplied with fresh carbon.

3.0 IN-SITU CHEMICAL OXIDATION (ISCO) PERFORMANCE MONITORING

A network of injections wells has been installed as part of the ISCO system to remediate impacted soils within the source area and in the rear yard. A total of ten (10) injection wells (IWs) have been installed:

- IW1-7 were installed in a line, parallel to Malcolm X Blvd; and
- IW8-10 were installed east of IW1-7, also parallel to Malcolm X Blvd

Additionally, a total of three (3) monitoring wells (MW1401-1403) have been installed on the east-side sidewalk of Malcolm X Boulevard to determine the effectiveness of the chemical oxidant injection program.

A cut sheet with details of the injection wells can be found in **Figure 8**

3.1 Additional Injections and Future Operations

All injection wells (IW1-10) are constructed out of 1" PVC pipes to a depth of 56' below grade. The IWs are finished at top of cellar slab elevation with an 8-inch bolt-down manhole cover. Additional ISCO treatment will be achieved through the use of these injection wells. The post construction ISCO plan can be found in **Figure 8**.

Future injection events will occur on an as-needed basis, dependent on the analytical results from MW1401-1403. The monitoring wells with stagnant, elevated VOCs concentrations will require additional injections at the injection wells immediately upstream as part of remediation.

A mixing tank (approx. 300 gallons), injection manifold, and appropriate hoses will be utilized for additional injection events. This equipment will be set up outside of the building, and hoses will be connected to the injection points through a 1" PVC coupler. The number of hoses used will depend on the number of injection wells that require additional treatment. The iron and Klozur solutions will be mixed with water inside of the mixing tank, before they are pumped into the wells via submersible pump.

3.2 ISCO Sampling Event Protocol

Groundwater samples will be collected from MW1401-1403 one month after the end of the chemical oxidant injection events to confirm the performance of the remedy. Samples will be collected on a quarterly basis thereafter, until modifications to the frequency or sampling requirements are granted by the NYSDEC. Groundwater samples will be submitted to an ELAP certified environmental laboratory for analysis of VOCs by EPA Method 8260, SVOCs by EPA Method 8270D, Iron 2+, Persulfate, and field pH.

All sampling activities will be recorded in a field book and associated sampling log as provided in **Attachment H** - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Sampling Plan provided as **Attachment E** of the SMP.

4.0 MAINTENANCE AND PERFORMANCE MONITORING REPORTING REQUIREMENTS

Maintenance reports and any other information generated during regular operations at the site will be kept on-file.

4.1 Routine Maintenance Reports

Checklists or forms (attached) will be completed during each routine maintenance event. Checklists/forms will include, but not be limited to the following information:

- Date;
- Name, company, and position of person(s) conducting maintenance activities;
- Maintenance activities conducted;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted ; and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

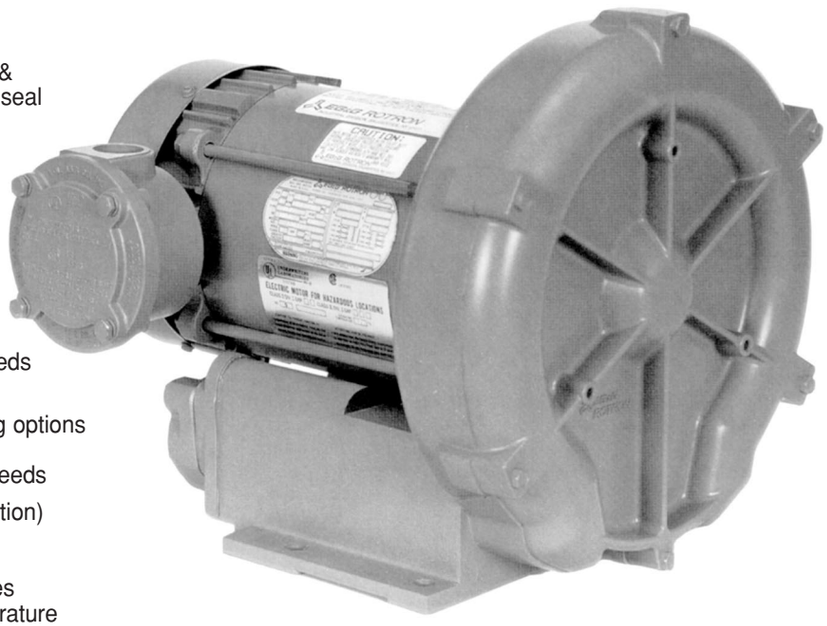
4.2 Non-Routine Maintenance Reports

During each non-routine maintenance event, a form will be completed which will include, but not be limited to, the following information:

- Date;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Presence of leaks;
- Repairs or adjustments made to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and,
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

EN 454M & CP 454M
Sealed Regenerative Blower w/Explosion-Proof Motor

FEATURES
- Manufactured in the USA – ISO 9001 compliant
- Maximum flow: 127 SCFM
- Maximum pressure: 65 IWG
- Maximum vacuum: 59 IWG
- Standard motor: 1.5 HP, explosion-proof
- Cast aluminum blower housing, cover, impeller & manifold; cast iron flanges (threaded); teflon lip seal
- UL & CSA approved motor with permanently sealed ball bearings for explosive gas atmospheres Class I Group D minimum
- Sealed blower assembly
- Quiet operation within OSHA standards

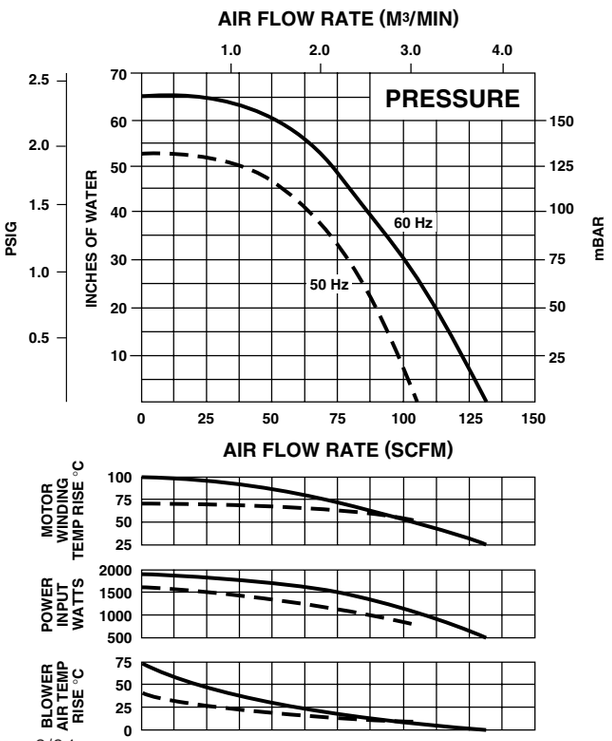


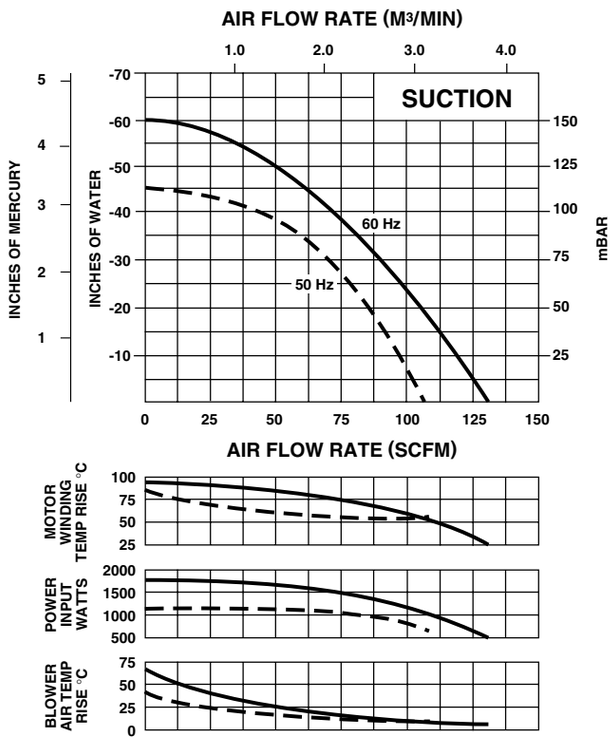
MOTOR OPTIONS
- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepowers for application-specific needs

BLOWER OPTIONS
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES (See Catalog Accessory Section)
- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges & relief valves
- Switches – air flow, pressure, vacuum or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package

BLOWER PERFORMANCE AT STANDARD CONDITIONS



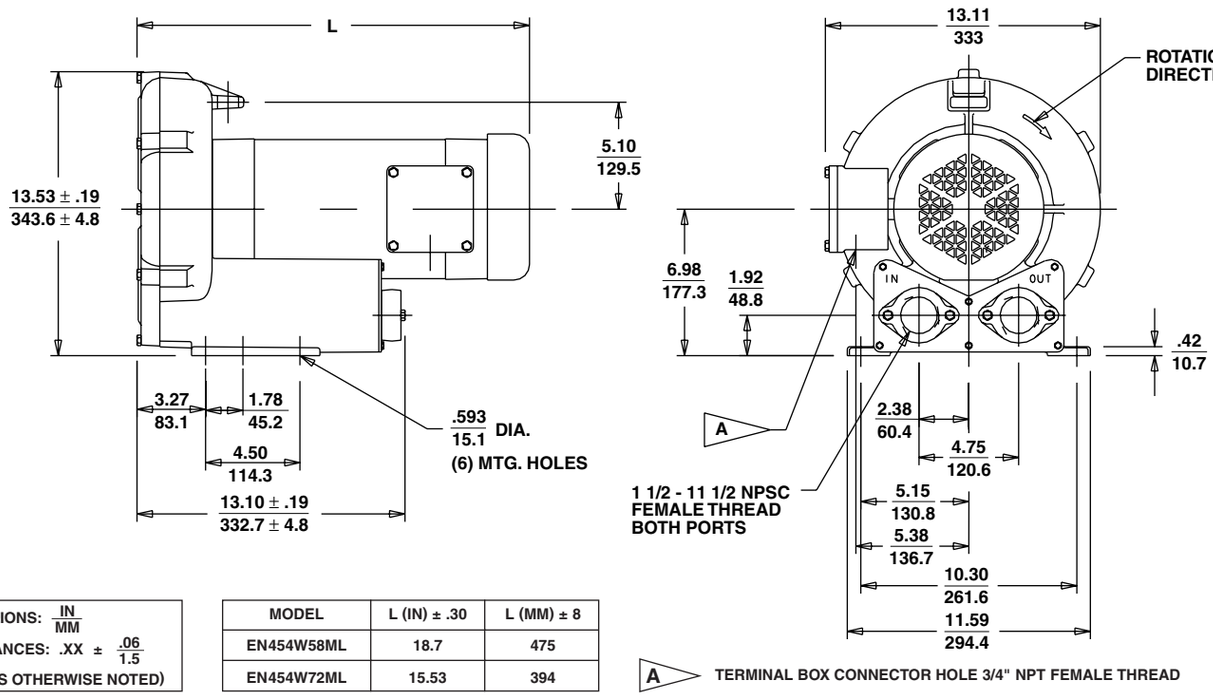


Rev. 2/04

AMETEK Technical and Industrial Products, Kent, OH 44240 • e mail: rotronindustrial@ametek.com • internet: www.ametektmd.com

EN 454M & CP 454M
Sealed Regenerative Blower w/Explosion-Proof Motor

Scale CAD drawing available upon request.



DIMENSIONS: IN / MM
TOLERANCES: .XX ± .06 / 1.5
(UNLESS OTHERWISE NOTED)

MODEL	L (IN) ± .30	L (MM) ± 8
EN454W58ML	18.7	475
EN454W72ML	15.53	394

A TERMINAL BOX CONNECTOR HOLE 3/4" NPT FEMALE THREAD

SPECIFICATIONS

MODEL	EN454W58ML		EN454W72ML		CP454W72MLR	CP454FR72MLR
Part No.	080487		080488		080490	080494
Motor Enclosure – Shaft Material	Explosion-proof – **CS**		Explosion-proof – **CS**		Chem XP – **CS**	Chem XP – **SS**
Horsepower	1.5		1.5		Same as EN454W72ML – 080488 except add Chemical Processing (CP) features from catalog inside front cover	Same as EN454W72ML – 080488 except add Chemical Processing (CP) features from catalog inside front cover
Phase – Frequency [1]	Single - 60 Hz		Three - 60 Hz			
Voltage [1]	115	208-230	230	460		
Motor Nameplate Amps	15	7.9-7.5	4.6	2.3		
Max. Blower Amps [3]	20	10.9-10	5.6	2.8		
Inrush Amps	96	48	32	16		
Starter Size	1	0	00	00		
Service Factor	1.0		1.0			
Thermal Protection [2]	Class B - Pilot Duty		Class B - Pilot Duty			
XP Motor Class – Group	I-D, II-F&G		I-D, II-F&G			
Shipping Weight	86 lb (39 kg)		80 lb (36.2 kg)			

[1] Rotron motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: **208-230/415-460 VAC-3 ph-60 Hz** and **190-208/380-415 VAC-3 ph-50 Hz**. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a ±10% voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

[2] Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

[3] Maximum blower amps corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

Specifications subject to change without notice. Please consult your Local Field Sales Engineer for specification updates.

Rev. 2/04

SERVICE AND PARTS MANUAL FOR BLOWER MODEL

EN454 – EN656

ROTRON Industrial Products
627 lake Street, Kent, ohio 44240 U.S.A.
Telephone: 330-673-3452 Fax: 330-677-3306
e-mail: rotronindustrial@ametek.com
internet: www.ametektip.com

Your Choice. Our Commitment.™

WARRANTY, INSTALLATION, MAINTENANCE AND TROUBLESHOOTING INSTRUCTIONS

TECHNICAL AND INDUSTRIAL PRODUCTS
627 Lake Street, Kent, Ohio 44240 USA
Telephone: 330-673-3452 Fax: 330-677-3306
e-mail: rotronindustrial@ametek.com web site: www.ametektip.com

1. AMETEK Rotron DR, EN and HiE regenerative direct drive blowers are guaranteed for one full year from the date of installation (limited to 18 months from the date of shipment) to the original purchaser only. Should the blower fail we will evaluate the failure If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

2. AMETEK Rotron Minispiral, Revaflow, Multiflow, Nautilair, remote drive blowers, moisture separators, packaged units, CP blowers, Nasty Gas™ models and special built (EO) products are guaranteed for one full year from date of shipment for workmanship and material defect to the original purchaser only. Should the blower fail, If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

3. **Parts Policy** - AMETEK Rotron spare parts and accessories are guaranteed for three months from date of shipment for workmanship and material defect to the original purchaser only. If failure is determined to be workmanship or material defect related we will at our option repair or replace the part.

Corrective Action - A written report will be provided indicating reason(s) for failure, with suggestions for corrective action. Subsequent customer failures due to abuse, misuse, misapplication or repeat offense will not be covered. AMETEK Rotron will then notify you of your options. Any failed unit that is tampered with by attempting repair or diagnosis will void the warranty, unless authorized by the factory.

Terms and Conditions - Our warranty covers repairs or replacement of regenerative blowers only, and will not cover labor for installation, outbound and inbound shipping costs, accessories or other items not considered integral blower parts. Charges may be incurred on products returned for reasons other than failures covered by their appropriate warranty. Out-of-warranty product and in warranty product returned for failures determined to be caused by abuse, misuse, or repeat offense will be subject to an evaluation charge. Maximum liability will in no case exceed the value of the product purchased. Damage resulting from mishandling during shipment is not covered by this warranty. It is the responsibility of the purchaser to file claims with the carrier. Other terms and conditions of sale are stated on the back of the order acknowledgement.

Installation Instructions for SL, DR, EN, CP, and HiE Series Blowers

1. **Bolt It Down** - Any blower must be secured against movement prior to starting or testing to prevent injury or damage. The blower does not vibrate much more than a standard electric motor.

2. **Filtration** - All blowers should be filtered prior to starting. Care must be taken so that no foreign material enters the blower. If foreign material does enter the blower, it could cause internal damage or may exit at extremely high velocity.

   Should excessive amounts of material pass through the blower, it is suggested that the cover(s) and impeller(s) be removed periodically and cleaned to avoid impeller imbalance. Impeller

imbalance greatly speeds bearing wear, thus reducing blower life. Disassembling the blower will void warranty, so contact the factory for cleaning authorization.

3. **Support the Piping** - The blower flanges and nozzles are designed as connection points only and are not designed to be support members.

   Caution: Plastic piping should not be used on blowers larger than 1 HP that are operating near their maximum pressure or suction point. Blower housing and nearby piping temperatures can exceed 200ºF. Access by personnel to the blower or nearby piping should be limited, guarded, or marked, to prevent danger of burns.

4. **Wiring** - Blowers must be wired and protected/fused in accordance with local and national electrical codes. All blowers must be grounded to prevent electrical shock. Slo-Blo or time delay fuses should be used to bypass the first second of start-up amperage.

5. **Pressure/Suction Maximums** - The maximum pressure and/or suction listed on the model label should not be exceeded. This can be monitored by means of a pressure or suction gage (available from Rotron), installed in the piping at the blower outlet or inlet. Also, if problems do arise, the Rotron Field representative will need to know the operating pressure/suction to properly diagnose the problem.

6. **Excess Air** - Bleed excess air off. DO NOT throttle to reduce flow. When bleeding off excess air, the blower draws less power and runs cooler.

   Note: Remote Drive (Motorless) Blowers - Properly designed and installed guards should be used on all belts, pulleys, couplings, etc. Observe maximum remote drive speed allowable. Due to the range of uses, drive guards are the responsibility of the customer or user. Belts should be tensioned using belt gauge.

Maintenance Procedure

When properly piped, filtered, and applied, little or no routine maintenance is required. Keep the filter clean. Also, all standard models in the DR, EN, CP, and HiE series have sealed bearings that require no maintenance. Bearing should be changed after 15,000 to 20,000 hours, on average. Replacement bearing information is specified on the chart below.

Bearing Part Number	Size	Seal Material	Grease	Heat Stabilized
510217 510218 510219	205 206 207	Polyacrylic	Nye Rheotemp 500 30% +/- 5% Fill	Yes – 325 F
510449 516440 516648	203 202 307	Buna N	Exxon Polyrex Grease	NO
516840 516841 516842 516843 516844 516845 516846 516847	206 207 208 210 309 310 311 313	Buna N	Exxon Polyrex Grease	NO

Troubleshooting

		POSSIBLE CAUSE	OUT OF WARRANTY REMEDY ***
IMPELLER DOES NOT TURN	Humming Sound	1. * One phase of power line not connected 2. * One phase of stator winding open 3. Bearings defective 4. Impeller jammed by foreign material 5. Impeller jammed against housing or cover 6. ** Capacitor open	1. Connect 2. Rewind or buy new motor 3. Change bearings 4. Clean and add filter 5. Adjust 6. Change capacitor
	No Sound	1. * Two phases of power line not connected 2. * Two phases of stator winding open	1. Connect 2. Rewind or buy new motor
IMPELLER TURNS	Blown Fuse	1. Insufficient fuse capacity 2. Short circuit	1. Use time delay fuse of proper rating 2. Repair
	Motor Overheated Or Protector Trips	1. High or low voltage 2. * Operating in single phase condition 3. Bearings defective 4. Impeller rubbing against housing or cover 5. Impeller or air passage clogged by foreign material 6. Unit operating beyond performance range 7. Capacitor shorted 8. * One phase of stator winding short circuited	1. Check input voltage 2. Check connections 3. Check bearings 4. Adjust 5. Clean and add filter 6. Reduce system pressure/vacuum 7. Change capacitor 8. Rewind or buy new motor
	Abnormal Sound	1. Impeller rubbing against housing or cover 2. Impeller or air passages clogged by foreign material 3. Bearings defective	1. Adjust 2. Clean and add filter 3. Change bearings
	Performance Below Standard	1. Leak in piping 2. Piping and air passages clogged 3. Impeller rotation reversed 4. Leak in blower 5. Low voltage	1. Tighten 2. Clean 3. Check wiring 4. Tighten cover, flange 5. Check input voltage

*** 3 phase units**

**** 1 phase units**

***** Disassembly and repair of new blowers or motors will void the Rotron warranty. Factory should be contacted prior to any attempt to field repair an in-warranty unit.**

Blower Disassembly:

WARNING: Attempting to repair or diagnose a blower may void Rotron's warranty. It may also be difficult to successfully disassemble and reassemble the unit.

1) Disconnect the power leads. **CAUTION:** Be sure the power is disconnected before doing any work whatsoever on the unit.

2) Remove or separate piping and/or mufflers and filters from the unit.

3) Remove the cover bolts and then the cover. **NOTE:** Some units are equipped with seals. It is mandatory that these seals be replaced once the unit has been opened.

4) Remove the impeller bolt and washers and then remove the impeller. **NOTE:** Never pry on the edges of the impeller. Use a puller as necessary.

5) Carefully note the number and location of the shims. Remove and set them aside. NOTE: If the disassembly was for inspection and cleaning the unit may now be reassembled by reversing the above steps. If motor servicing or replacement and/or impeller replacement is required the same shims may not be used. It will be necessary to re-shim the impeller according to the procedure explained under assembly.

6) Remove the housing bolts and remove the motor assembly (arbor/.housing on remote drive models).

7) Arbor disassembly (Applicable on remote drive models only):
   a) Slide the bearing retraining sleeve off the shaft at the blower end.
   b) Remove the four (4) screws and the bearing retaining plate from the blower end.
   c) Lift the shaft assembly far enough out of the arbor to allow removal of the blower end snap ring.
   d) Remove the shaft assembly from the arbor.
   e) If necessary, remove the shaft dust seal from the pulley end of the arbor.

Muffler Material Replacement:

1) Remove the manifold cover bolts and them manifold cover.

2) The muffler material can now be removed and replaced if necessary. On blowers with fiberglass acoustical wrap the tubular retaining screens with the fiberglass matting before sliding the muffler pads over the screens.

3) Reassemble by reversing the procedure.

NOTE: On DR068 models with tubular mufflers it is necessary to remove the cover and impeller accessing the muffler material from the housing cavity.

Blower Reassembly:

1) Place the assembled motor (assembled arbor assembly for remote drive models) against the rear of the housing and fasten with the bolts and washer.

2) To ensure the impeller is centered within the housing cavity re-shim the impeller according to the procedure outlined below.

3) If blower had a seal replace the seal with a new one.

4) Place the impeller onto the shaft making sure the shaft key is in place and fasten with the bolt, washer and spacer as applicable. Torque the impeller bolt per the table below. Once fastened carefully rotate the impeller to be sure it turns freely.

5) Replace the cover and fasten with bolts.

6) Reconnect the power leads to the motor per the motor nameplate.

Bolt Size	**Torque** **Pound-Force-Foot**
1/4-20	**6.25 +/- 0.25**
5/16-18	**11.5 +/- 0.25**
3/8-16	**20.0 +/- 0.5**
½-13	**49.0 +/- 1**
5/8 –11	**90.0 +/- 2**

Impeller Shimming Procedure:

WARNING: This unit may be difficult to shim. Extreme care may be exercised.

Tools Needed: Machinist's Parallel Bar
Vernier Caliper with depth measuring capability
Feeler gauges or depth gauge

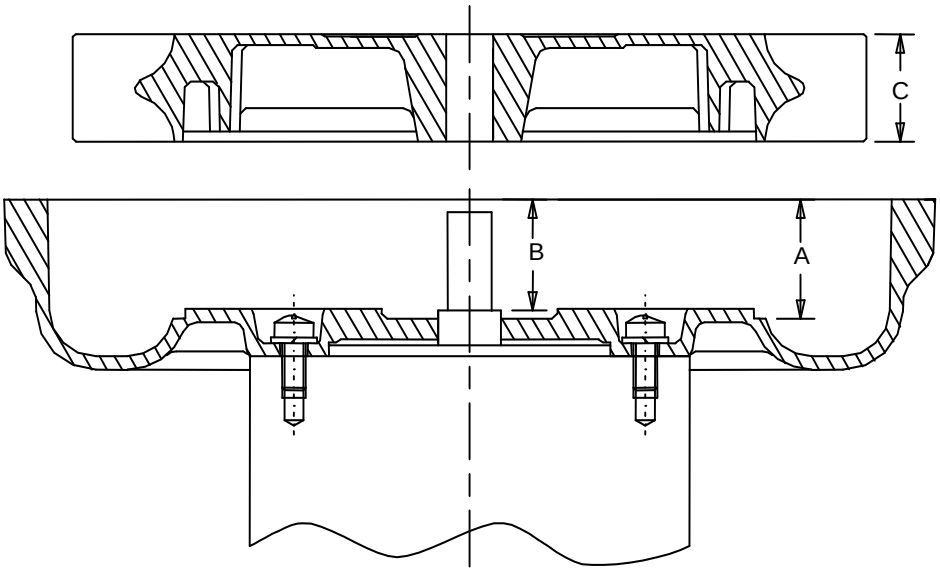
Measure the Following:

Distance from the flange face to the housing (A)
Distance from the flange face to the motor shaft shoulder (B)
Impeller Thickness (C)

Measurements (A) and (B) are made by laying the parallel bar across the housing flange face and measuring to the proper points. Each measurement should be made at three points, and the average of the readings should be used.

Shim Thickness = B – (A+C)/2

After the impeller installation (step #4 above) the impeller/cover clearance can be checked with feeler gauges, laying the parallel bar across the housing flange face. This clearance should nominally be (A-C)/2.



ROTRON TECHNICAL MOTOR DIVISION
REGENERATIVE BLOWER GROUP

75 North Street
Saugerties, New York 12477
Phone: (845) 246-3401
Fax: (845) 246-3802

EXPLOSION-PROOF BLOWERS

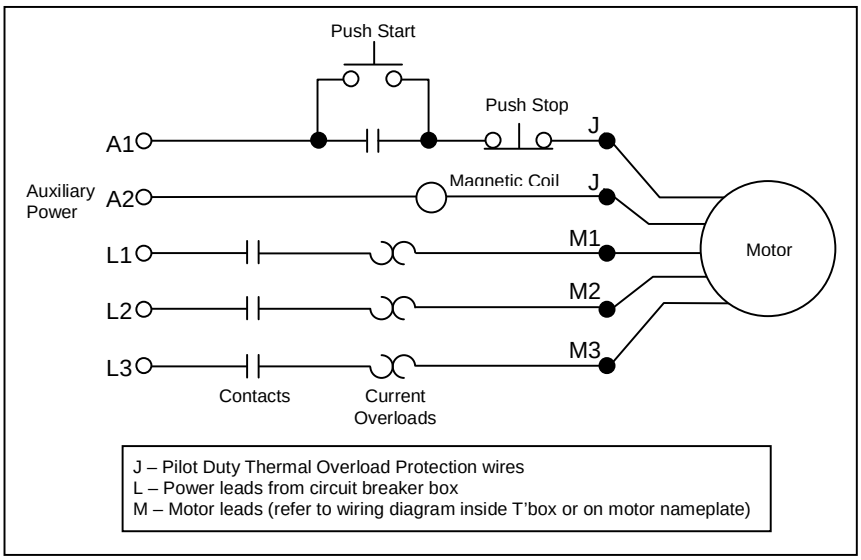
IMPORTANT: Read before wiring this Explosion-proof Blower

This AMETEK Rotron Explosion-proof Regenerative Blower may be equipped with Pilot Duty Thermal Overload (PDTO) or Automatic Thermal Overload (ATO) protection. When properly wired to a motor starter, this protection limits the motor winding temperature rise per the National Electric Code (NEC) article 500. Failure to properly wire this blower is an NEC violation and could cause an explosion. AMETEK Rotron assumes no responsibilities for damages incurred by negligent use of this product, and will not warranty a blower on which the PDTO is not properly connected. Some blowers 1 HP and under do not require PDTO and have built in ATO. Consult the factory if verification of wiring connections is required.

In all cases, follow the motor controller manufacturer's instructions. The following schematic is for conceptual understanding only, and may not apply to all motor/controller combinations.

The manufacturer's wiring diagram found on the motor takes precedent over reference diagrams supplied by AMETEK Rotron Technical Motor Division.

Schematic



The schematic is shown for a three phase motor. For a single phase motor disregard L3 and M3. Pushing the START button completes the auxiliary control circuit, allowing current to flow through the magnetic coil. The contacts are magnetically closed, starting the motor and latching the auxiliary circuit. The motor will continue to run until the STOP push button is depressed, the motor reaches the overload temperature, or the current sensing overloads trip out.

If you have any questions, contact AMETEK Rotron at 914-246-3401 for the location of your area representative.

POLICY REGARDING INSTALLATION OF AMETEK ROTRON REGENERATIVE BLOWERS IN HAZARDOUS LOCATIONS

AMETEK Rotron will not knowingly specify, design or build any regenerative blower for installation in a hazardous, explosive location without the proper NEMA motor enclosure. AMETEK Rotron does not recognize sealed blowers as a substitute for explosion-proof motors. Sealed units with standard TEFC motors should never be utilized where local, state, and/or federal codes specify the use of explosion-proof equipment.

AMETEK Rotron has a complete line of regenerative blowers with explosion-proof motors. Division 1 & 2, Class I, Group D; Class II, Groups F & G requirements are met with these standard explosion-proof blowers.

AMETEK Rotron will not knowingly specify, design or build any regenerative blower for installation in a hazardous, corrosive environment without the proper surface treatment and sealing options.

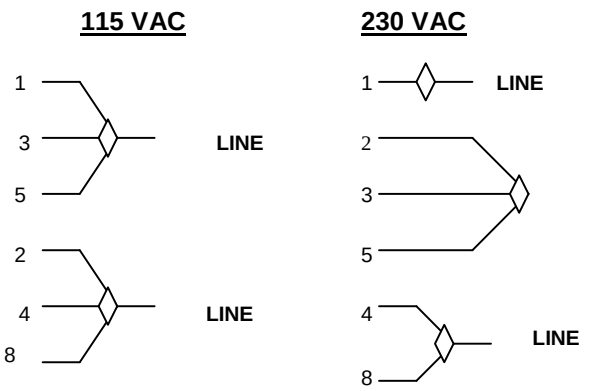
AMETEK Rotron has a complete line of Chemical Processing and Nasty Gas™ regenerative blowers with Chem-Tough™, stainless steel parts, and seals.

AMETEK Rotron offers general application guidance; however, suitability of the particular blower selection is ultimately the responsibility of the purchaser, not the manufacturer of the blower.

FS2 Rev. B 3/10/98

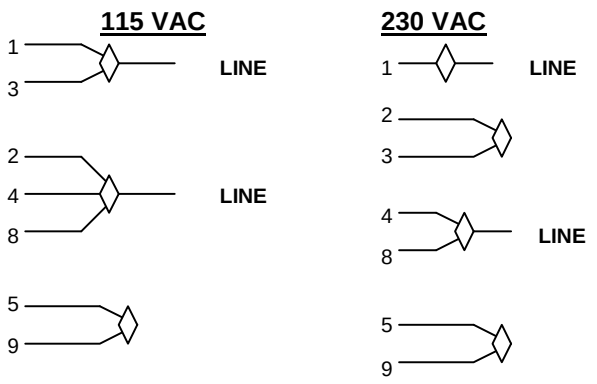
WIRING DIAGRAMS, XP MOTORS

H. 1Ø, 6 WIRE



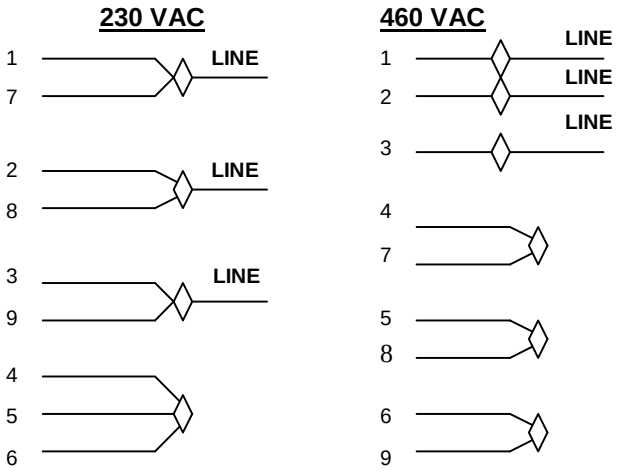
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

I. 1Ø, 7 WIRE



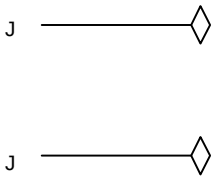
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

K. 3Ø, 9 WIRE



INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

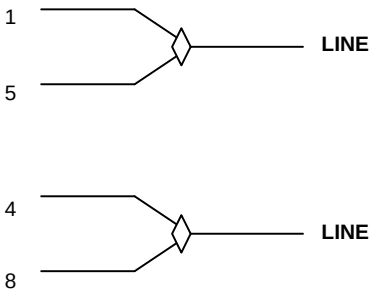
L. PILOT DUTY THERMAL OVERLOADS



HOOK J LEADS TO CONTROL CIRCUITRY

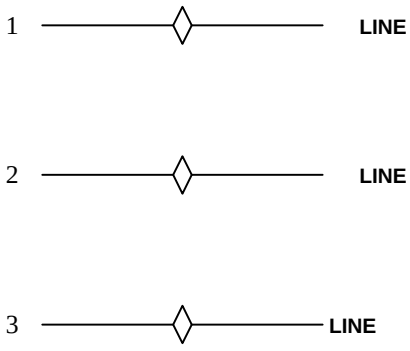
M. 1Ø 230 VAC

SINGLE VOLTAGE



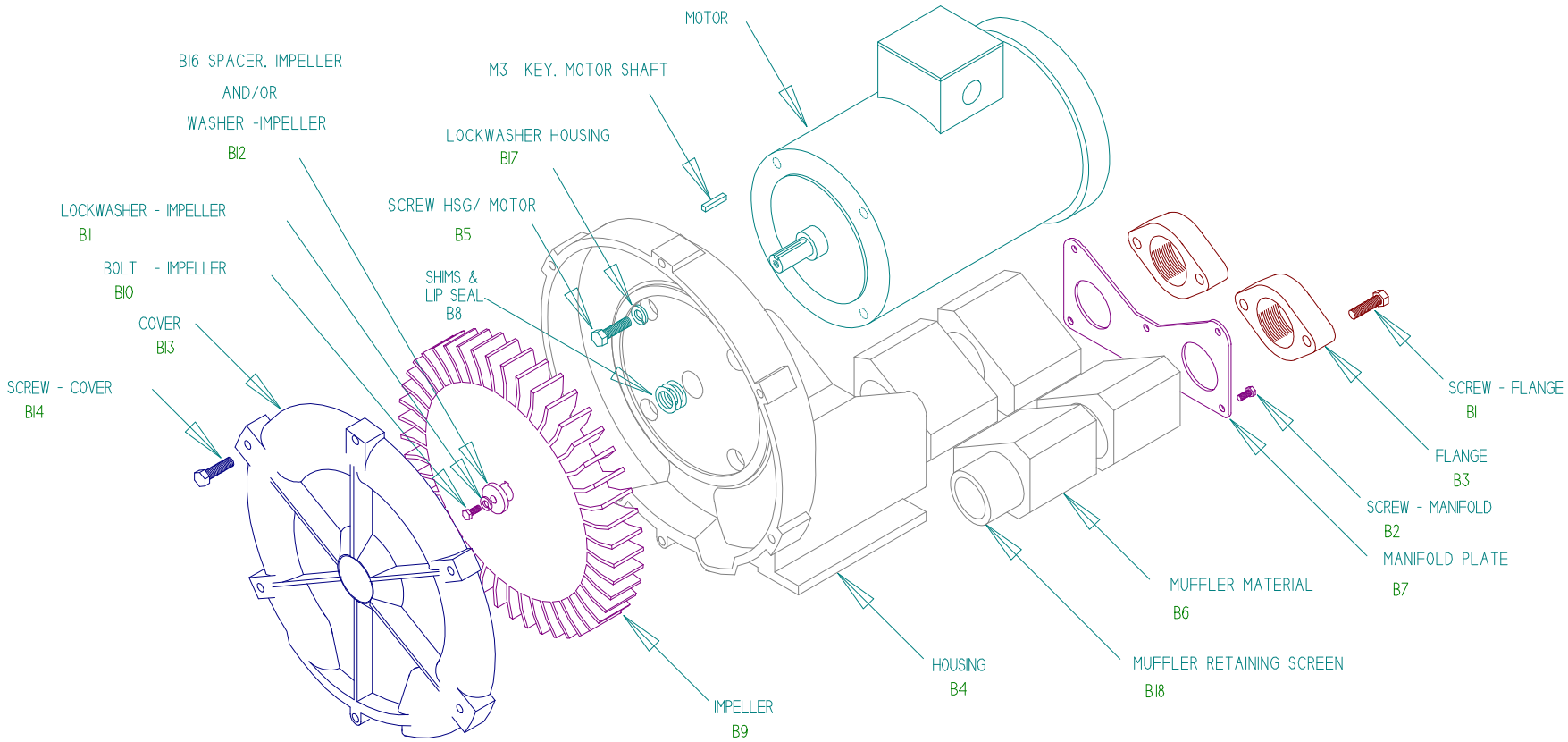
INTERCHANGE LEADWIRES 5 & 8 TO REVERSE ROTATION

N. 3Ø 575 VAC



INTERCHAGE ANY TWO LEAD LINES TO REVERSE ROTATION

ASSEMBLY DIAGRAM
EN454 EN513 EN523 EN505
EN555 EN606 EN656



Parts Breakdown

Item No.	Qty. Req'd	Description	EN454 038175 038176	EN454 080487 080488 080916	EN513 038183 038037	EN523 038223 038184	EN505 038177 038178 038445	EN555 038045	EN606 038179 038222 038437 038536 038538
M3	1	Key Motor Shaft	510629	510629	510629	155099	510629	510629	510629
B1	4	Screw, Flange	120162	120162	120162	120162	120162	120162	155095
B2	6	Screw, Manifold	155496	155170	(10 pcs) 120214	(10 pcs) 120214	155170	155496	155176
B3	2	Flange	510354	510354	510354	510354	510354	510354	511480
B4	1	Housing	515737	551001	523419	523420	See Next Page	516721	See Next Page
B5	4	Screw, Hsg /Motor	251791	155128	251791	251791	155128	251791	251791
B6	4	Muffler Material	515743	515743	516560	516560	(6 pcs) 515743	515743	See Next Page
	2	Muffler Insert	Not Used	551006	Not Used	Not Used	Not Used	Not Used	Not Used
B7	1	Manifold Plate	516410	516410	529868	529868	517460	515482	516392
B8	*	Shim .002"	510356	510356	510356	500664	510356	510356	510356
	*	Shim .005"	510357	510357	510357	500665	510357	510357	510357
	*	Shim .010"	510358	510358	510358	500666	510358	510358	510358
	*	Shim .020"	510359	510359	510359	500667	510359	510359	510359
	*	Shim .030"	Not Used	Not Used	Not Used	510292	Not Used	Not Used	Not Used
B9	1	Impeller	515675	551067	516557	(2 pcs) 516562	517433	516678	511272
B10	1	Bolt, Impeller	120214	120214	120325	120214	120214	120262	120325
B11	1	Lockwasher, Impeller	120203	120203	120203	120203	120203	120203	120203
B12		Washer, Impeller	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B13	1	Cover	517807	551065	516559	516559	517808	516675	511274
B14	6	Screw, Cover	155236	155129	(8 pcs) 120255	(8 pcs) 155098	155236	(7 pcs) 155236	155236
B16	1	Spacer, Impeller Bolt	510355	510355	510355	510355	510355	510355	510355
B17		Lockwasher, Housing	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B18	1	Screen, Muffler Retaining, Right (**)	510362	551087	511718	511718	See Next Page	510362	See Next Page
	1	Screen, Muffler Retaining, Left (**)	510362	551087	511718	511718	See Next Page	510362	See Next Page
B19		Bolt, Muffler Hsg/Hsg	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B20		Muffler Housing	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Bolt, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Lockwasher, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Washer, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Spacer, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B23		Bolt, Mounting Rail	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B24		Lockwasher, Rail	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B25		Nut, Rail	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B26		Rail Mounting	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
	1	Lip Seal	516587	516587	516587	516587	516587	516587	516587

Model	Part No.	Motor	Wiring Diagram	Specific Parts	Bearing, Rear (M1)
EN454W58L	038175	515747	H + L		
EN454W72L	038176	515746	K + L		
EN454W58ML	080487	515747	H + L		
EN454W72ML	080488	515746	K + L		
EN454W86ML	080916	517391	N + L		510449
EN513W58L	038183	515747	H + L		
EN513W72L	038037	515746	K + L		
EN523M72L	038184	517675	K + L		
EN523M5L	038223	551373	M + L	B13 516555 1 pc Center Annulus	510217
EN505AX58ML	038177	510326	H + L		
EN505AX72ML	038178	510325	K + L	B4 517419 B18 517435 2 pcs	510449
EN505CJ5ML	038445	529622	M + L	B4 529654 B18 517436 2 pcs	
EN555M72L	038045	516687	K + L		
EN606M72L	038179 ***	516687	K + L	B4 511276 1 pc	510449
EN606M5L	038222 **	551366	M + L	B6 511285 4 pcs	510217
EN606M86L	038437	529630	N + L	B4 529790 1 pc	510449
EN606M72ML	038536	516687	K + L	B6 529781 4 pcs	
EN606M5ML	038538	551366	M + L	B18 529782 2 pcs	510217
EN656M86XL	080058	529630	N + L		510449
EN656M72XL	080059	516687	K + L		
EN656M5XL	080060	551366	M + L	B7 Muffler extension 551974 1 pc	510217

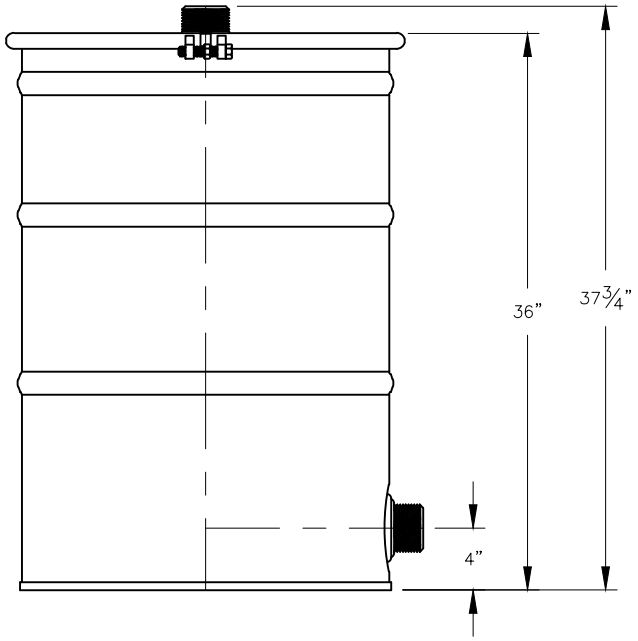
*As needed **Viewed looking at inlet/outlet ports ***Not currently in production; superseded by model listed below

EN656 **080058** **080059** **080060**
510629
120255
155170
511480
550195
251791
(10 pcs.) 551585
Not Used
See Next Page
510356
510357
510358
510359
Not Used
550305
120325
120203
Not Used
550249
(8 pcs) 155236
510355
Not Used
517436
517436
Not Used
Not Used
Not Used
Not Used
Not Used
Not Used
Not Used
Not Used
Not Used
Not Used
516587

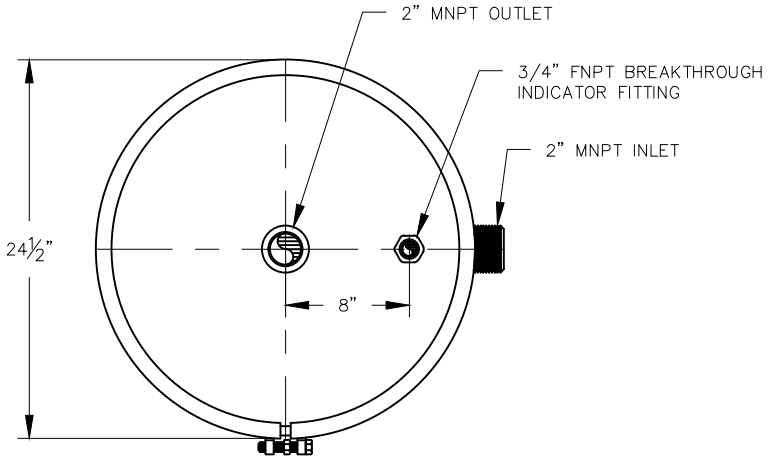
*As needed **Viewed looking at inlet/outlet ports ***Not currently in production; superseded by model listed below

Bearing, Impeller End (M2)
510217
510218
510217
510217
510218
510217
510218
510217
510218

*As needed **Viewed looking at inlet/outlet ports ***Not currently in production; superseded by model listed below



ELEVATION



PLAN

VESSEL STANDARDS

VESSEL MATERIALS : CARBON STEEL	VOLUME OF VESSEL : 7.5 FT^3
LINING : EPOXY PHENOLIC	STANDARD CARBON FILL : 175 LBS
EXTERIOR PAINT : ACRYLIC ALKYD ENAMEL	SHIP WEIGHT : 218 LBS
INTERNALS : STAINLESS STEEL SCREEN	MAXIMUM OPERATING PRESSURE : 6 PSIG
ADSORBENT OUTLET ASSEMBLY : REMOVABLE COVER	MAXIMUM OPERATING TEMPERATURE : 200°F
LIQUID DRAIN ASSEMBLY : N/A	

NO.	REVISION	BY	DATE
3	REMOVE DRAIN	JB	8/1/13
2	REVISE INLET ELEVATION	JB	11/2/06
1	REVISE TITLEBLOCK	JB	6/30/03

PROJECT

ECONOSORB-V

PROJ. NO. SALES

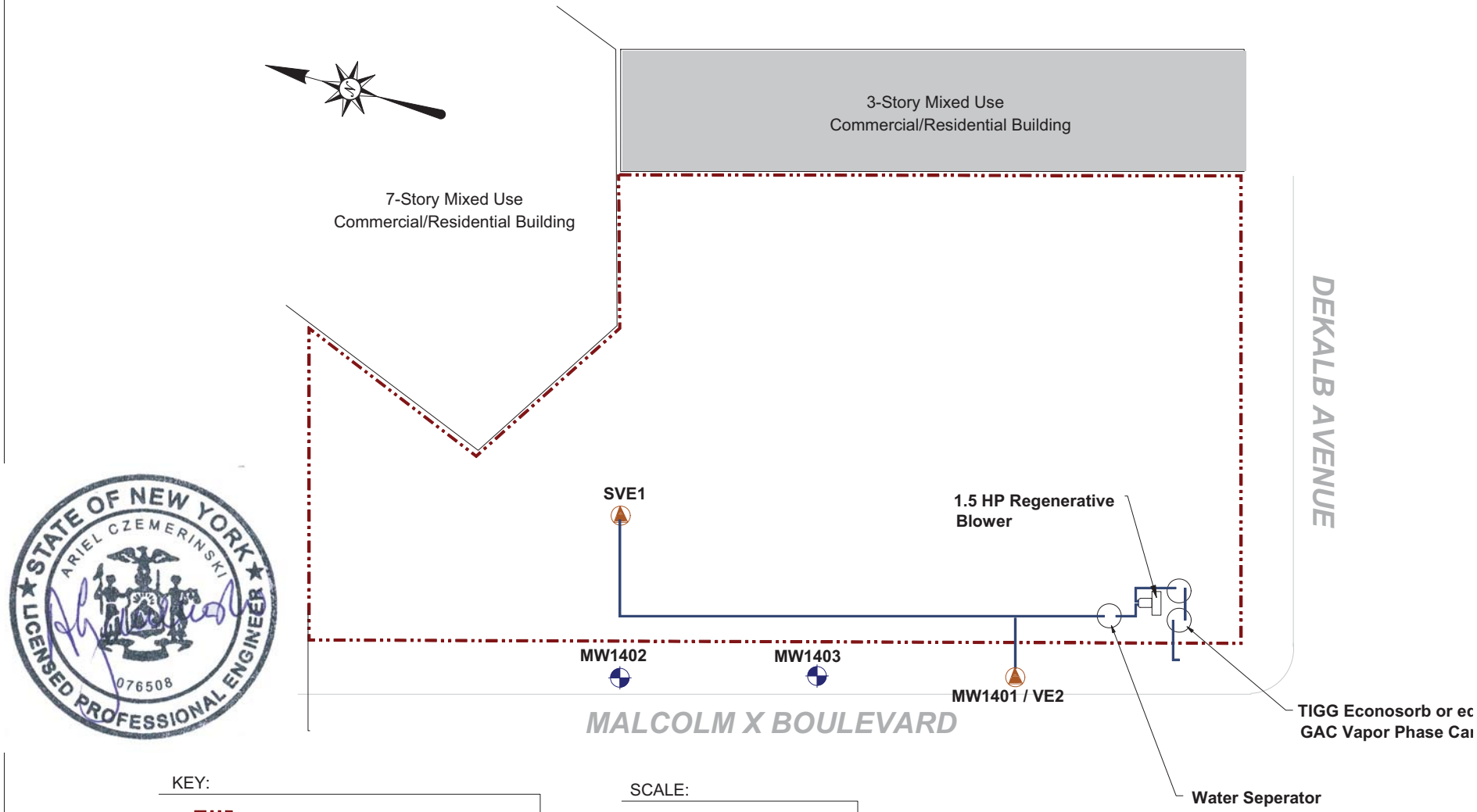
P.O. NO.

DRAWN BY	ZS
DESIGN BY	BL
CHKD. BY	BL
DATE	10/12/99
SCALE	NTS

TIGG corporation

PLAN & ELEVATION

DWG. NO. ECONOSORB-V-1001 REV. 3



STATE OF NEW YORK
ARIEL CZEMERINSKI
076508
LICENSED PROFESSIONAL ENGINEER

KEY:

- Site Boundary
- Monitoring Well
- Vapor Extraction Well

SCALE:

0 12.5 25

1 Inch = 25 feet

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

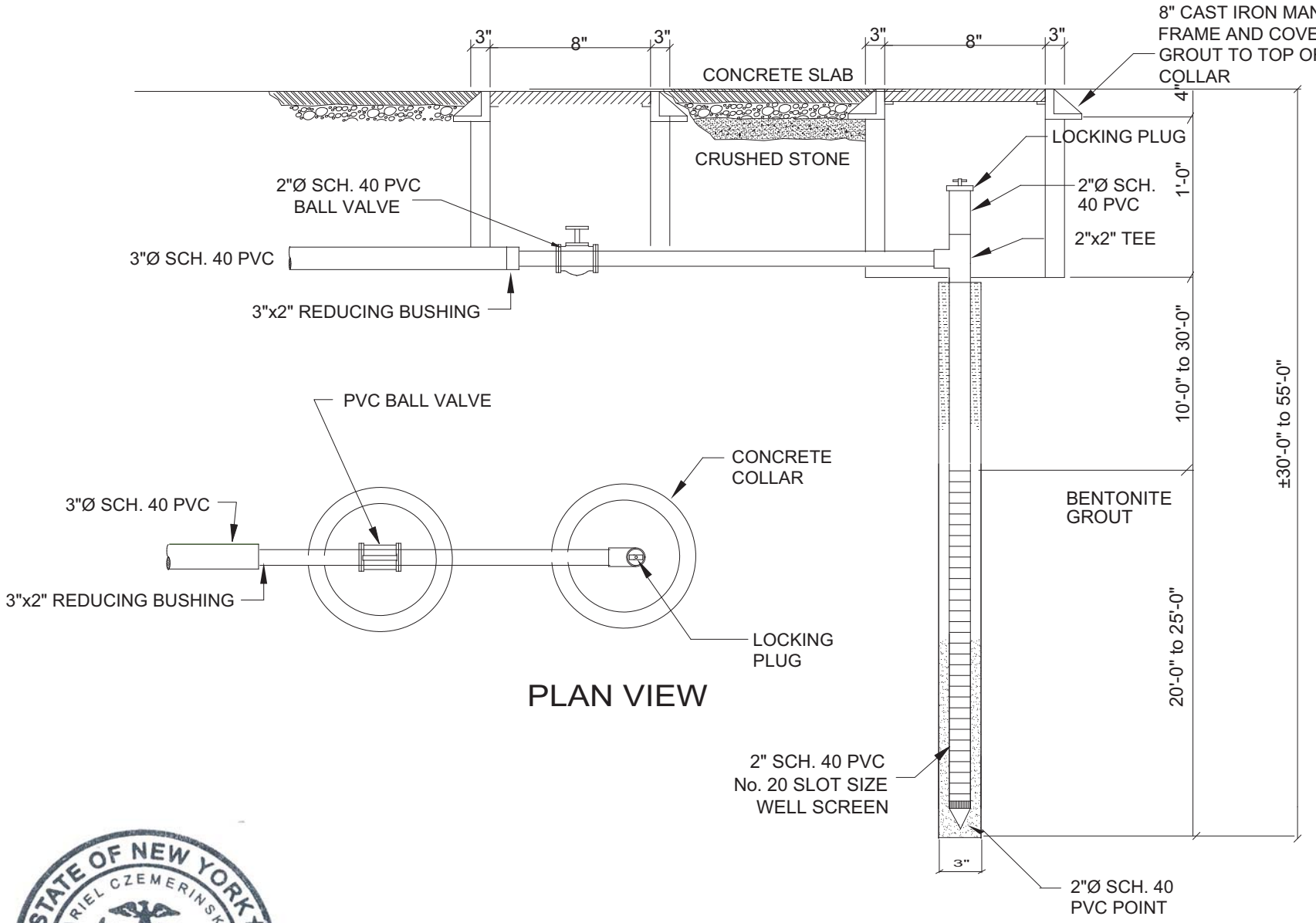
Figure No. **2**

Drawing Date: 10/17/19

Site Name: FORMER GETTY SERVICE STATION

Site Address: 1103-1107 DEKALB AVENUE, BROOKLYN, NY

Drawing Title: ENGINEERING CONTROLS - SVE SYSTEM



PLAN VIEW

VAPOR EXTRACTION WELL

N.T.S.

STATE OF NEW YORK
ARIEL CZEMERINSKI
076508
LICENSED PROFESSIONAL ENGINEER

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

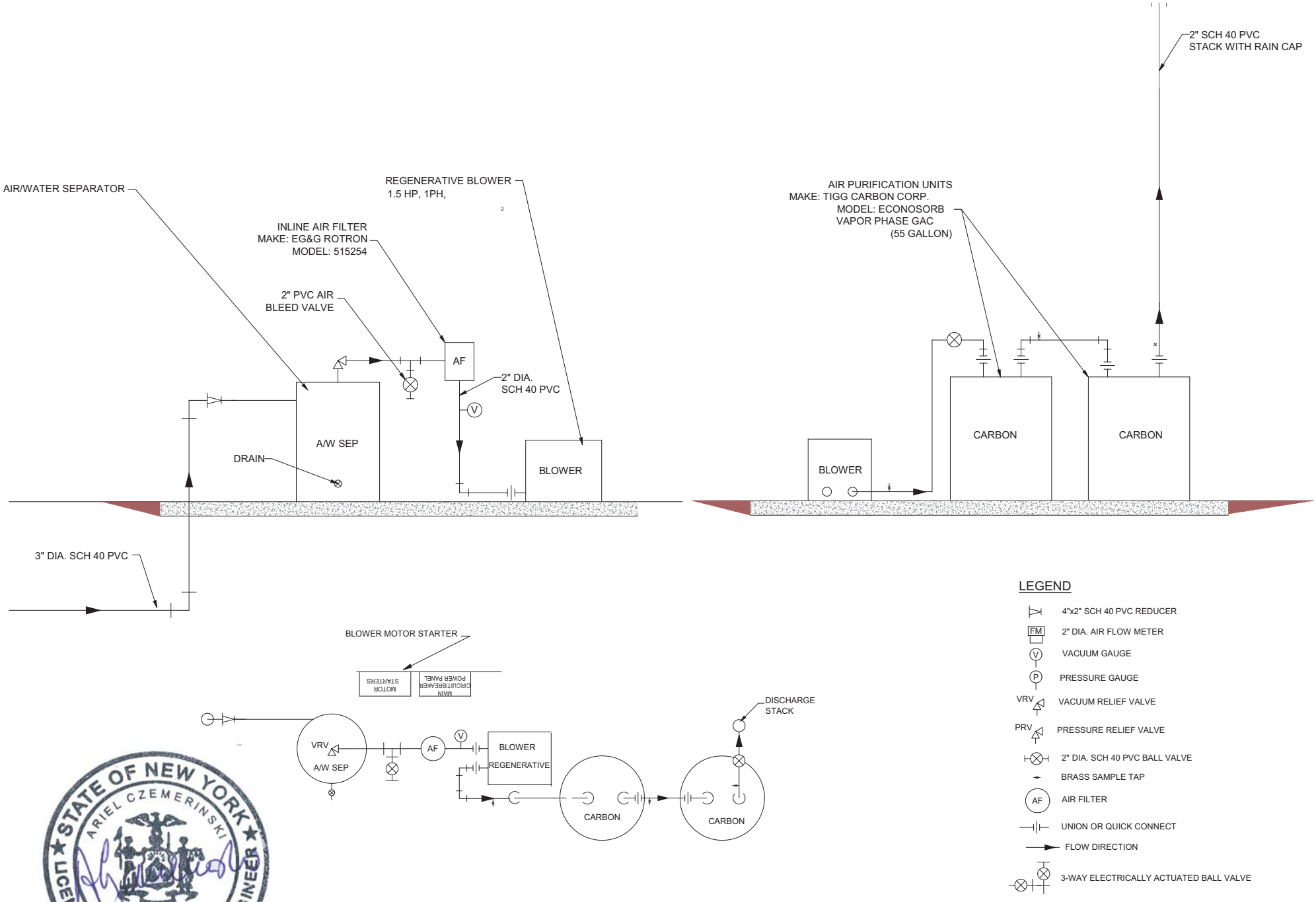
Figure No. **3**

Date: 10/17/19

Site Name: FORMER GETTY SERVICE STATION

Site Address: 1107 DEKALB AVENUE, BROOKLYN, NY

Drawing Title: SVE WELL DETAILS



LEGEND

- 4"x2" SCH 40 PVC REDUCER
- FM — 2" DIA. AIR FLOW METER
- V — VACUUM GAUGE
- P — PRESSURE GAUGE
- VRV — VACUUM RELIEF VALVE
- PRV — PRESSURE RELIEF VALVE
- 2" DIA. SCH 40 PVC BALL VALVE
- BRASS SAMPLE TAP
- AF — AIR FILTER
- UNION OR QUICK CONNECT
- FLOW DIRECTION
- 3-WAY ELECTRICALLY ACTUATED BALL VALVE

STATE OF NEW YORK
ARIEL CZEMERINSKI
076508
LICENSED PROFESSIONAL ENGINEER

AMC Engineeting, PLLC
18-36 42nd Street
Astoria, NY 11105

Figure No. **4**

Date: 10/17/19

Site Name: FORMER GETTY SERVICE STATION

Site Address: 1107 DEKALB AVENUE, BROOKLYN, NY

Drawing Title: SVE SYSTEM DETAIL

ATTACHMENT J
Remedial System Optimization
Table of Contents

REMEDIAL SYSTEM OPTIMIZATION FOR FORMER GETTY SERVICE STATION #00564

ATTACHMENT K
Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

FORMER GETTY SERVICE STATION #00564
1103-1107 DEKALB AVENUE
BROOKLYN, NY

FEBRUARY 2017

FORMER GETTY SERVICE STATION #00564

COMMUNITY AIR MONITORING PLAN
TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been prepared for use during activities that disturb the building slab/foundation, rear cellar level courtyard slab or at-grade concrete slab around the cellar level rear courtyard. The CAMP provides measures for protection for the on-site works and building occupants and downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the investigation activities) from potential airborne contaminant releases resulting from investigative activities at the site.

Compliance with this CAMP is required during all activities associated with drilling and sampling activities that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). These activities include drilling and soil and groundwater sampling. This CAMP has been prepared to ensure that investigation activities do not adversely affect passersby, residents, or workers in the area immediately surrounding the Site and to preclude or minimize airborne migration of investigation-related contaminants to off-site areas.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan as presented in DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC May 3, 2010). This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air;

- New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2.0 AIR MONITORING

Chlorinated volatile organic compounds (VOCs) and petroleum VOCs are the constituents of concern at the Site. The appropriate method to monitor air for these constituents during remediation activities is through real-time VOC and air particulate (dust) monitoring.

2.1 Meteorological Data

At a minimum, wind direction will be evaluated at the start of each workday, noon of each workday, and the end of each workday. These readings will be utilized to position the monitoring equipment in appropriate upwind and downwind locations.

2.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before activities begin. These points will be monitored periodically in series during the site work. When the drilling area is within 20 feet of potentially exposed populations or occupied structures, the perimeter monitoring points will be located to represent the nearest potentially exposed individuals at the downwind location.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor (or equivalent). Air will be monitored for VOCs with a portable Ionscience 3000 photoionization detector (PID), or equivalent. All air monitoring data will be documented in a site log book by the designated site safety officer. The site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan

3.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

Volatile organic compounds (VOCs) will be monitored within the work area and at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present.

The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report, as shown in Appendix A, will be completed.

3.1 Potential Corrective Measures and VOC Suppression Techniques

If the 15-minute integrated VOC level at the downwind location persists at a concentration that exceeds the upwind level by more than 5 ppm but less than 25 ppm during remediation activities, then vapor suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive organic vapors:

- Collection of purge water in covered containers;
- storage of excess sample and drill cuttings in drums or covering with plastic

4.0 PARTICULATE MONITORING

Air monitoring for particulates (i.e., dust) will be performed continuously during drilling activities using both air monitoring equipment and visual observation at upwind and downwind locations. Monitoring equipment capable of measuring particulate matter smaller than 10 microns (PM_{10}) and capable of integrating (averaging) over periods of 15 minutes or less will be set up at upwind (i.e., background) and downwind locations, at heights approximately four to five feet above land surface (i.e., the breathing zone). Monitoring equipment will be MIE Data Ram monitors, or equivalent. The audible alarm on the particulate monitoring device will be set at 90 micrograms per cubic meter ($\mu g/m_3$). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 $\mu g/m^3$ above background. The monitors will be calibrated at least once per day prior to work activities and recalibrated as needed thereafter. In addition, fugitive dust migration will be visually assessed during all intrusive work activities.

The following summarizes particulate action levels and the appropriate responses:

- If the downwind PM-10 particulate level is 100 $\mu g/m^3$ greater than background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work must be stopped and an evaluation of activities initiated. Work can resume provided that dust suppression measures (as described in Section 2.3.1 below) and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report as shown in **Appendix A** will be completed.

4.1 Potential Particulate Suppression Techniques

If the integrated particulate level at the downwind location exceeds the upwind level by more than 100 $\mu g/m_3$ at any time during drilling activities, then dust suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive dusts:

- Placement of drill cuttings in drums or covering stockpiles with plastic;
- Misting of the drilling area with a fine water spray from a hand-held spray bottle

Work may continue with dust suppression techniques provided that downwind PM_{10} levels are not more than 150 $\mu g/m^3$ greater than the upwind levels.

There may also be situations where the dust is generated by drilling activities and migrates to downwind locations, but is not detected by the monitoring equipment at or above the action level. Therefore, if dust is observed leaving the working area, dust suppression techniques such as those listed above will be employed.

If dust suppression techniques do not lower particulates to below 150 $\mu g/m^3$, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review.

5.0 DATA QUALITY ASSURANCE

5.1 Calibration

Instrument calibration shall be documented on instrument calibration and maintenance sheets or in the designated field logbook. All instruments shall be calibrated as required by the manufacturer. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

5.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the SSO for reference.

5.3 Data Review

The SSO will interpret all monitoring data based the established criteria and his/her professional judgment. The SSO shall review the data with the PM to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the PM.

6.0 RECORDS AND REPORTING

All air readings must be recorded on daily air monitoring log sheets and made available for review by personnel from NYSDEC and NYSDOH.

Daily Air Monitoring Log

Project Name: Former Getty Service Station #00564 Date: _____

Project Location: 1103-1107 Dekalb Avenue, Brooklyn, NY BCP No: C224176

Temperature:_____ Wind Speed:_____ Wind Direction:_____

Background Data: Upwind - PID _____ppm Dust Meter 1 - _____mg/m^3

Downwind - PID _____ppm Dust Meter 2 - _____mg/m^3

Time	Work Zone		Upwind		Downwind	
	PID - ppm	Dust - mg/m^3	PID - ppm	Dust - mg/m^3	PID - ppm	Dust - mg/m^3

Activities Performed: