# Former Brighton Cleaners

**KINGS, NEW YORK**

# Site Management Plan

**NYSDEC Site Number: C224157**

**Prepared for:**
3140 Coney Island Realty, LLC
3061 Brighton 6th Street
Brooklyn, NY 11235

**Prepared by:**
P.W. Grosser Consulting Engineer & Hydrogeologist, P.C.
630 Johnson Avenue, Suite 7
Bohemia, NY 11716
631-589-6353

**Revisions to Final Approved Site Management Plan:**

| Revision # | Submitted Date | Summary of Revision | DEC Approval Date |
|---|---|---|---|
| 1 | October 6, 2017 | Removal of carbon treatment, reduction in vapor sampling frequency | |
| | | | |
| | | | |
| | | | |

**OCTOBER 2017**

# TABLE OF CONTENTS

TABLE OF CONTENTS ..... II
LIST OF TABLES ..... V
LIST OF FIGURES ..... VI
LIST OF APPENDICES ..... VII
CERTIFICATION ..... VIII
ES EXECUTIVE SUMMARY ..... 2
SITE MANAGEMENT PLAN ..... 5
1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM ..... 5
1.1 Introduction ..... 5
1.1.1 General ..... 5
1.1.2 Purpose ..... 6
1.1.3 Revisions ..... 7
1.2 Site Background ..... 7
1.2.1 Site Location and Description ..... 7
1.2.2 Site History ..... 7
1.2.3 Geologic Conditions ..... 8
1.3 Summary of Remedial Investigation Findings ..... 10
1.3.1 Soil ..... 10
1.3.2 Site-Related Groundwater ..... 11
1.3.3 Site-Related Soil Vapor Intrusion ..... 11
1.3.4 Underground Storage Tanks ..... 12
1.4 Summary of Remedial Actions ..... 12
1.4.1 Removal of Contaminated Materials from the Site ..... 13
1.4.2 Site-Related Treatment Systems ..... 14
1.4.3 Remedial Action Objectives ..... 15
1.4.4 Remaining Contamination ..... 16
2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN ..... 20
2.1 Introduction ..... 20
2.1.1 General ..... 20
2.1.2 Purpose ..... 20
2.2 Engineering Controls ..... 21
2.2.1 Engineering Control Systems ..... 21
2.2.1.1 Composite Cover ..... 21
2.2.1.2 Soil Vapor Extraction System ..... 21
2.2.1.3 Sub-Slab Depressurization System ..... 22
2.2.1.4 ISCO ..... 23
2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems 24
2.2.2.1 Composite Cover System ..... 24
2.2.2.2 Soil Vapor Extraction System [SVE System] ..... 24
2.2.2.3 Sub-slab Depressurization System [SSDS] ..... 24
2.2.2.4 Groundwater Monitoring Activities ..... 25
2.3 Institutional Controls ..... 25

2.3.1 Excavation Work Plan ..... 26
2.3.2 Soil Vapor Intrusion Evaluation ..... 27
2.4 Inspections and Notifications ..... 28
2.4.1 Inspections ..... 28
2.4.2 Notifications ..... 29
2.5 Contingency Plan ..... 30
2.5.1 Emergency Telephone Numbers ..... 30
2.5.2 Map and Directions to Nearest Health Facility ..... 31
2.5.3 Response Procedures ..... 33
3.0 SITE MONITORING PLAN ..... 34
3.1 Introduction ..... 34
3.1.1 General ..... 34
3.1.2 Purpose and Schedule ..... 34
3.2 Composite Cover System Monitoring ..... 36
3.3 Media Monitoring Program ..... 36
3.3.1 Groundwater Monitoring ..... 36
3.3.1.1 Sampling Protocol ..... 37
3.3.1.2 Monitoring Well Repairs, Replacement And Decommissioning ..... 38
3.3.2 Vapor Monitoring ..... 38
3.3.2.1 Sampling Protocol ..... 39
3.3.2.2 Monitoring Well Repairs, Replacement And Decommissioning ..... 39
3.4 Site-Wide Inspection ..... 40
3.5 Monitoring Quality Assurance/Quality Control ..... 40
3.6 Monitoring Reporting Requirements ..... 41
4.0 OPERATION AND MAINTENANCE PLAN ..... 44
4.1 Introduction ..... 44
4.2 Engineering Control System Operation and Maintenance ..... 44
4.2.1 Soil Vapor Extraction System ..... 44
4.2.1.1 Scope ..... 45
4.2.1.2 System Start-Up and Testing ..... 46
4.2.1.3 System Operation: Routine Operation Procedures ..... 46
4.2.1.4 System Operation: Routine Equipment Maintenance ..... 47
4.2.1.5 System Operation: Non-Routine Equipment Maintenance ..... 48
4.3 Engineering Control System Performance Monitoring ..... 48
4.3.1 ISCO Monitoring and Re-Treatment ..... 48
4.3.1.1 Monitoring Schedule ..... 49
4.3.1.2 General Equipment Monitoring ..... 49
4.3.1.3 System Monitoring Devices and Alarms ..... 49
4.3.1.4 Sampling Event Protocol ..... 49
4.3.2 SVE System / SSDS Introduction ..... 49
4.3.2.1 SVE System / SSDS Monitoring Schedule ..... 50
4.3.2.2 SVE System / SSDS General Equipment Monitoring ..... 50
4.3.2.3 SVE System / SSDS System Monitoring Devices and Alarms ..... 50
4.3.2.4 SVE System / SSDS Sampling Event Protocol ..... 51
4.4 Maintenance and Performance Monitoring Reporting Requirements ..... 51
4.4.1 Routine Maintenance Reports ..... 51

4.4.2 Non-Routine Maintenance Reports ..... 52
5.0 INSPECTIONS, REPORTING AND CERTIFICATIONS ..... 53
5.1 Site Inspections ..... 53
5.1.1 Inspection Frequency ..... 53
5.1.2 Inspection Forms, Sampling Data, and Maintenance Reports ..... 53
5.1.3 Evaluation of Records and Reporting ..... 53
5.2 Certification of Engineering and Institutional Controls ..... 54
5.3 Periodic Review Report ..... 55
5.4 Corrective Measures Plan ..... 56

# LIST OF TABLES


| | |
|---|---|
| Table 1 | Remedial Investigation Soil Contamination Summary |
| Table 2 | Remedial Investigation Groundwater Contamination Summary |
| Table 3 | Remedial Investigation Soil Vapor Data |
| Table 4 | Soil Cleanup Objectives for the Site |
| Table 5 | Summary of Remaining Soil Contamination Above Unrestricted Levels and Restricted Residential Levels |
| Table 6 | Summary of Groundwater Contamination Following Remedy |
| Inline Table 1 | Emergency Contact Numbers (Section 2.5.1) |
| Inline Table 2 | Other Contact Numbers (Section 2.5.1) |
| Inline Table 3 | Monitoring/Inspection Schedule (Section 3.1.2) |
| Inline Table 4 | Schedule of Monitoring/Inspection Reports (Section 3.6) |

# LIST OF FIGURES


| | |
|---|---|
| Figure 1 | Site Vicinity Map |
| Figure 2 | Figure of Site and Site Boundaries |
| Figure 3 | Surrounding Land Use |
| Figure 4 | Historic Site Plan |
| Figure 5A | Geologic Cross Section(s) |
| Figure 5B | Geologic Cross Section(s) |
| Figure 6 | Groundwater Flow Figure |
| Figure 7 | Pre-IRM Soil Contamination Summary |
| Figure 8 | Pre-IRM Groundwater Contamination Summary |
| Figure 9 | Pre-IRM Soil Vapor Data |
| Figure 10 | Extent of Remedial Excavation Performed |
| Figure 11 | Contour Map of Fill Thickness |
| Figure 12 | Location of Remaining Soil Contamination Above Unrestricted and Restricted Residential Levels |
| Figure 13 | Groundwater Spider Diagram |
| Figure 14 | Location of Composite Cover System Types |
| Figure 15 | Construction Membrane Location |
| Figure 16 | Area of Soil Vapor Intrusion Concern |
| Figure 17 | Map of Route from Site to Hospital |
| Figure 18 | Groundwater Monitoring Well Network |
| Figure 19 | Baseline Post-Remediation Groundwater Quality |
| Figure 20 | Vacuum Monitoring Points |
| Figure 21 | Truck Transport Routes |
| Figure 22 | CAMP Monitoring Locations |

# LIST OF APPENDICES

Appendix A Environmental Easement

Appendix B Metes and Bounds

Appendix C EC As-Built Drawings

Appendix D Excavation Work Plan

Appendix E Construction Membrane Manufacturer Cut Sheets

Appendix F Health and Safety Plan and Community Air Monitoring Plan

Appendix G Monitoring Well Construction Logs

Appendix H Groundwater Monitoring Well Sampling Log Form

Appendix I System Performance Logs

Appendix J Site-wide Inspection Form

Appendix K Quality Assurance Project Plan

Appendix L EC System Component Manual(s), System Inspection Checklist(s), Trouble Shooting Guide, and Maintenance Schedules

# CERTIFICATION

I, Paul K. Boyce, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 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).

PAUL K. BOYCE, P.E.

Name

074604

PE License Number

Paul Boyce

Signature

10.06.17

Date

PE Stamp



# ES 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 # C224157, 3140 Coney Island Ave, Brooklyn, NY |
| Institutional Controls: | 1. The property may be used for restricted residential use; |
| | 2. All ECs must be inspected at a frequency and in a manner defined in the SMP. |
| | 3. Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns; |
| | 4. Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns; |
| | 5. All Engineering Controls must be operated and maintained as specified in this SMP; |
| | 6. Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in this SMP; |
| | 7. Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP; |
| | 8. The property may not be used for a higher level of use, such as unrestricted use without additional remediation and amendment of the Environmental Easement, as approved by the NYSDEC; |
| | 9. All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with this SMP; |

Site Identification: Site # C224157, 3140 Coney Island Ave, Brooklyn, NY

| | |
|---|---|
| | 10. The use of the groundwater underlying the property is prohibited without treatment rendering it safe for intended use; |
| | 11. Vegetable gardens and farming on the property are prohibited; |
| | 12. The Site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable. |
| | 13. Excavation Work Plan |
| | 14. Soil Vapor Intrusion Evaluation |
| Engineering Controls: | 1. Cover system |
| | 2. Soil Vapor Extraction System |
| | 3. Sub-Slab Depressurization System |
| | 4. In-Situ Chemical Oxidation Injections |

| Inspections: | Frequency |
|---|---|
| 1. Cover inspection | Annually |
| 2. Groundwater, Vapor, and ISCO Monitoring Well Repairs, Replacement, and Decommissioning | Annually |
| 3. Vacuum Monitoring Wells | Quarterly |

Site Identification: Site # C224157, 3140 Coney Island Ave, Brooklyn, NY

| | |
|---|---|
| Monitoring: | |
| 1. Groundwater Monitoring and Sampling | Quarterly |
| 2. SVE System Influent and Effluent Sampling, System Operational Data | Annual |
| 3. SSDS Effluent Sampling | Annual |
| Maintenance: | |
| 1. Blower maintenance | Quarterly |
| Reporting: | Quarterly |
| 1. Status Reports containing SVE system and analytical data and groundwater analytical data | Quarterly |
| 2. Inspection Reports and Certifications | Annually |

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

# SITE MANAGEMENT PLAN

## 1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

### 1.1 Introduction

This document is required as an element of the remedial program at the Former Brighton Cleaners Site (hereinafter referred to as the "Site") under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The Site was remediated in accordance with the Brownfield Cleanup Agreement #C224157-03-12, Site #C224157, which was executed on April 12, 2012.

#### 1.1.1 General

3140 Coney Island Realty, LLC entered into a BCA with the NYSDEC to remediate a 0.1 acre property located in Kings County in Brooklyn, New York. This BCA required the Remedial Party, 3140 Coney Island Realty, LLC, to investigate and remediate contaminated media at the Site. A vicinity map is included as **Figure 1**. A figure showing the Site location and boundaries of this 0.1-acre Site is provided in **Figure 2**. The boundaries of the Site are more fully described in the metes and bounds site description that is part of the Environmental Easement included as **Appendix A**.

After completion of the remedial work described in the Remedial Action Work Plan, some contamination was left in the subsurface at this Site, which is hereafter referred to as 'remaining contamination." This Site Management Plan (SMP) was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

This SMP was prepared by P.W. Grosser Consulting Engineer and Hydrogeologist, P.C., on behalf of 3140 Coney Island Realty, LLC, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and

Remediation, dated May 2010, and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the Environmental Easement for the Site.

### 1.1.2 Purpose

The Site contains contamination left after completion of the remedial action. Engineering Controls have been incorporated into the Site remedy to control exposure to remaining contamination during the use of the Site to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Kings County Clerk, will require compliance with this SMP and all ECs and ICs placed on the Site. The ICs place restrictions on Site use, and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement for contamination that remains at the Site. 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 the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination at the Site after completion of the Remedial Action, including: (1) implementation and management of all Engineering and Institutional Controls; (2) media monitoring; (3) operation and maintenance of all treatment, collection, containment, or recovery systems; (4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports; and (5) defining criteria for termination of treatment system operations.

To address these needs, this SMP includes three plans: (1) an Engineering and Institutional Control Plan for implementation and management of ECs/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual for complex systems).

This plan also includes a description of Periodic Review Reports for the periodic submittal of data, information, recommendations, and certifications to 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 C224157-03-12, Site #C224157) for the Site, and thereby subject to applicable penalties.

### 1.1.3 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. In accordance with the Environmental Easement for the Site, the 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.

## 1.2 Site Background

### 1.2.1 Site Location and Description

The site is located in the Brighton Beach section of Kings County of Brooklyn, New York and is identified as Block 8678 and Lot 64 on the New York City Tax Map. The Site is an approximately 0.1-acre area bounded by an apartment building to the north, an apartment building to the south, Coney Island Avenue to the east, and a single family residence and vacant lot to the west (see **Figure 3**). The boundaries of the site are more fully described in **Appendix B** – Metes and Bounds.

### 1.2.2 Site History

The Site was formerly improved with a one-story commercial building with a basement and a metal shed in the rear yard, which were demolished in 2009. The building was used as a dry cleaning facility and was run by Brighton Cleaners. PWGC reviewed the Sanborn Fire Insurance Maps which revealed that operations within the building consisted of cleaning and dyeing from 1950 to 2007. A 1930 Sanborn map shows the building use as a market and 1895 through 1906 Sanborn maps reveal that the Site was also used as part of a horse racing track. The Site's historic usage as a dry cleaning facility led to the introduction of PCE into the subsurface, specifically in the western side of the Site. The former dry cleaning machine was reportedly located in the southern section of the Site near the rear of the former building as shown on **Figure 4**. In addition, a 1,100 gallon fuel oil UST was located in the northwest corner of the Site.

PWGC is unaware of a Phase I report prepared for the Site. A Phase II Environmental Site Assessment was conducted by Associated Environmental Services (AES) in September 2007. The investigation revealed the presence of chlorinated solvents, such as tetrachloroethene (PCE), and petroleum compounds in on-Site soil and groundwater, with the highest extent of contamination in the western section of the Site. AES then performed a remedial investigation in January 2010 to further investigate the western section of the Site, including collecting groundwater samples at varying depths below the water table, and to investigate the down-gradient groundwater off-Site. AES also performed a supplemental remedial investigation (SRI) in April 2011 which included the installation of four on-Site monitoring wells. PWGC then performed a SRI in July through October 2012 which included collecting additional soil samples, installation of two vertical profile borings and groundwater sampling, installation of a multi-level well, installation of four additional monitoring wells, performing a tidal investigation, waste characterization, and collection of soil vapor samples.

### 1.2.3 Geologic Conditions

The geologic setting of Long Island is well documented and consists of crystalline bedrock composed of schist and gneiss overlain by layers of unconsolidated deposits. Immediately overlying the bedrock is the Raritan Formation, consisting of the Lloyd sand confined by the Raritan Clay Member. The Lloyd sand is an aquifer and consists of discontinuous layers of gravel, sand, sandy and silty clay, and solid clay. The Raritan Clay is a solid and silty clay with few lenses of sand and gravel, abundant lignite and pyrite, and gray, red, or white in color.

Above the Raritan Clay lies the Magothy Formation. The Magothy Aquifer consists of layers of fine to coarse sand of moderate to high permeability with inter-bedded lenses of silt and clay of low permeability resulting in areas of preferential horizontal flow. Therefore, this aquifer generally becomes more confined with depth. The Magothy Aquifer is overlain by the Jameco and Upper Glacial Aquifer systems. The Upper Glacial Aquifer is the water table aquifer at this location and is comprised of medium to coarse sand and gravel with occasional thin lenses of fine sand and brown clay. This aquifer extends from the land surface to the top of the Magothy and, therefore, is hydraulically connected to the Magothy Aquifer.

The Site is located on the peninsula of Coney Island, which was once a barrier island, but has since been connected to the mainland of Brooklyn by landfill. The Site is located within the Pavement & Buildings-Hooksan-Verrazano complex, 0 to 8 percent

slopes, which is described as "nearly level to gently sloping urbanized areas of sandy sediments that have been substantially cut and filled mostly for residential use; a mixture of sandy soils and loamy-capped anthropogenic soils, with up to 80 percent impervious pavement and buildings covering the surface; located along the southern shorelines of Brooklyn and Queens."

The Site is located over the Long Island aquifer system, which underlies all of Nassau, Suffolk, Kings (Brooklyn), and Queens Counties. The unconsolidated aquifer formations form a southward-dipping wedge that attains a maximum thickness in Kings County about eight-hundred (800) feet in the southeast area of Brooklyn. Overlying bedrock in the area is the Lloyd, Magothy, Jameco, and Upper Glacial aquifer systems. The Upper Glacial aquifer overlies all underlying units and is found at the surface in nearly all of Kings and Queens Counties. Portions of the Upper Glacial aquifer, which contain a generally thin soil mantle of Holocene age, make up most of the Rockaway Peninsula and Coney Island.

The Site overlies an interconnected aquifer system consisting of the upper glacial deposits and the underlying Magothy Formation. Depth to groundwater in the underlying glacial aquifer is approximately 9 to 10 feet below sidewalk grade. The lithologic description of the sediments from soil borings installed during previous investigations at the Site and through soil excavations conducted during implementation of the IRM and RAWP identifies the materials as fill material to approximately five feet below grade underlain by layers of fine to medium silty sands and silt. In the eastern section of the Site, the fill material extends deeper to the depth of the former basement which is approximately 6 to 7 feet below sidewalk grade.

A thin clay/peat layer was observed in several borings across the Site. The layer appears to be approximately 0.5 to 1 foot thick and is observed at approximately 9.5 feet below grade. This clay/peat layer may have acted as a retardant to dense non-aqueous phase liquid (DNAPL) and dissolved VOC flow to deeper groundwater depths.

A geologic section up to a depth of 12 feet below sidewalk grade is shown in **Figures 5A** and **5B**.

A groundwater flow figure is shown in **Figure 6**.

## 1.3 Summary of Remedial Investigation Findings

A Remedial Investigation (RI) was performed to characterize the nature and extent of contamination at the Site. The results of the RI are described in detail in the following reports:

- RI Report, AES, February 12, 2010.
- SRI Report, AES, September 14, 2011.
- SRI and IRM Report, PWGC, June 3, 2013.

Generally, the RI and SRIs determined that there was impact to the soil, groundwater, and soil vapor. Pure or spent PCE was likely discharged in the rear (western section) of the property to surface soils. The PCE travelled deeper through the soil due to the force of gravity until the groundwater and clay/peat layer was encountered at approximately 10 feet below grade. Once in the groundwater, the PCE travelled further laterally, generally in the down-gradient direction, as well as deeper and dissolved into the groundwater, although vertical dispersion was hampered by the thin clay/peat layer. As the PCE travelled through the soil and groundwater, dechlorination of the contaminant resulted in the production of daughter products such as TCE, DCE, and vinyl chloride. Off-gassing from the contaminants in the groundwater and in the soil resulted in elevated chlorinated solvents in soil vapor samples. Contaminants have migrated off-Site in soil, groundwater, and soil vapor.

In addition to the chlorinated solvent contamination, a fuel oil UST in the northwestern section of the Site contained several corrosion holes which allowed fuel oil to leak from the UST into the soil. The fuel oil contaminants travelled deeper into the soil due to the force of gravity until the groundwater was encountered. Once in the groundwater, the fuel oil travelled laterally, generally in the down-gradient direction, and dissolved in the groundwater.

Below is a summary of site conditions when the RIs and SRIs were performed in 2007, 2010, 2011, and 2012.

### 1.3.1 Soil

Prior to the IRM, the Site topography was generally flat and surface soils were at the sidewalk level. Based upon the RI and SRI results, the majority of VOC contaminants were located in the western section of the Site and consisted of chlorinated solvents and petroleum compounds. PCE concentrations in the soil were observed as

high as 3,400,000 µg/kg which indicated that there was likely small amounts of free phase product in the sample; the daughter contaminant concentrations were generally significantly lower. A spider diagram of soil samples collected prior to the remedy is included as **Figure 7**. **Table 1** contains the soil analytical results from the RIs and SRIs.

### 1.3.2 Site-Related Groundwater

Based upon a review of the field observations and measurements and of the analytical data generated as part of the RI and IRM, the following conditions currently exist at the Site:

- The static water table elevation at the Site is approximately 9.5 feet below sidewalk grade.
- Regional groundwater flow direction in this area is likely south towards the Atlantic Ocean; however, calculations of the groundwater flow direction have been inconsistent and may result from differences in areas of exposed soil and stone during the Site redevelopment period affecting rainwater infiltration rates.
- Based upon RI and SRI results, it appears that PCE impact extends laterally across the Site in a down-gradient direction, as well as deeper into the groundwater. PCE concentrations in the groundwater were observed as high as 340,000 µg/L in MW-2 which is close to the expected source of contamination; the degradation compounds DCE, TCE, 1,2-Dichloroethane, and vinyl chloride, as well as petroleum compounds benzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-Butanone were also in excess of AWQS.
- Minor chlorinated volatile organic compound (CVOC) groundwater impact was observed in two of three temporary groundwater samples collected at the neighboring property south of the Site and minor petroleum impact indicative of a gasoline spill was identified in two temporary groundwater sampling locations further down-gradient of the Site which is unlikely to be related to Site activities.

A spider diagram of groundwater samples collected prior to the remedy is included as **Figure 8**. **Table 2** contains the groundwater analytical results from the RIs and SRIs.

### 1.3.3 Site-Related Soil Vapor Intrusion

Five soil vapor points were installed on and off-Site, sampled, and analyzed. Elevated concentrations of PCE and its breakdown products were observed in each of the

four on-Site soil vapor locations at concentrations indicating that mitigation of soil vapor is required, as per the New York State Department of Health (NYSDOH) October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York Soil Vapor / Indoor Air Matrices. The off-Site sample collected south of the subject property contained elevated concentrations of numerous VOCs; however, concentrations were significantly less than the on-site samples and did not require mitigation.

A spider diagram of soil vapor samples collected prior to the remedy is included as **Figure 9**. **Table 3** contains the soil vapor analytical results from the RIs and SRIs.

### 1.3.4 Underground Storage Tanks

An 1,100 gallon fuel oil UST was excavated from the northwestern section of the Site as shown on **Figure 4** in October 2012 during the installation of soldier beams in preparation of the IRM excavation. PWGC inspected the UST and identified several corrosion holes throughout the UST, ranging from pinhole sized to 10 millimeters long and a 30 millimeter tear at the top of one of the UST end seams. The UST was disposed of at Mid Island Salvage Corporation in Deer Park, NY.

## 1.4 Summary of Remedial Actions

The Site was remediated in accordance with the NYSDEC-approved IRM Work Plan dated June 22, 2012, the IRM Addendum dated January 14, 2013, the RAWP dated October 23, 2013, the SRI Addendum and Design Criteria Report dated March 3, 2014, and the RAWP Addendum dated April 21, 2014.

The following is a summary of the Remedial Actions performed at the Site:

1. Excavation of soil/fill exceeding commercial use SCOs listed in Table 1, to the depth of the groundwater (approximately 9 to 10 feet);
2. Two applications of chemical oxidants were introduced to the subsurface soils and groundwater to further reduce soil contaminants.
3. Construction of a Soil Vapor Extraction (SVE) system to remove sub-surface vapors and further remediate soil conditions. The SVE system will later be converted to a sub-slab depressurization system (SSDS) when Site conditions no longer require the use of a SVE system.

4. Construction and maintenance of a soil cover system consisting of 6 inch thick concrete slabs beneath the cellar floor and first floor and concrete slabs in the rear parking lot and driveway to prevent human exposure to remaining contaminated soil/fill remaining at the Site;

5. Execution and recording of an Environmental Easement to restrict land use and prevent future exposure to any contamination remaining at the Site.

6. Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;

Remedial activities were completed at the Site in November 2015.

### 1.4.1 Removal of Contaminated Materials from the Site

Contaminated materials were removed from the Site during the IRM and RAWP implementations.

During IRM activities, the majority of soils impacted with PCE at concentrations greater than Commercial Use SCOs were removed and disposed of at Biogenie in Canada. A total of 596.55 tons of hazardous soils were removed from the western section of the Site during the IRM implementation. In addition, a fuel oil UST was excavated and removed from the Site.

During the Remedial Action, a hot-spot excavation was conducted in the vicinity of the utility pole in the western section of the Site to a depth of 9 feet below sidewalk grade, where groundwater was encountered. Additional soil was removed during the RAWP implementation for construction activities. Soils in the western and center section of the Site were disposed of as hazardous soils at Biogenie in Canada and soils in the eastern section of the Site were disposed of at Conestoga landfill in Morgantown, PA. An additional 430.14 tons of hazardous soils were disposed of at Biogenie for a total of 1,026.69 tons of hazardous soil disposal for this project. There were 241.34 tons of non-hazardous soils disposed of at Conestoga landfill. A small hot-spot of lead impacted soils was identified in the eastern section of the Site. Two 55 gallon drums of hazardous lead were generated and transported to Triumvarate Environmental for disposal. Waste manifests for the soil disposal are included in the FER.

Dewatering at the Site was not required and no additional structures were uncovered at the Site during construction.

A list of the soil cleanup objectives (SCOs) for the primary contaminants of concern (COCs) and applicable land use for this Site is provided in **Table 4** along with other SCOs relevant to this project. The SCOs for the Site are Restricted Residential. Soil removal was conducted for soils with concentrations greater than Commercial Use SCOs. For soils exceeding Restricted Residential SCOs, but less than Commercial Use SCOs, additional means of remediation, such as ISCO injections and installation of a SVE system, were conducted and continue to be conducted to further remediate soils towards Restricted Residential SCOs.

A figure showing areas where excavation was performed following the IRM and RAWP implementations and construction is shown in **Figure 10** and areas of backfill are shown on **Figure 11**.

### 1.4.2 Site-Related Treatment Systems

To reduce the volume of soil and soil vapor impact and to stabilize plume migration and mitigate potential vapor migration into the on-Site building, a soil vapor extraction (SVE) system was constructed. The SVE system was designed to physically remove volatile compounds in a vapor phase from the unsaturated zone. It is an in-situ process employing vapor extraction wells where a blower is utilized to create a negative pressure gradient that causes movement of vapors toward the extraction laterals. The volatile constituents are readily removed from the subsurface through the SVE laterals. The extracted volatile compounds are then discharged to the atmosphere or treated with granulated activated carbon (GAC) if concentrations exceed air emission requirements. The NYSDEC will be petitioned to bypass the GAC drum once concentrations in the influent air stream have decreased to acceptable concentrations. The SVE system was designed and installed in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

The SVE as-built drawings are included as **Appendix C**. A total of six 4 inch diameter SVE laterals wrapped in non-woven geotextile were installed approximately 4 feet below sidewalk level: four 20 slot PVC laterals laid north-south across the site and two steel laterals, with 3/8 inch diameter holes drilled into the sides of the steel pipes

every 3 inches, laid east-west by two concrete footings. Valves were installed for each lateral to operate as needed. The laterals were manifolded together and piped up to the roof to a moisture separator, through the 5 HP blower, then to granulated activated carbon (GAC) units (use of the GAC units was discontinued in August 2017), and then out of an effluent stack that discharges 8 feet above the roof of the building.

When SVE influent concentrations were within allowable discharge limits as set forth in 6 NYCRR Part 212, the NYSDEC was petitioned to allow the effluent air to bypass carbon treatment which was granted by NYSDEC in July 2017. Based upon acceptable analytical results of the soil, groundwater, and influent soil vapor stream, the NYSDEC will be petitioned to allow conversion of the SVE system to a SSDS. Bypassing the carbon and conversion to a SSDS will be further discussed in Section 4.

In addition to the SVE system installed, in-situ chemical oxidant (ISCO) injections in select areas of the Site have been and will continue to be conducted, as needed. The chemical oxidant used for the two applications was PersulfOx®. PersulfOx is an in situ chemical oxidation reagent that destroys organic contaminants found in groundwater and soil through powerful yet controlled chemical reactions. PersulfOx is a sodium persulfate based technology which employs a patented catalyst to enhance the oxidative destruction of both hydrocarbons and chlorinated contaminants in the subsurface. If necessary, injections of 3-D MicroEmulsion HRC Advanced (3DME) bioremediation may be conducted for final polishing of the soil and groundwater. 3DME is a form of HRC Advanced and has a molecular structure specifically designed to maximize the cost effective anaerobic treatment of contaminants in subsurface soils and groundwater. 3DME produces a sequential, staged release of its electron donor components. The immediately available free lactic acid is fermented rapidly while the controlled-release lactic acid is metabolized at a more controlled rate. Typical 3DME single application longevity is rated at periods of up to 3 to 5 years. The ISCO injections will be further discussed in Section 4.

### 1.4.3 Remedial Action Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

**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 ground or surface water contamination.

**Soil**

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

**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.

### 1.4.4 Remaining Contamination

**Soil**

The western portion of the Site was largely excavated to the groundwater table. Following the IRM implementation, two bottom samples and ten sidewall samples were collected. Bottom endpoint samples were collected from the smear zone or beneath the water table and contained concentrations of several CVOCs and petroleum compounds

greater than Restricted Residential SCOs, but less than Commercial Use SCOs. These exceedances are likely attributable to contamination observed in the groundwater. Sidewall samples were collected approximately 1 foot above the smear zone and contained concentrations of several CVOCs and petroleum compounds greater than Restricted Residential SCOs, but less than Commercial Use SCOs with the exception of one sidewall sample that was less than Restricted Residential SCOs.

During the RAWP implementation, the central portion of the Site was also largely excavated to the groundwater table along the northern and southern property boundaries where footings were installed for the new building and to a depth of approximately 7 feet below grade for the cellar. Four endpoint samples were collected beneath the cellar which revealed concentrations of CVOCs greater than Unrestricted Use SCOs in each sample with two of the samples containing concentrations of PCE greater than Restricted Residential SCOs.

The eastern portion of the Site was also excavated to the groundwater table along the northern and southern property boundaries for the installation of footings and the remaining area was excavated to 1 to 4 feet below grade, including a hot-spot lead excavation. A total of five endpoint samples were collected following removal of the hot-spot lead area; concentrations of lead and PCE were greater than Unrestricted Use SCOs, but less than Restricted Residential Use SCOs. The underground utilities are located in this area, between the eastern wall of the cellar and the street.

**Table 5** and **Figure 12** summarize the results of all soil samples remaining at the Site after completion of the Remedial Action that exceed the Track 1 (unrestricted) SCOs and Restricted Residential SCOs.

Following the IRM excavation and hot-spot excavations, a demarcation barrier constructed of orange snow fencing was laid at the bottom of the excavations, including along the eastern slope of the IRM excavation. During implementation of the RAWP and construction activities, the demarcation barrier was the building's footings and concrete slab; the approximate depths of excavation are illustrated on **Figure 10**.

Since contaminated soil, groundwater, and soil vapor remains beneath the Site after completion of the Remedial Action, Institutional and Engineering Controls are required to protect human health and the environment. These Engineering and Institutional Controls (ECs/ICs) are described in Section 2.

**Groundwater**

Following removal of the bulk of the source material and two rounds of chemical oxidant injections, impact to the groundwater has been reduced, but is still present. Three rounds of groundwater samples were collected during implementation of the Remedial Action. As all of the monitoring wells, with the exception of ML-Well1, were destroyed during the construction process, groundwater samples were collected from temporary boring locations following the two ISCO events and from the shallow interval of ML-Well1 in October 2014 and May 2015. The third round of groundwater samples were conducted in October 2015 following installation of the new permanent monitoring wells. All samples were analyzed for VOCs by USEPA method 8260.

Analytical results indicated the presence of CVOCs in the groundwater exceeding AWQS throughout the Site with the highest concentrations generally observed in the southwestern section of the Site. The concentrations have continued to decrease since the removal of the bulk source material and the ISCO injections were conducted. Based upon the results of groundwater sampling conducted on October 2, 2015, concentrations of PCE have decreased significantly. The maximum concentration detected during this sampling round was 760 µg/L in well MW-14, the rest of the concentrations ranged between non-detect and 86 µg/L. Concentrations of DCE ranged between 31 and 1,800 µg/L, TCE ranged between non-detect and 240 µg/L, and VC ranged between non-detect and 210 µg/L. The highest concentrations were each detected in MW-14, a newly installed monitoring well in the southwest section of the property.

**Table 6** and **Figure 13** summarize the results of all groundwater samples collected at the Site since the Remedial Investigation.

**Soil Vapor**

Soil vapor at the site was analyzed during the Supplemental Remedial Investigation phase. Five samples were collected, four on-site and one off-site at the neighboring property to the south. Sub-slab and indoor air samples were not collected as the building was a vacant, uncapped lot. Analytical results revealed elevated concentrations of chlorinated solvents as summarized in the below table:

| Compound | Concentration Range (µg/m$^3$) |
|---|---|
| PCE | Non-detect to 2,660 |
| TCE | Non-detect to 2,900 |
| DCE | 62.2 to 6,500 |
| VC | Non-detect to 112 |

The highest concentrations were detected in the western section of the site which is near the suspected source area. The off-site sample concentration indicated that mitigation or monitoring would not be required. A spider diagram showing the soil vapor sample locations and the four chlorinated solvents is included as **Figure 9**.

Since these samples were analyzed, the bulk of the source material was removed during the IRM and construction of the new building and two rounds of soil and groundwater chemical injections were conducted to reduce the source for soil vapor impact. The installation of the construction membrane and the installation and operation of a soil vapor extraction (SVE) system will prevent soil vapor intrusion into the new building.

# 2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN

## 2.1 Introduction

### 2.1.1 General

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

### 2.1.2 Purpose

This plan provides:

- A description of all ECs/ICs on the Site;
- The basic implementation and intended role of each EC/IC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the features to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of ECs/ICs, such as the implementation of the Excavation Work Plan 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 ECs/ICs required by the site remedy, as determined by the NYSDEC.

## 2.2 Engineering Controls

### 2.2.1 Engineering Control Systems

#### *2.2.1.1 Composite Cover*

Exposure to remaining contamination in soil/fill at the Site is prevented by a composite cover system placed over the site. This cover system is comprised of 6 inch thick concrete covered roads, concrete covered sidewalks, and concrete building slabs as shown on **Figure 14**. The entire Site will be covered with this composite cover system. There will be no exposed soil or landscaped areas. The Excavation Work Plan that appears in **Appendix D** outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection and maintenance of this cover are provided in the Monitoring Plan included in Section 4 of this SMP.

A construction membrane was installed beneath the cellar and first floor footprint. The construction membrane location is shown on **Figure 15**. The membranes installed are as follows:

| Construction Membrane | Location |
|---|---|
| Grace Preprufe 300R | Cellar and elevator pit slab (horizontal) |
| Grace Preprufe 160R | Cellar and elevator pit walls (vertical) |
| Grace Florprufe 120 | First floor slab (horizontal) |

Manufacturer's specifications for the membrane and certification that the membrane is compatible with the soil vapor identified on-Site are included in **Appendix E**.

#### *2.2.1.2 Soil Vapor Extraction System*

The remedial action included the installation of a SVE system to remove residual VOCs from the vadose zone and to stabilize plume migration and mitigate potential vapor migration into the proposed on-Site building. SVE systems are designed to physically remove volatile compounds in a vapor phase from the unsaturated zone. It is an in-situ process employing vapor extraction laterals where a blower is utilized to create a negative pressure gradient that causes movement of vapors toward the extraction wells. The volatile constituents are readily removed from the subsurface through the extraction wells. The extracted volatile compounds are then discharged to the atmosphere or treated if concentrations exceed air emission requirements.

SVE piping was constructed of 4 inch diameter lateral piping and was separated into multiple segments that can be independently shut off, when necessary, and are installed across the Site as shown in the as-built drawings in **Appendix C**. Each segment is composed of two sections of 10 feet of screen wrapped in non-woven geotextile fabric and connected in the center with a "T" fitting. The segments laid east to west are constructed of perforated Schedule 80 steel pipe due to the overhead weight of the concrete footings and the segments laid north to south are constructed of 20 slot Schedule 80 PVC. The remainder of the lateral piping is constructed of 3 inch diameter Schedule 80 steel which leads to a pipe run along the northern wall of the building. The piping continues up to the roof and is constructed of 3 inch diameter Schedule 80 PVC. Once at the roof level, the piping connects to the 5 horsepower Rotron EN757F75XL blower, a moisture separator, and a Tigg N-400XP carbon unit for treatment (if necessary, based upon effluent emission concentrations).

The SVE system began operation on Thursday, November 5, 2015 and will operate continuously with the exception of maintenance related shutdowns.

Based upon dispersion modeling analysis performed by PWGC using the NYSDEC DAR-1 policy, PWGC recommended discontinuing use of the carbon treatment unit and reducing the vapor sampling frequency from quarterly to annual in the June 2017 Periodic Review Report. These modifications were approved by the NYSDEC in a July 18, 2017 letter.

Procedures for operating and maintaining the SVE system are documented in the Operation and Maintenance Plan (Section 4 of this SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3 of this SMP). The Monitoring Plan also addresses severe condition inspections in the event that a severe condition, which may affect controls at the Site, occurs.

*2.2.1.3 Sub-Slab Depressurization System*

The SVE system will be converted to an active SSDS based upon acceptable future analytical results of the soil, groundwater, and influent soil vapor stream. This decision will be made in consultation with the NYSDEC. The conversion to a SSDS will be accomplished by replacing the 5.0 horsepower blower with a lower flow rate model

that is appropriate for operation of a SSDS. A specific model blower will be specified at that time. SVE laterals outside of the cellar and first floor footprint will be turned off. The SSDS will operate continuously with the exception of related shutdowns.

Procedures for operating and maintaining the SSDS system are documented in the Operation and Maintenance Plan (Section 4 of this SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3 of this SMP). The Monitoring Plan also addresses severe condition inspections in the event that a severe condition, which may affect controls at the Site, occurs.

*2.2.1.4 ISCO*

Further reductions in VOC impact to the soil and groundwater may be conducted with ISCO injections. The location and frequency of ISCO injections will be dependent upon the location and concentration of contaminants in soil and/or groundwater and the manufacturer of the chemical oxidant and the NYSDEC will be consulted.

ISCO injections will be conducted in a manner suitable for the chemical oxidant, typically by installing temporary soil borings to a depth of 5 feet below the water table, beginning the chemical injection, and then incrementally raising the injectable point to 5 feet above the water table during the injection to increase the surface area of the treatment zone.

Permanent injection wells may be installed and will be constructed of 2 inch diameter PVC pipe. The length and depth of the screen will be dependent upon the desired treatment area, typically 10 feet of screen set 5 feet below the water table.

For permanent or temporary borings, chemical oxidant mixtures will be prepared in accordance with manufacturer's recommendations and injected into the borings with a pump. The chemicals currently specified for injection are Persulfox and/or 3-D Microemulsion manufactured by Regenesis.

The effectiveness of the ISCO injections will be monitored by groundwater and/or soil sampling. The frequency of sampling will be conducted in accordance with **Inline Table 3** in Section 3.1.2. Monitoring of the ISCO EC will be further discussed in Section 4.3.1.

### 2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when effectiveness 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 6.6 of NYSDEC DER-10.

#### *2.2.2.1 Composite Cover System*

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

#### *2.2.2.2 Soil Vapor Extraction System [SVE System]*

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 is no longer required, a proposal to discontinue the system will be submitted by the property owner. Conditions that warrant discontinuing the SVE system include contaminant concentrations in groundwater that: (1) reach levels that are consistently below ambient water quality standards, (2) have become asymptotic to a low level over an extended period of time as accepted by the NYSDEC, (3) the NYSDEC has determined that the SVE system has reached the limit of its effectiveness, or (4) the SVE system is converted to a SSDS based upon soil, groundwater, and SVE influent and effluent analytical results and as accepted by the NYSDEC. 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.

#### *2.2.2.3 Sub-slab Depressurization System [SSDS]*

The SVE system will be converted to a SSDS based upon acceptable soil, groundwater, and SVE influent and effluent analytical results and in consultation with the NYSDEC. The conversion to an active SSDS will be accomplished by shutting down several legs of the SVE laterals under the ventilated parking area and replacing the blower with a lower flow rate model that is appropriate for operation of an active SSDS.

The active SSDS will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SSDS is no longer

required, a proposal to discontinue the SSDS will be submitted by the property owner to the NYSDEC and NYSDOH.

#### *2.2.2.4 Groundwater Monitoring Activities*

Groundwater monitoring activities to assess the efficacy of the ISCO treatments will continue, as determined by the NYSDEC, until residual groundwater concentrations are found to be consistently below NYSDEC standards or have become asymptotic at an acceptable level over an extended period. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional source removal, treatment and/or control measures will be evaluated.

## 2.3 Institutional Controls

A series of Institutional Controls is required by the RAWP to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to restricted residential or lower level uses only. Adherence to these Institutional Controls on the Site is required by the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP;

Institutional Controls identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

The Site has a series of Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- The property may only be used for restricted residential or lower level uses provided that the long-term Engineering and Institutional Controls included in this SMP are employed.
- The property may not be used for a higher level of use, such as unrestricted use without additional remediation and amendment of the Environmental Easement, as approved by the NYSDEC;
- All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- The use of the groundwater underlying the property is prohibited without treatment rendering it safe for intended use;
- Vegetable gardens and farming on the property are prohibited;
- The Site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

### 2.3.1 Excavation Work Plan

The Site will be remediated for restricted residential use. Any future intrusive work that will penetrate the composite cover or encounter or disturb the remaining contamination, including any modifications or repairs to the existing cover system will be

performed in compliance with the Excavation Work Plan (EWP) that is attached as **Appendix D** to this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the Site. A sample HASP is attached as **Appendix F** to this SMP that is in current compliance with DER-10, and 29 CFR 1910, 29 CFR 1926, and all other applicable Federal, State and local regulations. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided in Section A-1 of the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP and CAMP, and will be included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan (See Section 5).

The Site owner and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation de-water, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings). The Site owner will ensure that Site development activities will not interfere with, or otherwise impair or compromise, the engineering controls described in this SMP. Currently, a SVE system is installed to reduce the potential for SVI.

### 2.3.2 Soil Vapor Intrusion Evaluation

Prior to the construction of any additional enclosed structures with the potential for soil vapor intrusion (SVI) (see **Figure 16**), an SVI evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the proposed structure. Alternatively, an SVI mitigation system may be installed or the existing system modified as an element of the building foundation without first conducting an investigation. This mitigation system will include a vapor barrier and passive sub-slab depressurization system that is capable of being converted to an active system.

Prior to conducting an SVI investigation or installing a mitigation system, 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.

SVI sampling results, evaluations, and follow-up actions will also be summarized in the next Periodic Review Report.

## 2.4 Inspections and Notifications

### 2.4.1 Inspections

Inspections of all remedial components installed at the Site will be conducted at the frequency specified in the SMP Monitoring Plan schedule. A comprehensive Site-wide inspection will be conducted annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether Engineering Controls 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;
- Sampling and analysis of appropriate media during monitoring events;
- If site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system;

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Periodic Review Reporting section of this plan (Section 5).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the ECs/ICs implemented at the Site by a qualified environmental professional as determined by NYSDEC.

### 2.4.2 Notifications

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are required under the terms of the Brownfield Cleanup Agreement (BCA), 6NYCRR Part 375, and/or Environmental Conservation Law.
- 7-day advance notice of any proposed ground-intrusive activities pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundation, structures or engineering control that reduces or has the potential to reduce the effectiveness of an Engineering Control 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 Engineering Controls 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 shall be submitted to the NYSDEC within 45 days and shall describe and document 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 has been provided with a copy of the 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.

## 2.5 Contingency Plan

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

### 2.5.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence requiring assistance, the Owner or Owner's representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to Kris Almskog of PWGC. These emergency contact lists must be maintained in an easily accessible location at the site.

**Inline Table 1: Emergency Contact Numbers**

| | |
|---|---|
| Medical, Fire, and Police: | 911 |
| One Call Center: | (800) 272-4480<br>(3 day notice required for utility markout) |
| Poison Control Center: | (800) 222-1222 |
| Pollution Toxic Chemical Oil Spills: | (800) 424-8802 |
| NYSDEC Spills Hotline | (800) 457-7362 |

**Inline Table 2: Contact Numbers**

| | |
|---|---|
| Kris Almskog, PWGC PM/HSM | 631-589-6353 |
| Jennifer Lewis, PWGC FTL/HSO | 631-589-6353 |
| Paul Boyce, PE, PWGC PM/HSM | 631-589-6353 |
| Thomas Melia, PWCG Alternate PM/HSM | 631-589-6353 |

* Note: Contact numbers subject to change and should be updated as necessary

2.5.2 Map and Directions to Nearest Health Facility

Site Location: 3140 Coney Island Avenue, Brooklyn, NY

Nearest Hospital Name: Coney Island Hospital

Hospital Location: 2601 Ocean Parkway, Brooklyn, NY

Hospital Telephone: 1-718-616-3000

Directions to the Hospital:

1. Head North on Coney Island Avenue.

2. Turn left onto Avenue Z.

3. Destination will be on your left.

Total Distance: 0.8 miles

Total Estimated Time: 5 minutes

## Map Showing Route from the site to the Hospital (Figure 17):

### 2.5.3 Response Procedures

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan (**Inline Table 1**). The list will also be posted prominently at the site and made readily available to all personnel at all times.

Small hazardous spills/environmental releases shall be contained as close as possible to the source. Whenever possible, the Material Safety Data Sheet (MSDS) will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. Spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill. The following seven steps should be taken by the Emergency Coordinator:

- Determine the nature, identity and amounts of major spill components;
- Make sure unnecessary persons are removed from the spill area;
- Notify appropriate response teams and authorities;
- Use proper PPE in consultation with the FTL/HSO;
- If a flammable liquid, gas or vapor is involved, remove ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.);
- If possible, try to stop the leak with appropriate material; and,
- Remove surrounding materials that can react or compound with the spill.

# 3.0 SITE MONITORING PLAN

## 3.1 Introduction

### 3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the remedy to reduce or mitigate contamination at the Site, the soil cover system, and all affected site media identified below. Monitoring of other Engineering Controls is described in Chapter 4, Operation, Monitoring and Maintenance Plan. This Monitoring Plan may only be revised with the approval of NYSDEC.

### 3.1.2 Purpose and Schedule

This Monitoring 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, particularly ambient groundwater standards and Part 375 SCOs for soil;
- Assessing achievement of the remedial performance criteria.
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment; and
- Preparing the necessary reports for the various monitoring activities.

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

- Sampling locations, protocol, and frequency;
- Information on all designed monitoring systems (e.g., well logs);
- Analytical sampling program requirements;
- Reporting requirements;
- Quality Assurance/Quality Control (QA/QC) requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and

- Annual inspection and periodic certification.

Annual monitoring of the performance of the remedy and overall reduction in contamination on-site will be conducted for the first 1 year. The frequency thereafter will be determined by NYSDEC. Trends in contaminant levels in air, soil, and/or groundwater in the affected areas, will be evaluated to determine if the remedy continues to be effective in achieving remedial goals. Monitoring programs are summarized in **Inline Table 3** and outlined in detail in Sections 3.2 and 3.3 below.

**Inline Table 3: Monitoring/Inspection Schedule**

| Monitoring Program | Frequency* | Matrix | Analysis |
|---|---|---|---|
| Composite Cover System | Annual | Soil | Visual Inspection of Cover System |
| Groundwater Monitoring and Sampling | Quarterly | Groundwater | 8260 VOCs |
| Groundwater, Vapor, and ISCO Monitoring Well Repairs, Replacement, and Decommissioning | Annual | Equipment | Visual Inspection |
| SVE System Influent and Effluent Sampling | Annual | Combined Influent and Effluent Vapor | TO-15 VOCs |
| SVE System Operational Data | Twice the first week, then once a week for the first month, then monthly | Equipment | Visual Inspection |
| Vacuum Monitoring Wells | Once the first week, then once the third month, then quarterly | Equipment | Vacuum Readings |
| SSDS Effluent Sampling | Once the first day, once the first week, then quarterly | Effluent Vapor | TO-15 VOCs |

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

## 3.2 Composite Cover System Monitoring

The composite cover system, including the building slab, parking lot, driveway, and sidewalk structures, will be monitored to document existing conditions of the cover system and to ensure that the cover system is not breached, without proper notification and oversight. The cover system is in place to prevent human exposure to remaining contaminated soil/fill remaining at the Site. The cover system consists of impervious surfaces such as the concrete slabs, the concrete paved parking area, the concrete paved driveway to the parking area, and the concrete paved sidewalk in front of the building.

The cover system will be inspected at a minimum of once a year. The status, including the existing condition and signs of past excavation patching of the cover system, will be observed and recorded. The location of the various types of cover systems is illustrated on **Figure 14**.

## 3.3 Media Monitoring Program

### 3.3.1 Groundwater Monitoring

Groundwater monitoring will be performed on a periodic basis to assess the performance of the remedy.

A long-term groundwater monitoring program will be implemented to evaluate groundwater flow characteristics, confirm hydraulic control and plume stabilization, and to verify that VOC concentrations and the extent of groundwater contaminants are meeting remedial action objectives (RAOs). The locations of existing monitoring wells are illustrated on **Figure 18**. The network of monitoring wells has been installed to monitor both up-gradient and down-gradient groundwater conditions at the Site boundaries.

ML-Well1 is a multi-level well screened at six discrete depths. The individual wells are 1 inch in diameter and are screened at 15 to 20 feet, 35 to 40 feet, 55 to 60 feet, 75 to 80 feet, 95 to 100 feet and 115 to 120 feet. The remaining existing groundwater monitoring wells are constructed of 1 or 2 inch diameter PVC wells screened from approximately 5 to 15 feet below sidewalk grade with the exception of MW-15 which is screened from 8 to 12 feet below sidewalk grade and MW-16 which is screened from 5 to 12 feet below sidewalk grade. Monitoring well construction logs are included as **Appendix G** for all existing monitoring wells.

Groundwater is located approximately 9 to 10 feet below grade. Regional groundwater flow is south towards the Atlantic Ocean.

The monitoring well network will be monitored and sampled as per the frequency and for the analyses set forth in **Inline Table 3** in Section 3.1.2. In ML-Well1, only the two shallowest monitoring well intervals will be monitored and sampled. Analytical data from the October 2015 sampling event (Baseline Post-Remediation Groundwater Quality) are included as **Figure 19**. The sampling frequency may be modified with the approval of NYSDEC. The SMP will be modified to reflect changes in sampling plans approved by NYSDEC.

Deliverables for the groundwater monitoring program are specified below.

*3.3.1.1 Sampling Protocol*

All monitoring well sampling activities will be recorded in a field book and a groundwater-sampling log presented in **Appendix H**. Other observations (e.g., well integrity, etc.) will be noted on the well sampling log. The well sampling log will serve as the inspection form for the groundwater monitoring well network.

Prior to sampling, each well will be gauged with an electronic interface probe to measure the depth to LNAPL, if present, and the depth to water. Wells that are 2 inch diameter or larger will be purged using a decontaminated submersible pump fitted with disposal polyethylene tubing under low flow conditions. During purging, the groundwater parameters pH, temperature, conductivity, oxygen reduction potential (ORP), turbidity, and dissolved oxygen will be monitored every three minutes with a Horiba U52 water quality instrument or similar. When measurements stabilize in accordance with the United States Environmental Protection Agency (USEPA) standard operating procedure EQASOP-GW001, purging will be deemed completed and the Horiba will be disconnected. Wells that are 1 inch in diameter will be purged by utilizing a stainless steel check valve connected to polyethylene tubing and oscillated to recover groundwater. The groundwater samples will then be collected directly from the tubing and placed in pre-cleaned laboratory supplied glassware and packed in a cooler on ice and delivered to a NYSDOH ELAP certified laboratory under chain-of-custody seal. The groundwater samples will be analyzed in accordance with **Inline Table 3** in Section 3.1.2.

*3.3.1.2 Monitoring Well Repairs, Replacement And Decommissioning*

If biofouling or silt accumulation occurs in the on-Site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable or no longer required.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of monitoring wells for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent periodic report. Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC's "Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

### 3.3.2 Vapor Monitoring

Vapor monitoring will be performed on a periodic basis to assess the performance of the remedy and to evaluate compliance with effluent discharge requirements.

Monitoring of the SVE system / SSDS will consist of recording gauge readings and collecting influent and effluent vapor samples. SVE system / SSDS monitoring and sampling will be conducted as set forth in **Inline Table 3** in Section 3.1.2. An Operations and Maintenance (O&M) Manual for the SVE System / SSDS, detailing the specific gauges and meters to be recorded, is included in Section 4. O&M will continue until the RAOs have been achieved. Following conversion of the SVE system to a SSDS, confirmatory groundwater samples will continue to be collected from the on-Site monitoring well network for a period of 1 year to confirm compliance with the RAOs. If rebound conditions are encountered, an appropriate action, such as converting the SSDS back to a SVE system, will be taken to address the problem. Modifications or shutdowns to the SVE system / SSDS will be performed in consultation with the NYSDEC.

A network of vacuum monitoring wells has also been installed throughout the site to evaluate the effectiveness of the SVE system / SSDS to effectively create a vacuum to

remove contaminants in the soil vapor and prevent soil vapor intrusion into the building. The vacuum wells are constructed of a 2 foot long section of 1 inch diameter PVC pipe with a 0.5 foot screened interval at the bottom of the well. Locations of the vacuum monitoring wells is shown on **Figure 20**.

#### *3.3.2.1 Sampling Protocol*

All monitoring and sampling activities will be recorded in a field book and a system performance log presented in **Appendix I**. Other observations (e.g., system component integrity, etc.) will be noted on the system performance log. The system performance log will serve as the inspection form for the SVE system and SSDS.

Vacuum readings will be collected from the vapor monitoring wells by temporarily replacing the wells' J-plug with a cap outfitted with a brass barb or equivalent. The barb will be outfitted with ¼ inch diameter tubing connected to a vacuum gauge and vacuum readings will be recorded in the system performance logs.

In addition to routine system monitoring, influent and effluent vapor samples will be collected to verify the system's effectiveness and compliance with discharge requirements. The vapor samples will be analyzed in accordance with **Inline Table 3** in Section 3.1.2.

#### *3.3.2.2 Monitoring Well Repairs, Replacement And Decommissioning*

If silt accumulation occurs in the vacuum monitoring wells, the wells will be cleaned by scrubbing the screened interval with a brush or forcing air into the monitoring well to clear obstructions. Additionally, vacuum monitoring wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable or no longer required.

Repairs and/or replacement of wells in the vacuum monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of vacuum monitoring wells for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent periodic report. Well decommissioning without replacement will be done only with the prior approval of

NYSDEC. Vacuum monitoring well decommissioning will be performed by filling the well with a bentonite / concrete slurry. Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

### 3.4 Site-Wide Inspection

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections will also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (**Appendix J**). 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;
- Compliance with permits and schedules included in the Operation and Maintenance Plan; and
- Confirm that Site records are up to date.

### 3.5 Monitoring Quality Assurance/Quality Control

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the Site (**Appendix K**). Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:
    - Sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by

the analytical laboratory. Containers with preservative will be tagged as such.

- Sample holding times will be in accordance with the NYSDEC ASP requirements.
- Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.

- Sample Tracking and Custody;
- Calibration Procedures:
  - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.
  - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures;
- Preparation of a Data Usability Summary Report (DUSR), which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.
- Internal QC and Checks;
- QA Performance and System Audits;
- Preventative Maintenance Procedures and Schedules;
- Corrective Action Measures.

### 3.6 Monitoring Reporting Requirements

Forms and any other information generated during regular monitoring events and inspections will be kept on file on-Site. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by

NYSDEC and (2) submitted at the time of the Periodic Review Report, as specified in the Reporting Plan of this SMP.

All monitoring results will be reported to NYSDEC on a periodic basis in the Periodic Review Report. The report will include, at a minimum:

- Date of event;
- Personnel conducting sampling;
- Description of the activities performed;
- 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 groundwater conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC. A summary of the monitoring program deliverables are summarized in **Inline Table 4** below.

**Inline Table 4: Schedule of Monitoring/Inspection Reports**

| Task | Reporting Frequency* |
|---|---|
| Status Reports containing SVE system and analytical data and groundwater analytical data | Once the first month, then quarterly |
| Inspection Reports and Certifications | Annually |

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

# 4.0 OPERATION AND MAINTENANCE PLAN

## 4.1 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 and SSDS;
- 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 system and SSDS are operated and maintained.

Information on non-mechanical Engineering Controls (i.e. composite cover system) is provided in Section 3 - Engineering and Institutional Control Plan. A copy of this Operation and Maintenance Plan, along with the complete SMP, will be kept at the Site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of the SMP.

## 4.2 Engineering Control System Operation and Maintenance

### 4.2.1 Soil Vapor Extraction System

The remedial action includes a SVE system to remove residual VOCs from the vadose zone and to stabilize plume migration and mitigate potential vapor intrusion into the proposed on-Site building. SVE systems are designed to physically remove volatile compounds in a vapor phase from the unsaturated zone. It is an in-situ process employing vapor extraction laterals where a blower is utilized to create a negative pressure gradient that causes movement of vapors toward the extraction wells. The volatile constituents are readily removed from the subsurface through the extraction wells. The extracted volatile compounds are then discharged to the atmosphere or treated if concentrations exceed air emission requirements.

The SVE system was designed and installed in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006. Six lateral SVE lateral pipes were installed. Four of the SVE laterals were constructed of 4 inch diameter screened PVC and two of the SVE laterals were constructed of 4 inch diameter steel with perforations. The laterals were separated into multiple legs that can be shut off individually, when necessary. The SVE trenching is piped to a pipe run along the northern section of the property up to the roof, where the vapor stream is treated with carbon, if necessary, and then discharged to the air. As-built drawings are included as **Appendix C**.

The SVE system was started for normal operation on Thursday, November 5, 2015. Based upon dispersion modeling analysis performed by PWGC using data collected on March 1, 2017 and the NYSDEC DAR-1 policy, PWGC recommended discontinuing use of the carbon treatment unit and reducing the vapor sampling frequency from quarterly to annual in the June 2017 Periodic Review Report. These modifications were approved by the NYSDEC in a July 18, 2017 letter.

The description of the O&M components for the SVE system listed in the sub-sections below will also apply to the active SSDS following the system conversion with the exception of the lack of carbon treatment for the SSDS and a different model blower.

#### *4.2.1.1 Scope*

The SVE system has been designed to operate on a continuous basis for the duration of the remedial phase, with minimal shut-down time for system maintenance activities. Following conversion of the SVE system to an SSDS, the SSDS will continue to operate as an active SSDS on a continuous basis with minimal shut-down time for system maintenance activities. The system is controlled by a programmable logic controller (PLC) based system. The system treatment train is monitored at several points to ensure that critical system components are operating correctly and within allowable tolerances.

Because of the numerous mechanical components (i.e. blower, valves, etc), regular maintenance activities are recommended to ensure the system operates efficiently. Specific equipment maintenance activities include:

- System monitoring, including recording system operational parameters such as vacuum, flow rate, pressure, and temperature readings and hours of system operation,
- Maintenance of blower, including greasing bearings, replacement of belts,
- Repair/replacement of blower motor,
- Modification to PLC and interlock controls (i.e. adjusting time delays, differential pressure settings).

#### *4.2.1.2 System Start-Up and Testing*

Product manufacturer's catalog cut sheets for the specific SVE installed components are included in **Appendix L**.

- Prior to the system start-up, valves will be checked to ensure they are in their correct opened or closed position.
- After the system has been started, the flow rate of the blower will be adjusted to operate the system as designed.
- The blower will be inspected to ensure the fan is rotating in the proper direction.
- A visual inspection of pipes and connections will be conducted to determine if there are any leaks. Any necessary repairs will be made.
- The SVE system alarms will be tested to determine if they are operating correctly.
- Combined influent and effluent vapor samples will be collected as set forth in **Inline Table 3** in Section 3.1.2.

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

#### *4.2.1.3 System Operation: Routine Operation Procedures*

Routine operation procedures associated with the SVE system include the following:

- A system inspection log will be kept for each site visit that will include gauge readings, vacuum readings, alarm codes, and photoionization detector (PID) readings of the effluent vapor stream. Adjustments and repairs will be made on an as needed basis to keep the system operating as designed.
- Combined influent and effluent vapor samples will be collected at a minimum as set forth in **Inline Table 3** in Section 3.1.2. Analytical results will indicate if vapor phase granular activated carbon units are required to treat the effluent vapor stream.
- The system is designed to operate 24 hours a day, 7 days a week until the remedial action objectives (RAOs) are reached. Limited system shutdowns may occur during maintenance activities. The NYSDEC will be consulted regarding any modifications to the SVE system's operating schedule.
- Following conversion to an active SSDS, the system will continue to operate 24 hours a day, 7 days a week. Limited system shutdowns may occur during maintenance activities. The NYSDEC will be consulted regarding any modifications to the SSDS's operating schedule, including converting the active SSDS to a passive SSDS.

#### *4.2.1.4 System Operation: Routine Equipment Maintenance*

Because of the numerous mechanical components of the SVE system (i.e. blower, valves, etc), regular maintenance activities are recommended to ensure the system operates efficiently. Specific equipment maintenance activities will include:

- System monitoring, including recording system operational parameters,
- Maintenance of blower, including replacing bearings every 15,000 to 20,000 hours, replacement of belts,
- Modification to PLC and interlock controls (i.e. adjusting time delays, differential pressure settings).

- Visual inspections of the SVE components for leaks, damage, or scale / sediment build-up.
- Housekeeping inspections of the treatment room and the control room.
- Critical device / alarm testing and inspection.

**Appendix L** contains the EC Maintenance Schedules.

#### *4.2.1.5 System Operation: Non-Routine Equipment Maintenance*

Non-routine equipment maintenance associated with the SVE system includes the following:

- Replace the blower or other parts on an as needed basis due to damage or exceeding the life expectancy of the equipment.
- If monitoring indicates that the system is not functioning as the design intended, the system may have to be redesigned, modified, and restarted. The NYSDEC will be consulted prior to any modifications to the SVE system.

## 4.3 Engineering Control System Performance Monitoring

### 4.3.1 ISCO Monitoring and Re-Treatment

Based upon consultation with the NYSDEC, hot spot chemical injections using Persulfox or 3-D Microemulsion may be utilized to expedite contaminant concentrations reductions in the groundwater or soil. The decision to install temporary or permanent ISCO injection wells and chemical oxidant will be implemented only after discussion with and approval by NYSDEC.

The remedial action may include ISCO in selected hot-spots in an effort to stabilize plume migration at the southern property boundary and expedite the groundwater remediation in conjunction with the long-term use of the SVE system. Potential locations of ISCO injections will be determined based upon an evaluation of groundwater quality across the Site.

Following installation of the permanent or temporary injection well points, an appropriate mixture of chemical oxidant, based upon groundwater quality and manufacturer recommendations, will be injected into the subsurface. The decision to

install additional injection points will be at the discretion of the property owner and will be implemented only after discussion with and approval by NYSDEC.

#### *4.3.1.1 Monitoring Schedule*

The effectiveness of the ISCO injections will be monitored utilizing the existing groundwater monitoring well network as documented in Section 3.3.1 and at a frequency detailed in **Inline Table 3** in Section 3.1.2.

If permanent ISCO wells are installed, inspection frequency of the wells will correspond to the inspection frequency of the groundwater and vapor monitoring wells and is subject to change with the approval of the NYSDEC. Unscheduled inspections and/or sampling may take place when a suspected failure of the ISCO wells has been reported or an emergency occurs that is deemed likely to affect the operation of the system. Monitoring deliverables for the ISCO wells are specified later in this Plan.

#### *4.3.1.2 General Equipment Monitoring*

If permanent ISCO wells are installed, a visual inspection of the complete system will be conducted during the monitoring event. ISCO system components to be monitored include, but are not limited to, the following:

- ISCO well heads and well head covers.

#### *4.3.1.3 System Monitoring Devices and Alarms*

The ISCO wells have no monitoring devices or alarms.

#### *4.3.1.4 Sampling Event Protocol*

The groundwater will be sampled to determine the effectiveness of the ISCO injections utilizing the existing monitoring well network as documented in Section 3.3.1. Monitoring wells will not be sampled until a minimum of 1 month following a chemical injection, as recommended by the chemical manufacturer.

### 4.3.2 SVE System / SSDS Introduction

The remedial action includes a SVE system to remove residual VOCs from the vadose zone and to stabilize plume migration and mitigate potential vapor intrusion into the proposed on-Site building. SVE systems are designed to physically remove volatile compounds in a vapor phase from the unsaturated zone. It is an in-situ process employing vapor extraction wells where a blower is utilized to create a negative pressure gradient

that causes movement of vapors toward the extraction wells. The volatile constituents are readily removed from the subsurface through the extraction wells. The extracted volatile compounds are then discharged to the atmosphere or treated if concentrations exceed air emission requirements.

#### *4.3.2.1 SVE System / SSDS Monitoring Schedule*

The SVE system will be monitored at the frequency set forth in **Inline Table 3** in Section 3.1.2 and in Section 4.2.1.2.

Inspection frequency is subject to change with the approval of the NYSDEC. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE system / SSDS has been reported or an emergency occurs that is deemed likely to affect the operation of the system. Monitoring deliverables for the SVE system / SSDS are specified later in this Plan.

#### *4.3.2.2 SVE System / SSDS General Equipment Monitoring*

A visual inspection of the complete system will be conducted during the monitoring event. SVE system / SSDS components to be monitored include, but are not limited to, the following:

- Vacuum blower, vacuum, flow, and temperature,
- Individual SVE/SSDS lateral vacuum,
- General system piping,
- Effluent concentrations

A complete list of components to be checked is provided in the Inspection Checklist, presented in **Appendix J**. If any equipment readings are not within their typical 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 are required immediately, and the SVE system / SSDS restarted.

#### *4.3.2.3 SVE System / SSDS System Monitoring Devices and Alarms*

The SVE system / SSDS has a warning device to indicate that the system is not operating properly. In the event that the warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SVE system / SSDS restarted. Operational problems will be noted in the subsequent Periodic Review Report.

System monitoring device and alarm notification for moisture separator high, vacuum low, and vacuum high will be set.

#### *4.3.2.4 SVE System / SSDS Sampling Event Protocol*

Combined influent and effluent vapor samples will be collected at a minimum as set forth in **Inline Table 3** in Section 3.1.2 while the system is operating as a SVE system. Analytical results will evaluate the mass of contaminants removed from the subsurface.

Vapor samples will be collected directly into laboratory supplied summa canisters or other containers deemed suitable by the NYSDEC. Samples will be submitted to a NYSDOH ELAP certified laboratory under proper chain of custody procedures. Sample analyses are as detailed in **Inline Table 3** in Section 3.1.2.

## 4.4 Maintenance and Performance Monitoring Reporting Requirements

Maintenance reports and any other information generated during regular operations at the Site will be kept on-file on-Site. All reports, forms, and other relevant information generated will be available upon request to the NYSDEC and submitted as part of the Periodic Review Report, as specified in the Section 5 of this SMP.

### 4.4.1 Routine Maintenance Reports

Checklists or forms (see **Appendix J**) 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 (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).

4.4.2 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;
- Date of leak repair;
- Other 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).

# 5.0 INSPECTIONS, REPORTING AND CERTIFICATIONS

## 5.1 Site Inspections

### 5.1.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the schedules provided in Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan of this SMP. At a minimum, a site-wide inspection will be conducted annually. Inspections of remedial components will also be conducted when a breakdown of any treatment system component has occurred or whenever a severe condition has taken place, such as an erosion or flooding event that may affect the ECs.

### 5.1.2 Inspection Forms, Sampling Data, and Maintenance Reports

All inspections and monitoring events will be recorded on the appropriate forms for their respective system which are contained in **Appendices I** and **J** (SVE system / SSDS). Additionally, a general site-wide inspection form will be completed during the site-wide inspection (see **Appendix J**). These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including all media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format in the Periodic Review Report.

### 5.1.3 Evaluation of Records and Reporting

The results of the inspection and Site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- ECs/ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;
- Operation and maintenance activities are being conducted properly; and, based on the above items,
- The Site remedy continues to be protective of public health and the environment and is performing as designed in the RAWP and FER.

## 5.2 Certification of Engineering and Institutional Controls

After the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will prepare the following certification:

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.
- 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] for the Site.

The signed certification will be included in the Periodic Review Report described below.

### 5.3 Periodic Review Report

A Periodic Review Report will be submitted to the Department every year, beginning fifteen months after the Certificate of Completion is issued. 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 **Appendix B** (Metes and Bounds). The report will be prepared in accordance with NYSDEC DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also 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 inspection forms and other records generated for the Site during the reporting period in electronic format;
- 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), 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 electronically in a NYSDEC-approved format;
- 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
- The overall performance and effectiveness of the remedy.

- A performance summary for all treatment systems at the Site during the calendar year, including information such as:
  - The number of days the system was run for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A description of the resolution of performance problems;
  - A summary of the performance, effluent and/or effectiveness monitoring; and
  - Comments, conclusions, and recommendations based on data evaluation.

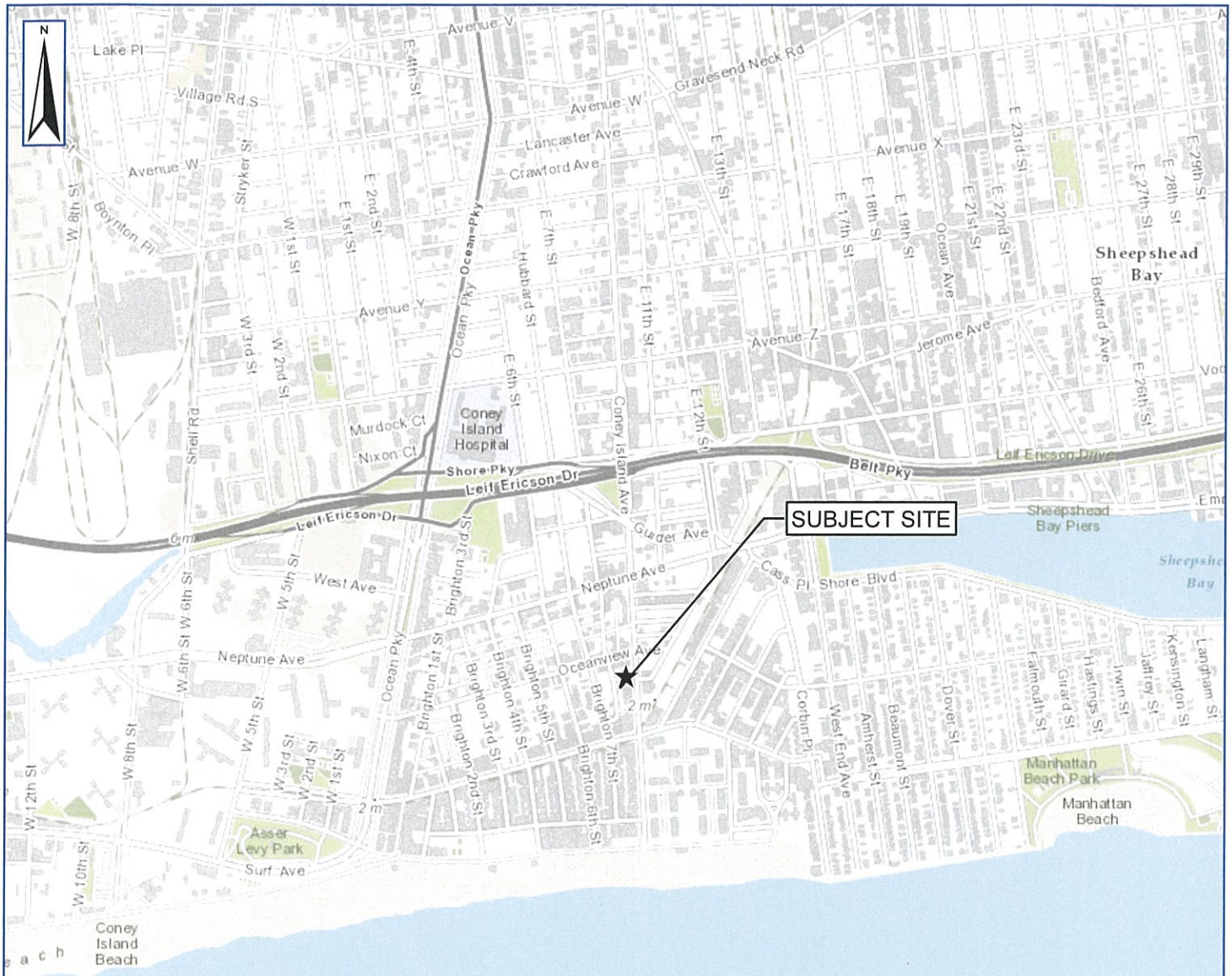
The Periodic Review Report will be submitted, in hard-copy format, to the NYSDEC Central Office and Regional Office in which the Site is located, and in electronic format to NYSDEC Central Office, Regional Office and the NYSDOH Bureau of Environmental Exposure Investigation.

### 5.4 Corrective Measures 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 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 plan until it is approved by the NYSDEC.

# Figures




Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

STATE OF NEW YORK
LICENSED PROFESSIONAL ENGINEER
074604


PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue, • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

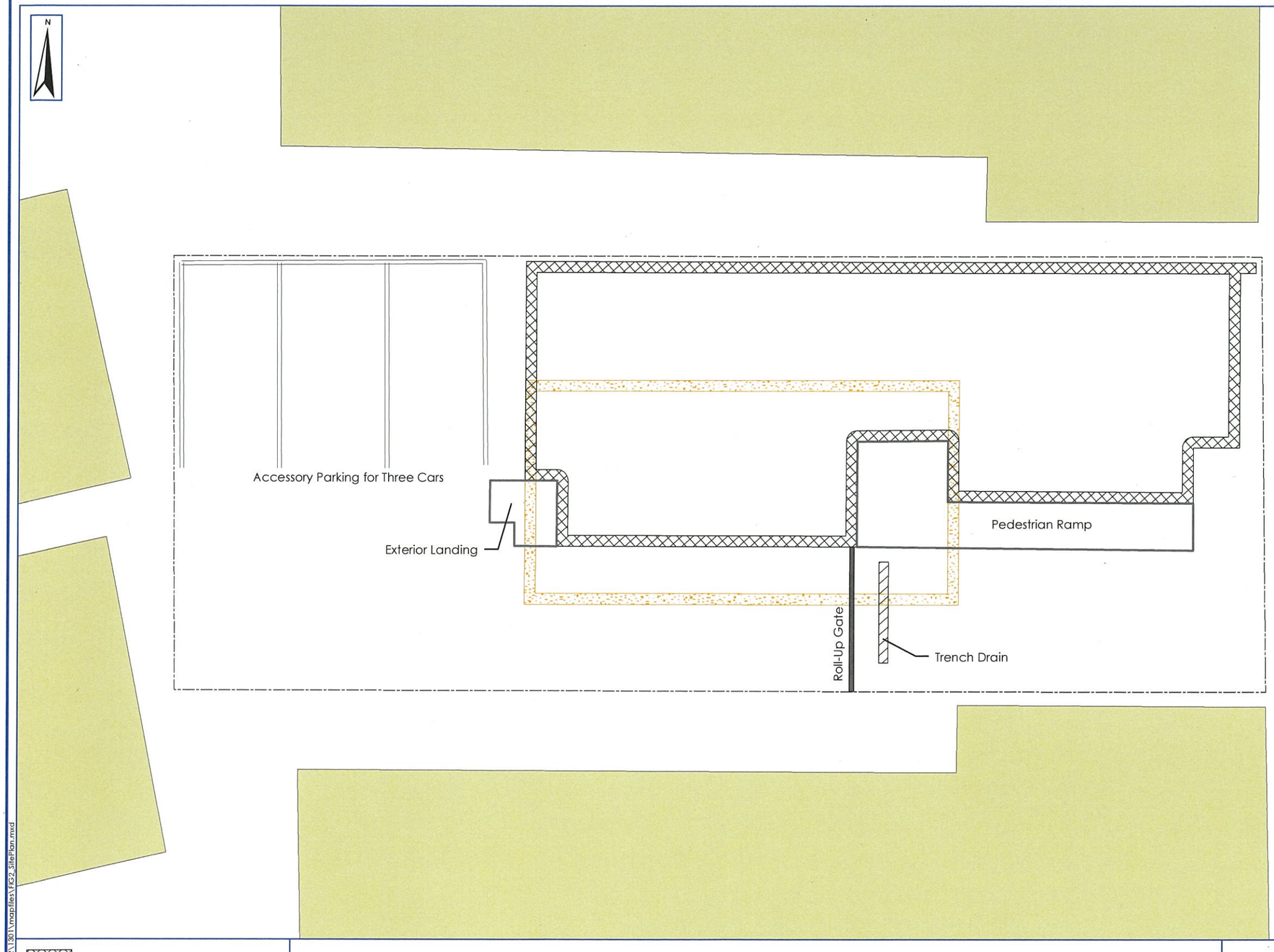

# SUBJECT SITE VICINITY

## 3140 CONEY ISLAND AVENUE
## BROOKLYN, NEW YORK

0 ¼ ½ ¾ 1 Miles

| | |
|---|---|
| Project: | CIR1201 |
| Date: | 2/5/2015 |
| Designed by: | BB |
| Drawn by: | BB |
| Approved by: | JLL |
| Figure No: | 1 |

Document Path: Z:\GIS\Projects\A-D\CIR1301\mapfiles\FIG1_VicinityMap.mxd




CONEY ISLAND AVENUE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH BOYCE
074604
LICENSED PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 2/5/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

First Floor Exterior Wall
Cellar Footprint
Property Boundary
Adjacent Buildings

# CURRENT SITE PLAN

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet

FIGURE NO: 2

SHEET:

Document Path: Z:\GIS\Projects\VA-BD\CIR\1201\mapfiles\FIG2_SitePlan.mxd




Adjacent Buildings

Property Boundary

# SURROUNDING LAND USE

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 50 100 150 200 Feet

PWGC
Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
BRENNETH BOICE
074604
LICENSED PROFESSIONAL ENGINEER
11-6-15

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
172 JAFFREY STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

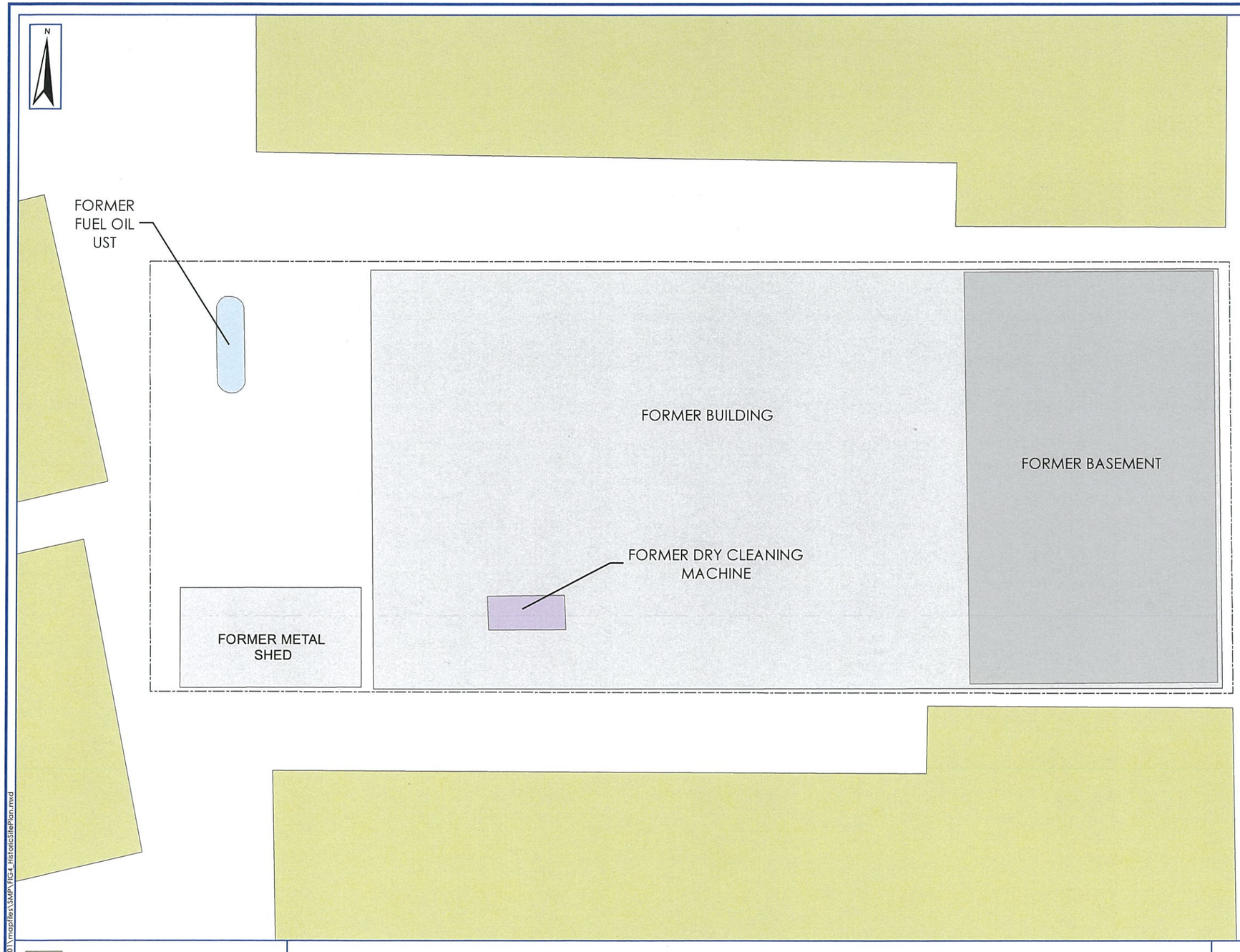
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 3

SHEET:

Document Path: G:\Projects\VA-D\CIR\1201\mapfiles\SMP\Fig3_SurroundingLandUse.mxd




Adjacent Buildings

Property Boundary

# HISTORIC SITE PLAN OF FORMER BRIGHTON CLEANERS

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet

PWGC
Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH GROSSER
074604
LICENSED PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

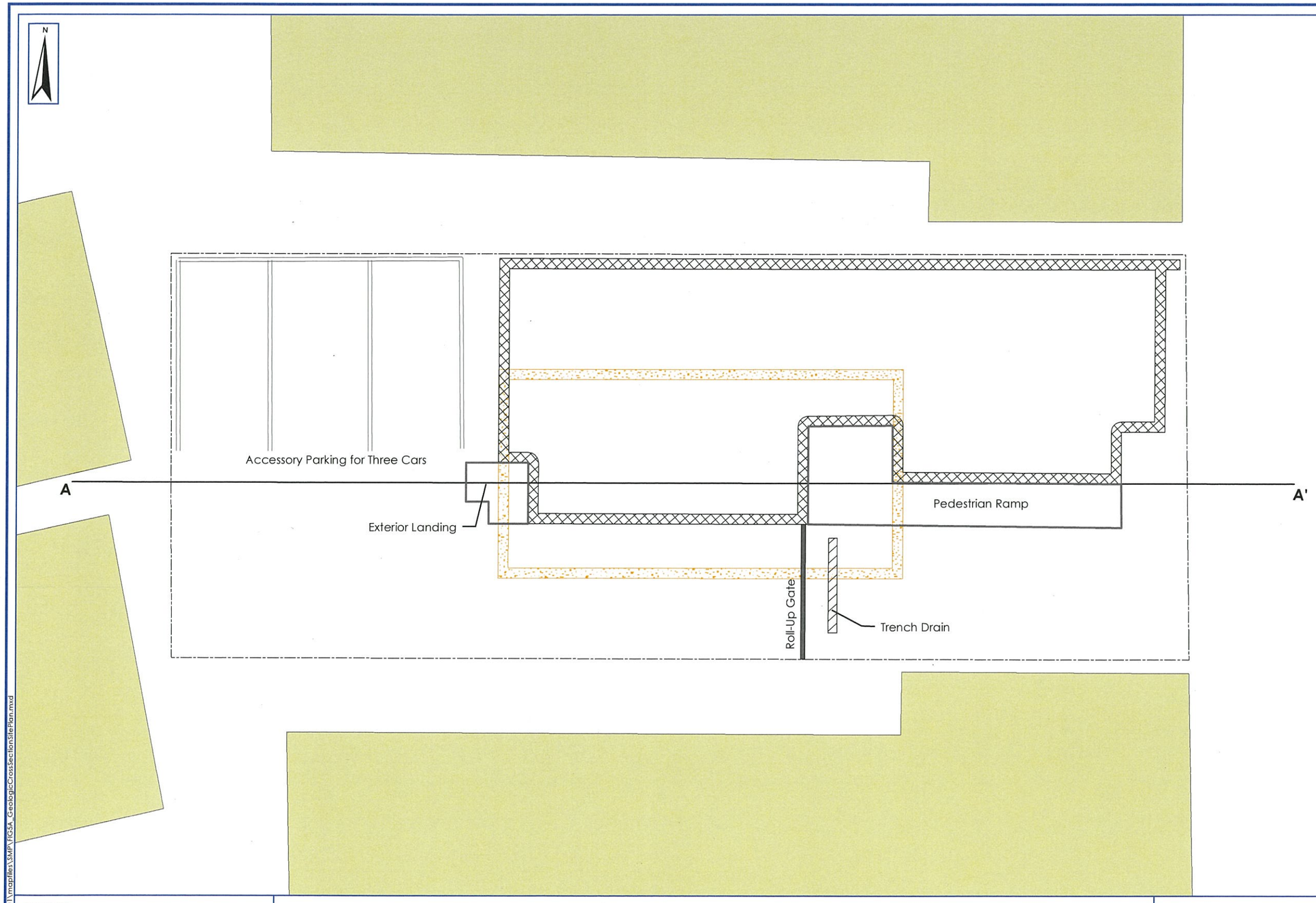
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 4

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG4_HistoricSitePlan.mxd




First Floor Exterior Wall
Cellar Footprint
Property Boundary
Adjacent Buildings

# GEOLOGIC CROSS SECTION SITE PLAN

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet

CONEY ISLAND AVENUE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH BOSE
074604
LICENSED PROFESSIONAL ENGINEER
11/6/15

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

DRAWING INFORMATION:

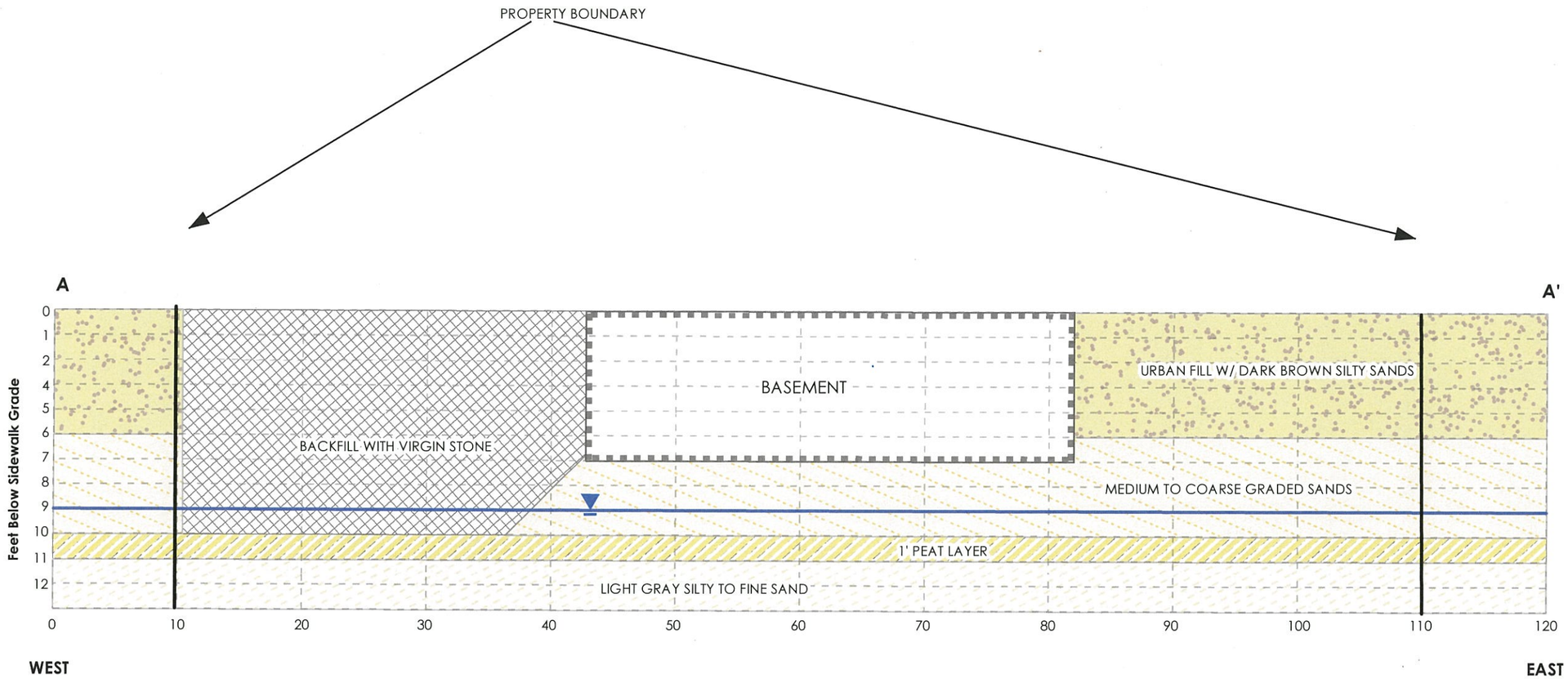
| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO:

5A

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG5A_GeologicCrossSectionSitePlan.mxd




# GEOLOGIC CROSS SECTION

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH BOYCE
074604
LICENSED PROFESSIONAL ENGINEER
11-6-15

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

DRAWING INFORMATION:

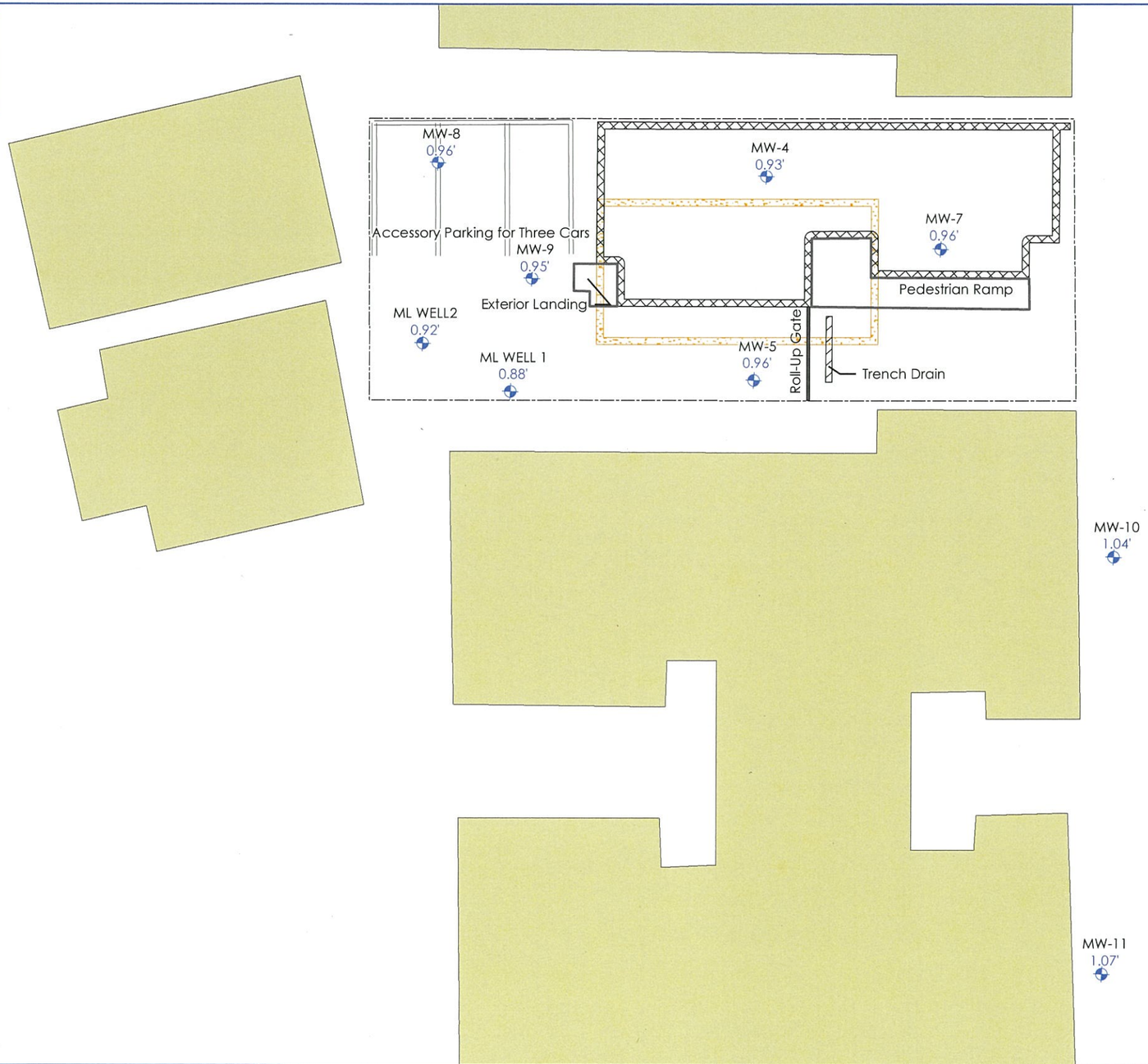
| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | JLL |
| Date: | 11/2/2015 | Drawn by: | JCG |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO:

5B

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG5B_GeologicCrossSection.mxd




REGIONAL GROUNDWATER FLOW DIRECTION

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH ROCE
LICENSED PROFESSIONAL ENGINEER
074604

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

Active Monitoring Wells in Sep 2013
First Floor Exterior Wall
CellarFootprint
Property Boundary
Adjacent Buildings

# GROUNDWATER FLOW DIRECTION
## SEP 30, 2013
3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

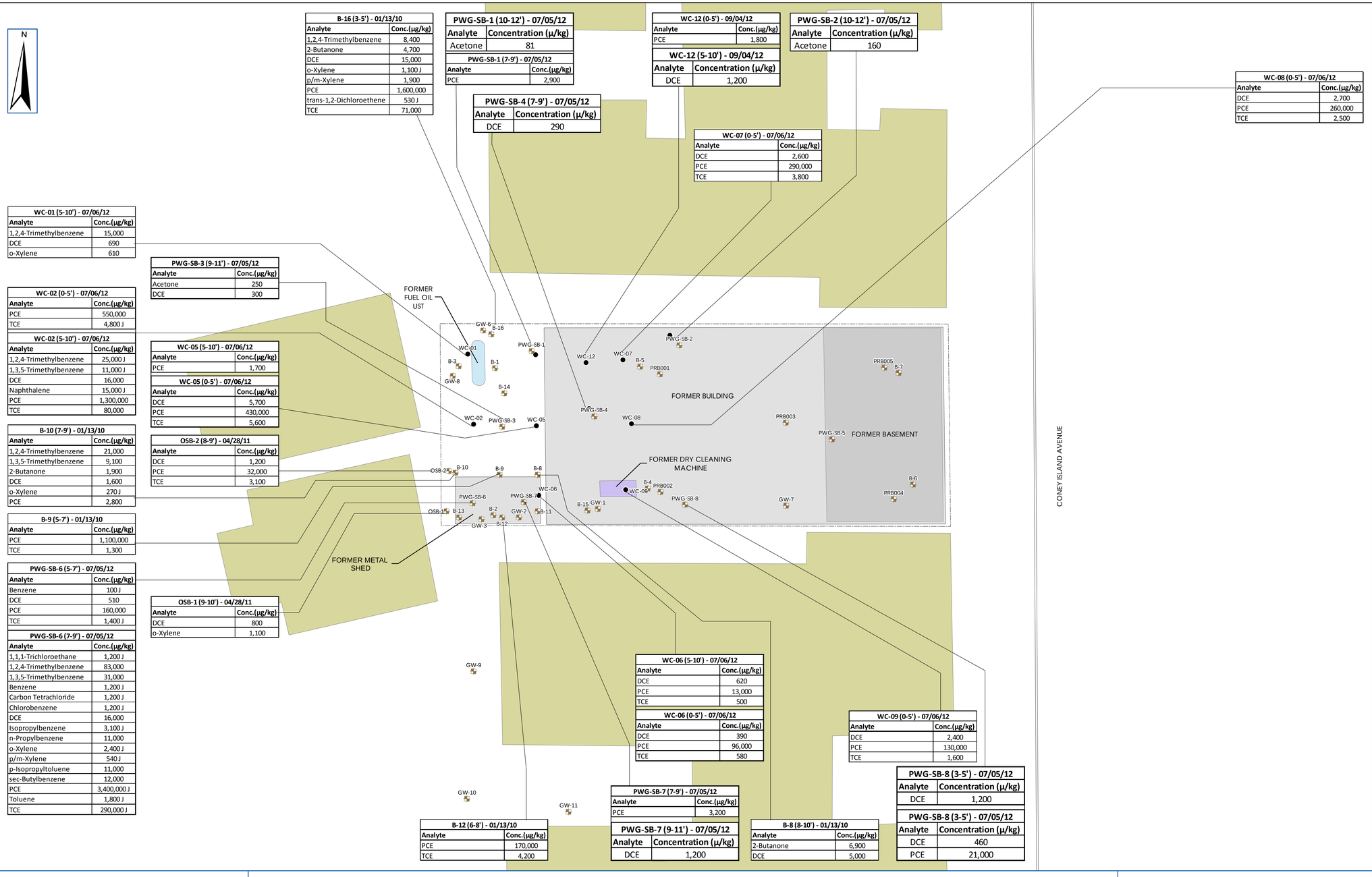
0 20 40 60 80 Feet

NOTE: All existing on-site monitoring wells have been destroyed except ML-WELL 1

FIGURE NO: 6

SHEET:

Document Path: G:\Projects\VA-DV\CIR\1201\maplles\SMP\FIG6_GroundwaterFlowFigure.mxd




Soil Boring
Waste Characterization
Curbline
Adjacent Buildings
Property Boundary

# PRE-IRM SOIL SAMPLE LOCATIONS

## 3140 CONEY ISLAND AVENUE
## BROOKLYN, NEW YORK

0 15 30 60 90 120 Feet

Notes:
Soil analytical data for borings B-2 - B-7 conducted in 2007 was not available.
Analytes displayed are in exceedence of the applicable Unrestricted Use Soil Cleanup Objective.

DCE - cis-1,2-Dichloroethene
PCE - Tetrachloroethene
TCE - Trichloroethene


PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM


This map is formatted to be printed on 22"x34" paper.

STATE OF NEW YORK — JOSEPH E. NETTI — 074604 — LICENSED PROFESSIONAL ENGINEER


UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW


DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
172 JAFFREY STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | JLL |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO:

7

SHEET:

Document Path: G:\Projects\A-D\CIR\13001 (maps files\FER\FIG7 PreRemedySoilSamplingLocations.mxd

| GW-8 (10-14') - 01/14/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4,5-Tetramethylbenzene | 29 |
| 1,2,4-Trimethylbenzene | 42 |
| 1,3,5-Trimethylbenzene | 17 |
| 4-Isopropyltoluene | 6.4 |
| DCE | 160 |
| PCE | 7.5 |
| VC | 9.2 |

| B-3 (depth unknown) - 2007 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4-Trimethylbenzene | 63 |
| 1,3,5-Trimethylbenzene | 21 |
| Acenaphthene (semi-volatile | 27 |
| Benzene | 6.37 |
| DCE | 670 |
| Ethylbenzene | 15 |
| Isopropylbenzene | 11 |
| o-Xylene | 7 |
| Naphthalene | 36 |
| n-Propylbenzene | 16 |
| p/m-Xylene | 29 |
| Phenanthrene (semi-volatile) | 71 |
| sec-Butylbenzene | 6 |
| PCE | 105 |
| Toluene | 8 |
| TCE | 20 |
| VC | 382 |

| GW-6 (10-14') - 01/14/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4,5-Tetramethylbenzene | 16 |
| 1,2,4-Trimethylbenzene | 10 |
| DCE | 5 |
| Naphthalene | 70 |
| PCE | 19 |
| VC | 3.7 |

| GW-6 (21-25') - 01/14/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,1-Dichloroethene | 9.3 |
| DCE | 260 |
| PCE | 11 |
| VC | 350 |

| GW-6 (33-37') - 01/14/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 6 |
| VC | 8.5 |

| GW-6 (48-52') - 01/14/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 14 |

| PWG-VP-01 (10-12') - 07/10/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| Benzene | 1.8 J |
| DCE | 1,100 |
| VC | 580 |

| PWG-VP-01 (30-32') - 07/10/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2-Dichloroethane | 0.62 |
| DCE | 6.6 |
| VC | 300 |

| MW-3 (9-19') - 07/19/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 870 |
| PCE | 410 |
| TCE | 100 |
| VC | 290 |

| B-5 (depth unknown) - 2007 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 458 |
| VC | 63 |

| MW-4 (6.5-16.5') - 07/19/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 74 |
| PCE | 120 |
| TCE | 6.3 |
| VC | 15 |

| MW-4 (7-17') - 07/19/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 5,200 |
| PCE | 1,400 |
| TCE | 1,500 |
| VC | 1,200 |

| B-7 (depth unknown) - 2007 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 17 |
| PCE | 14 |

| B-6 (depth unknown) - 2007 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 33 |
| PCE | 31 |
| TCE | 7 |
| VC | 18 |

| MW-1 (9-19') - 07/19/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 2,700 |
| PCE | 700 |
| TCE | 1,100 |
| VC | 480 |

| OSB-2 (10-12') - 04/28/11 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 27,000 |
| VC | 8,300 |

| OSB-2 (23-25') - 04/28/11 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 72 |
| PCE | 6.5 |
| VC | 24 |

| OSB-2 (35-37') - 04/28/11 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 300 |
| PCE | 7.7 |
| VC | 10 |

| OSB-2 (50-52') - 04/28/11 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4-Trimethylbenzene | 6.8 |
| DCE | 6.5 |
| PCE | 14 |

| MW-2 (9-19') - 07/19/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4-Trimethylbenzene | 1,400 J |
| DCE | 25,000 |
| PCE | 340,000 E |
| TCE | 26,000 |

| OSB-1 (10-12') - 04/28/11 | |
|---|---|
| Analyte | Concentration (µg/L) |
| Benzene | 2.4 |
| Isopropylbenzene | 8.1 |
| VC | 15 |

| OSB-1 (23-25') - 04/28/11 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 5.2 |
| VC | 5.5 |

| PWG-VP-02 (10-12') - 07/06/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 74 J |
| PCE | 84 |
| trans-1,2-Dichloroethene | 8.1 J |
| TCE | 6 |
| VC | 610 |

| PWG-VP-02 (30-32') - 07/09/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 100 |
| TCE | 8.7 |

| PWG-VP-02 (40-42') - 07/09/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 16 J |

| PWG-VP-02 (50-52') - 07/09/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 36 J |

| PWG-VP-02 (60-62') - 07/09/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 21 |

| PWG-VP-02 (70-72') - 07/09/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 15 |

| PWG-VP-02 (80-82') - 07/09/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 62 J |

| PWG-VP-02 (90-92') - 07/09/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 41 |

| PWG-VP-02 (100-102') - 07/09/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 7.7 |
| PCE | 230 |
| TCE | 15 |

| B-2 (depth unknown) - 2007 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4-Trimethylbenzene | 16 |
| 1,3,5-Trimethylbenzene | 6 |
| Benzene | 1.9 |
| DCE | 12,800 |
| PCE | 22 |
| TCE | 1,700 |
| VC | 2,080 |

| GW-3 (10-14') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4,5-Tetramethylbenzene | 7.3 |
| DCE | 940 |
| PCE | 72 |
| trans-1,2-Dichloroethene | 5.2 |
| TCE | 120 |
| VC | 290 |

| GW-3 (21-25') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 1200 |
| PCE | 220 |
| trans-1,2-Dichloroethene | 8.8 |
| TCE | 330 |
| VC | 280 |

| GW-3 (33-37') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 8.3 |

| GW-3 (48-52') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 35 |

| GW-2 (10-14') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4,5-Tetramethylbenzene | 43 |
| 1,2,4-Trimethylbenzene | 65 |
| 1,3,5-Trimethylbenzene | 27 |
| 4-Isopropyltoluene | 17 |
| DCE | 470 |
| Ethylbenzene | 5.9 |
| Isopropylbenzene | 5.7 |
| n-Butylbenzene | 5.8 |
| n-Propylbenzene | 13 |
| p/m-Xylene | 4.3 |
| sec-Butylbenzene | 7.6 |
| PCE | 20,000 |
| trans-1,2-Dichloroethene | 11 |
| TCE | 1,600 |
| VC | 160 |

| GW-2 (21-25') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 86 |

| GW-2 (33-37') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 53 |

| GW-2 (48-52') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| PCE | 18 |

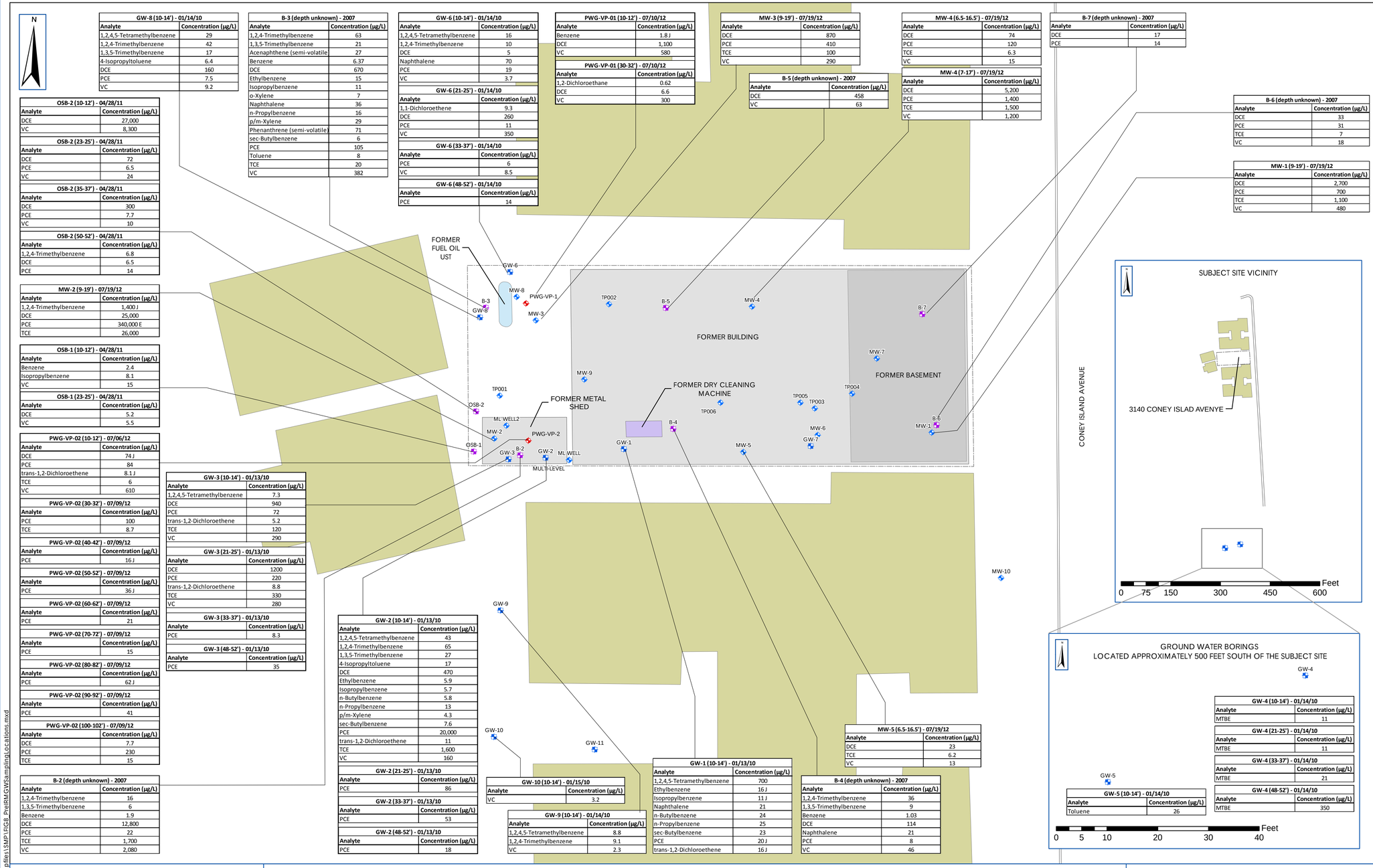
| GW-10 (10-14') - 01/15/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| VC | 3.2 |

| GW-9 (10-14') - 01/14/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4,5-Tetramethylbenzene | 8.8 |
| 1,2,4-Trimethylbenzene | 9.1 |
| VC | 2.3 |

| GW-1 (10-14') - 01/13/10 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4,5-Tetramethylbenzene | 700 |
| Ethylbenzene | 16 J |
| Isopropylbenzene | 11 J |
| Naphthalene | 21 |
| n-Butylbenzene | 24 |
| n-Propylbenzene | 25 |
| sec-Butylbenzene | 23 |
| PCE | 20 J |
| trans-1,2-Dichloroethene | 16 J |

| B-4 (depth unknown) - 2007 | |
|---|---|
| Analyte | Concentration (µg/L) |
| 1,2,4-Trimethylbenzene | 36 |
| 1,3,5-Trimethylbenzene | 9 |
| Benzene | 1.03 |
| DCE | 114 |
| Naphthalene | 21 |
| PCE | 8 |
| VC | 46 |

| MW-5 (6.5-16.5') - 07/19/12 | |
|---|---|
| Analyte | Concentration (µg/L) |
| DCE | 23 |
| TCE | 6.2 |
| VC | 13 |










Monitoring Well
Vertical Profile
Groundwater
Soil and Groundwater
Curbline
Adjacent Buildings
Property Boundary

# PRE-IRM GROUNDWATER SAMPLE LOCATIONS

## 3140 CONEY ISLAND AVENUE
## BROOKLYN, NEW YORK

0 25 50 75 100 Feet

Notes:
DCE - cis-1,2-Dichloroethene
PCE - Tetrachloroethene
TCE - Trichloroethene
VC - Vinyl Chloride

Analytes displayed are in exceedece of their applicable NYSDEC Ambient Water Quality Class GA Standard.


PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM


This map is formatted to be printed on 22"x34" paper.

STATE OF NEW YORK — PAUL J. NETTI — 074604 — LICENSED PROFESSIONAL ENGINEER


UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW


DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
172 JAFFREY STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

DRAWING INFORMATION:

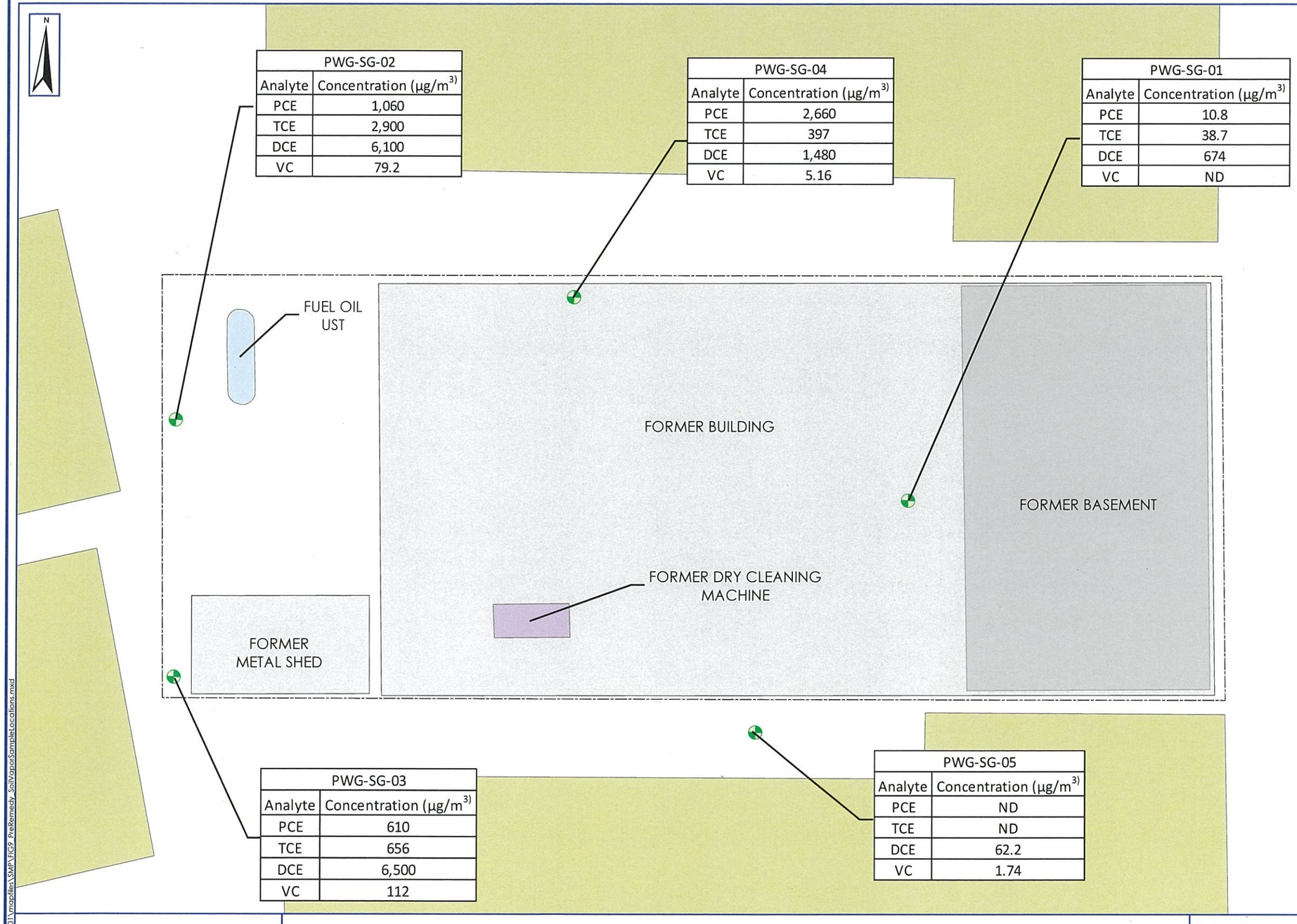
| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | JLL |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO:

8

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG8_PrePIMGWSamplingLocations.mxd




Adjacent Buildings

Property Boundary

Soil Vapor Sampling Location

# PRE-REMEDY SOIL VAPOR SAMPLING LOCATIONS

3140 CONEY ISLAND AVENUE
BROOKLY, NEW YORK

0 10 20 30 40 Feet

Note: Primary chlorinated volatile organic compounds included for each sample.

PCE - Tetrachloroethene
TCE - Trichloroethene
DCE - CIS-1,2-dichloroethene
VC - Vinyl chloride
ND - Non-Detect

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH HOYCE
074604
LICENSED PROFESSIONAL ENGINEER
11/6/15

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

3140 CONEY ISLAND REALTY, LLC
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

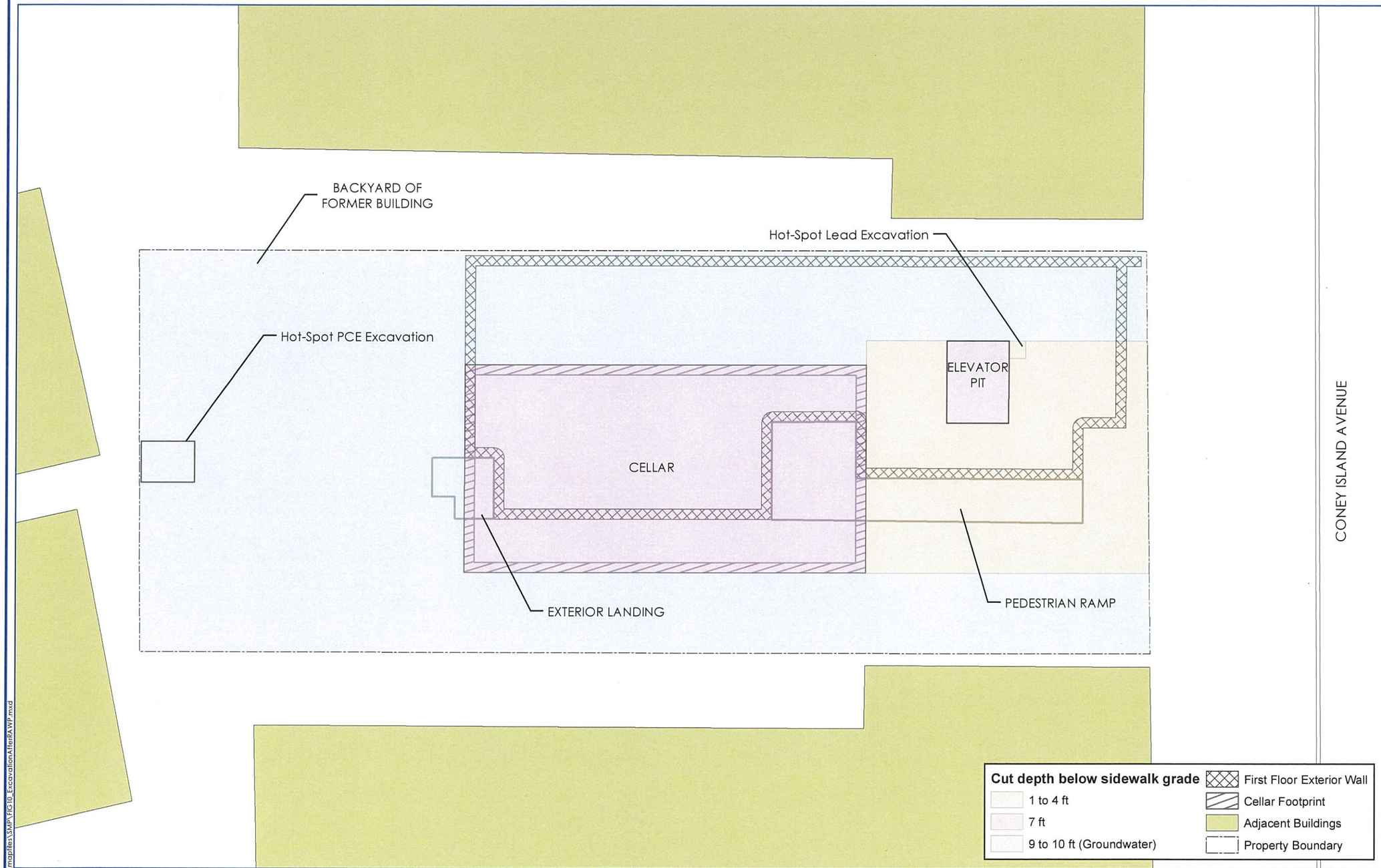
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 9

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG9_PreRemedy_SoilVaporSampleLocations.mxd




# AREAS OF EXCAVATION FOLLOWING RAWP IMPLEMENTATION

3140 CONEY ISLAND AVENUE
BROOLYN, NEW YORK

0 10 20 30 40 Feet

CONEY ISLAND AVENUE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
JOHN HENRY
LICENSED PROFESSIONAL ENGINEER
074604
11-06-15

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

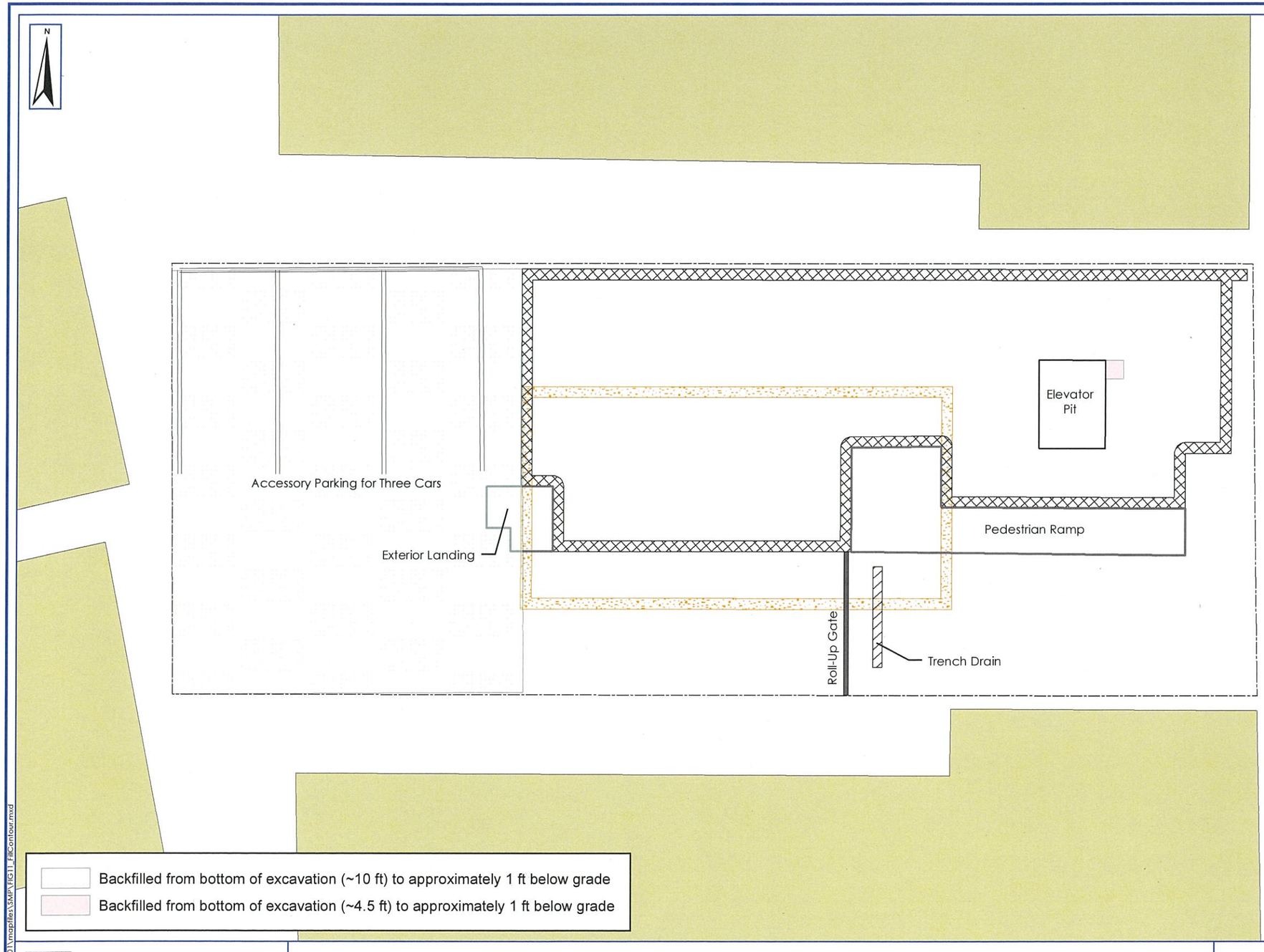
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | JLL |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO:
10

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\maplles\SMP\FIG10_ExcavationAfterRAWP.mxd




# CONTOUR MAP OF FILL THICKNESS

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

Note: Backfill consited of 3/4 inch virgin stone. Virgin stone material was also used to backfill a 3 inch diameter area surrounding each SVE lateral not shown on the figure.

CONEY ISLAND AVENUE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL W. GROSSER
LICENSED PROFESSIONAL ENGINEER
074604

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

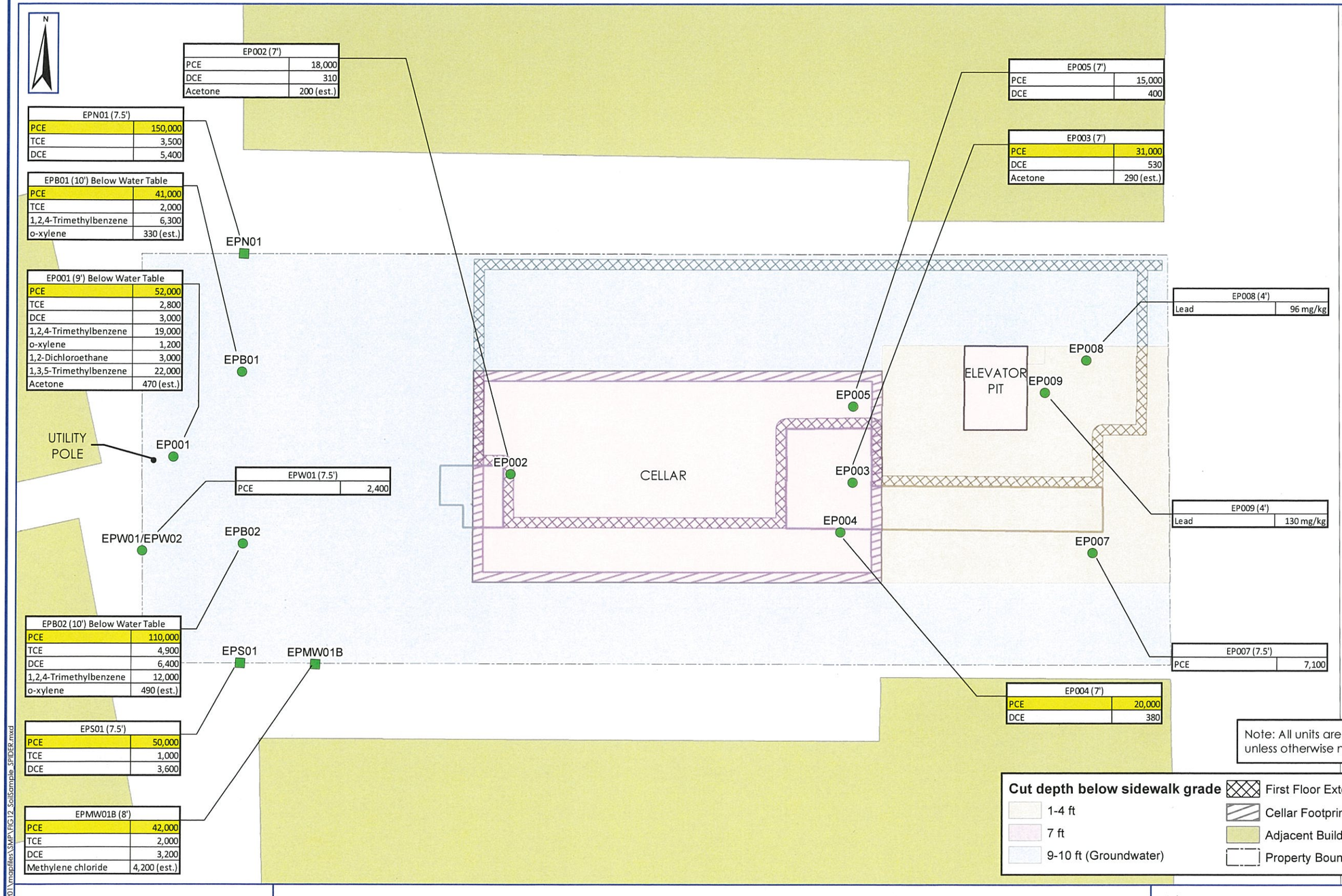
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 11

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG11_FillContour.mxd




**Endpoint Sample**

- Bottom
- Sidewall

# SOIL SAMPLE LOCATIONS AFTER EXCAVATION

3140 CONEY ISLAND AVENUE
BROOLYN, NEW YORK

0 10 20 30 40 Feet

Notes:
-Analytes displayed are in exceedence of their respective Unrestricted Use Soil Cleanup Objectives.
-Shaded analytes are in exceedence of Restricted Residential Soil Cleanup Objectives.
-Water table exists between 9 and 10 ft below sidewalk grade.
-PCE - Tetrachloroethene
-DCE - Dichloroethene
-TCE - Trichloroethene


PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM


STATE OF NEW YORK · PAUL KENNETH BOYCE · LICENSED PROFESSIONAL ENGINEER · 074604


UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW


DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

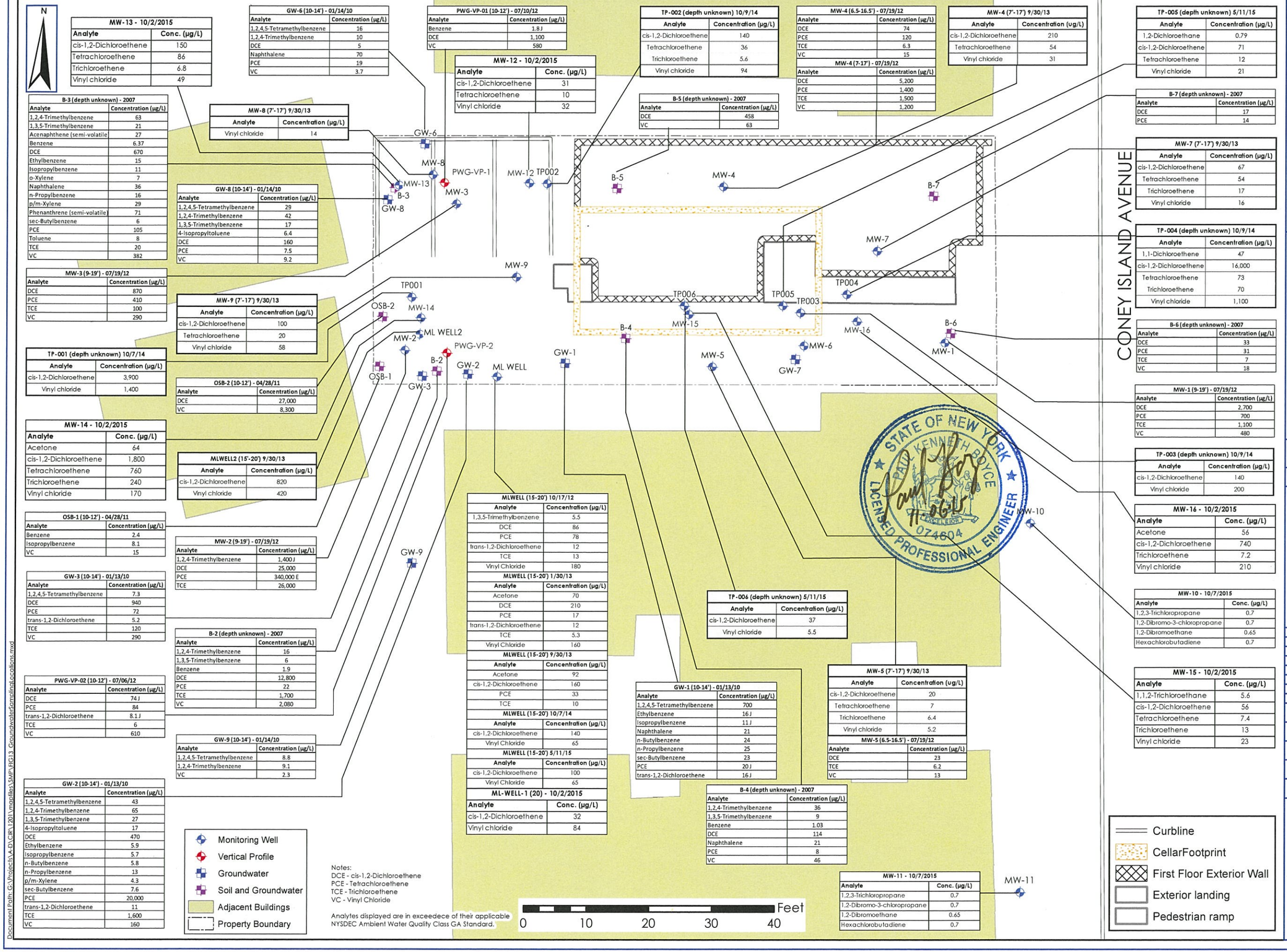
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | JLL |
| Date: | 11/2/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 12

SHEET:

Document Path: G:\Projects\VA-DV\CIR\1201\mapfiles\SMP\FIG12_SoilSample_SPIDER.mxd




Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG13_GroundwaterSampleLocations.mxd

PWGC
Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

# SHALLOW GROUNDWATER SAMPLE LOCATIONS

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
172 JAFFREY STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

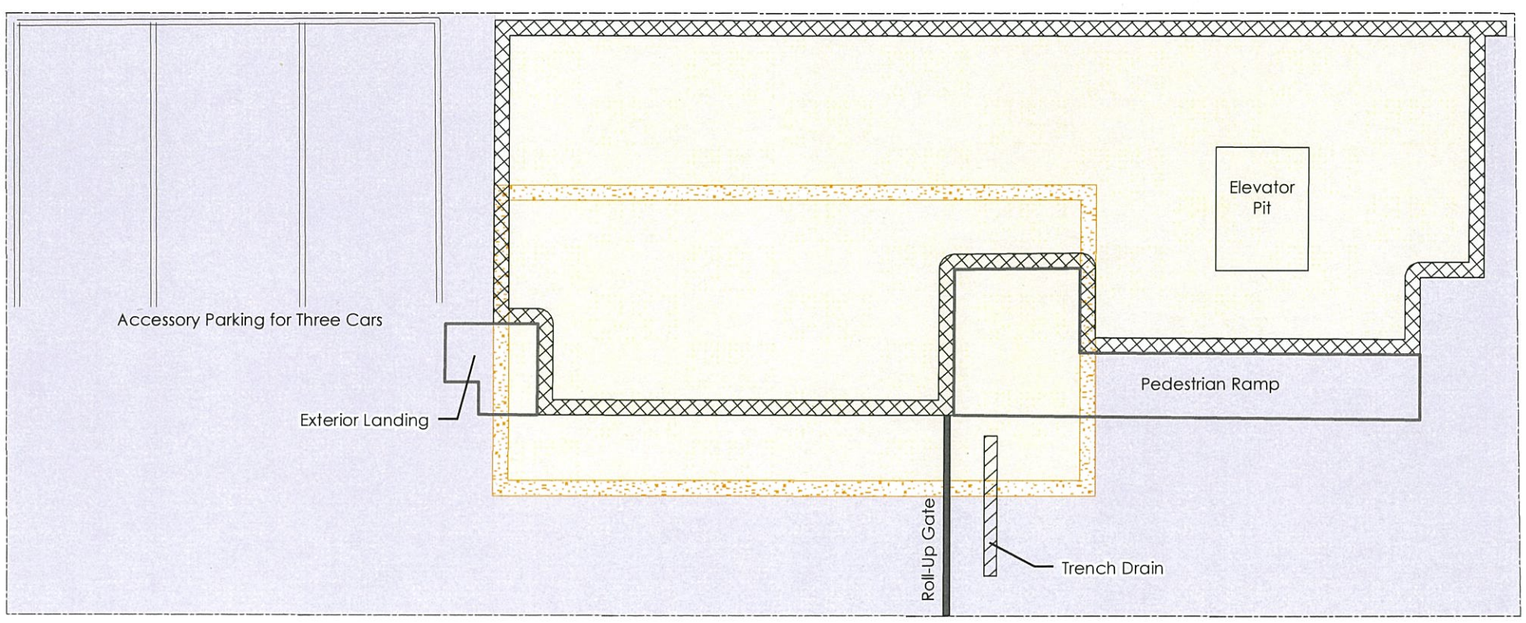
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | JLL |
| Date: | 11/5/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO:

13

SHEET:




6 inch thick concrete driveway and parking lot
6 inch thick concrete slabs

First Floor Exterior Wall
Cellar Footprint
Property Boundary
Adjacent Buildings

# LOCATION OF COMPOSITE COVER SYSTEM

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet

CONEY ISLAND AVENUE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH BOYT
074604
LICENSED PROFESSIONAL ENGINEER
11/6/15

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

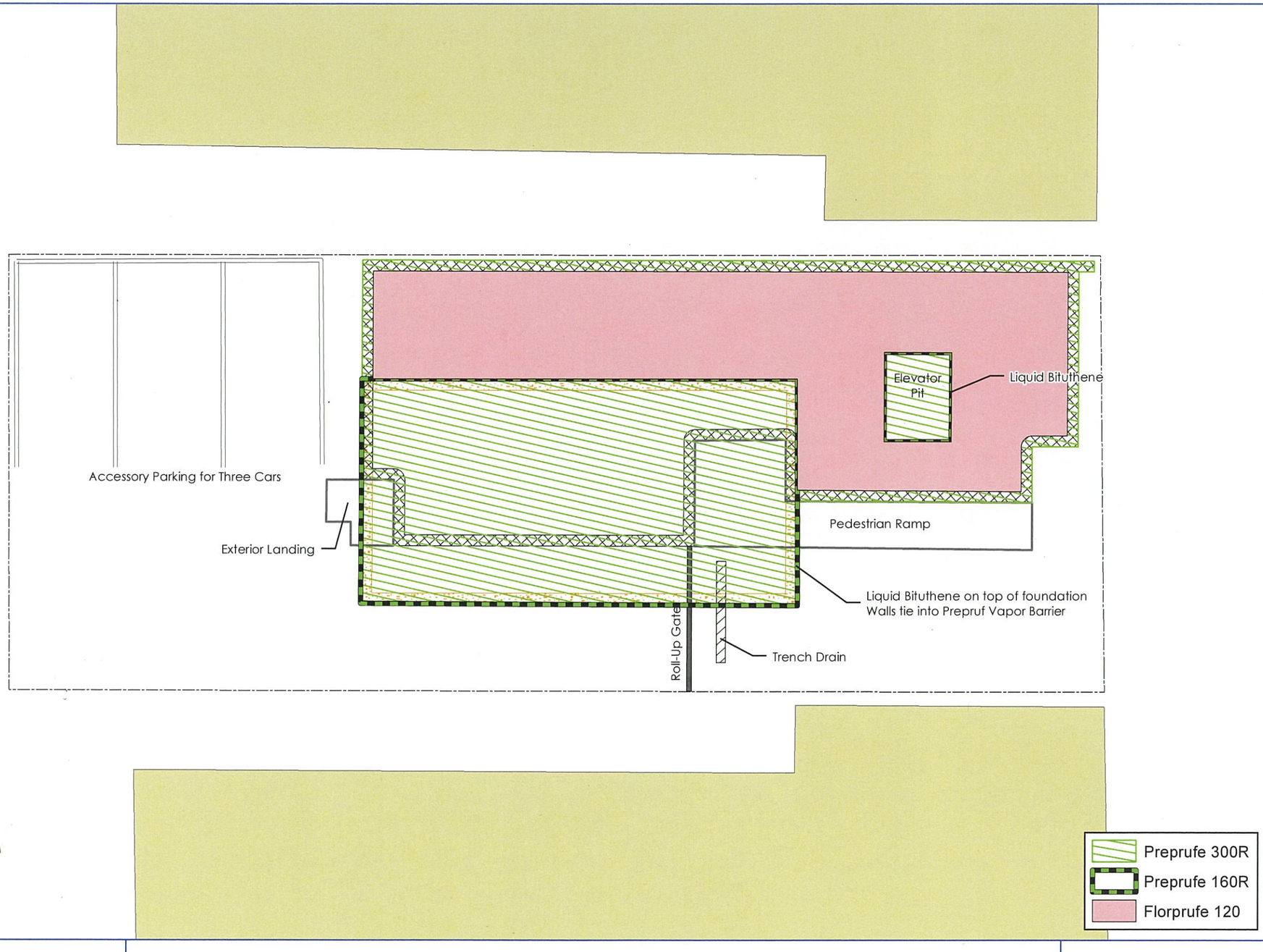
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/4/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 14

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG14_LocationOfCAP.mxd




First Floor Exterior Wall
Cellar Footprint
Property Boundary
Adjacent Buildings

# CONSTRUCTION MEMBRANE LOCATION

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet

CONEY ISLAND AVENUE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH BOEHNE
074604
LICENSED PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

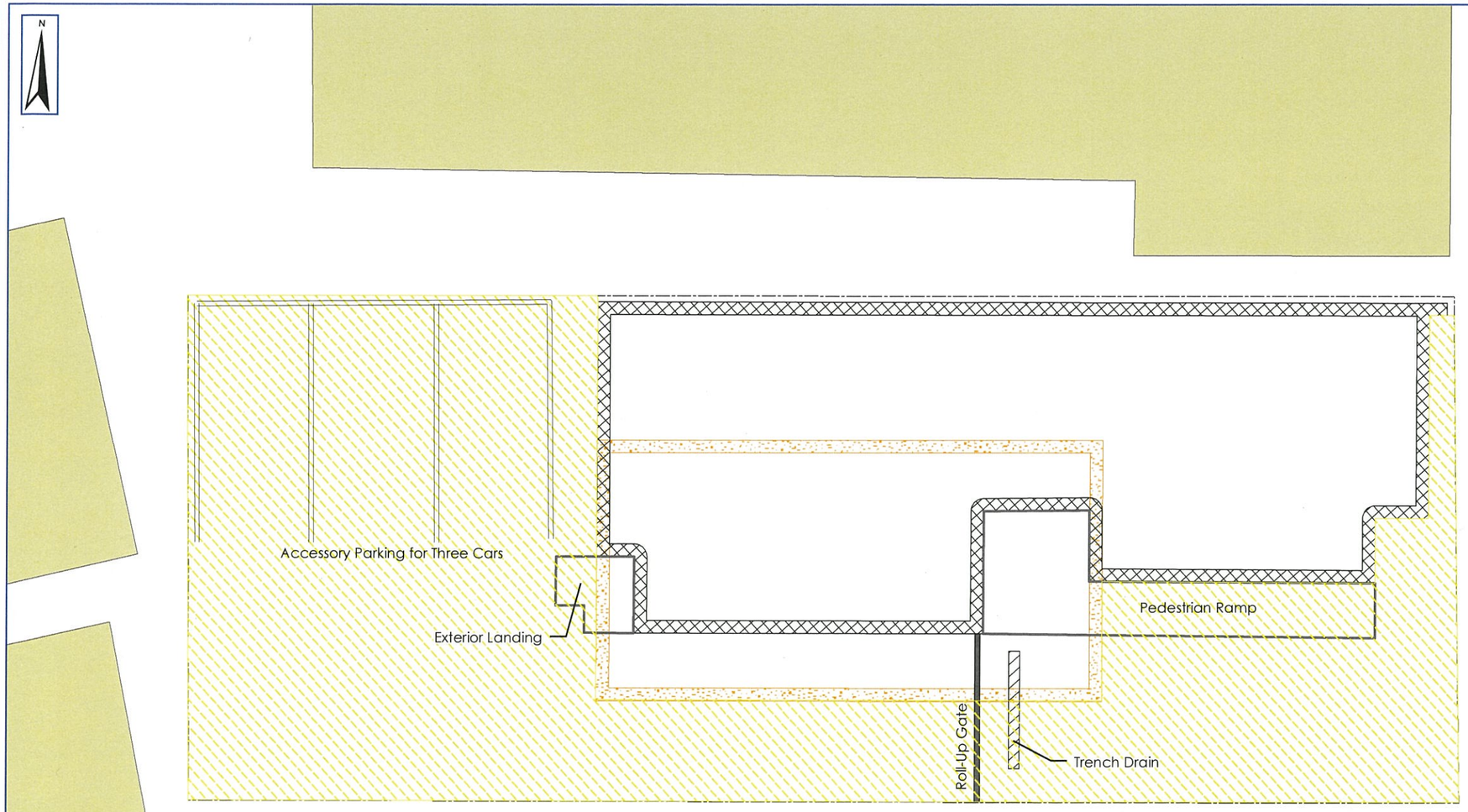
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/5/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 15

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG15_VaporBarrierLocation.mxd




# POTENTIAL AREA OF SOIL VAPOR INTRUSION

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet

Note: Potential Area of Soil Vapor Intrusion is outside of areas where the vapor barrier has been installed, but the SVE system will be operating.

CONEY ISLAND AVENUE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH BOYCE
LICENSED PROFESSIONAL ENGINEER
074604

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

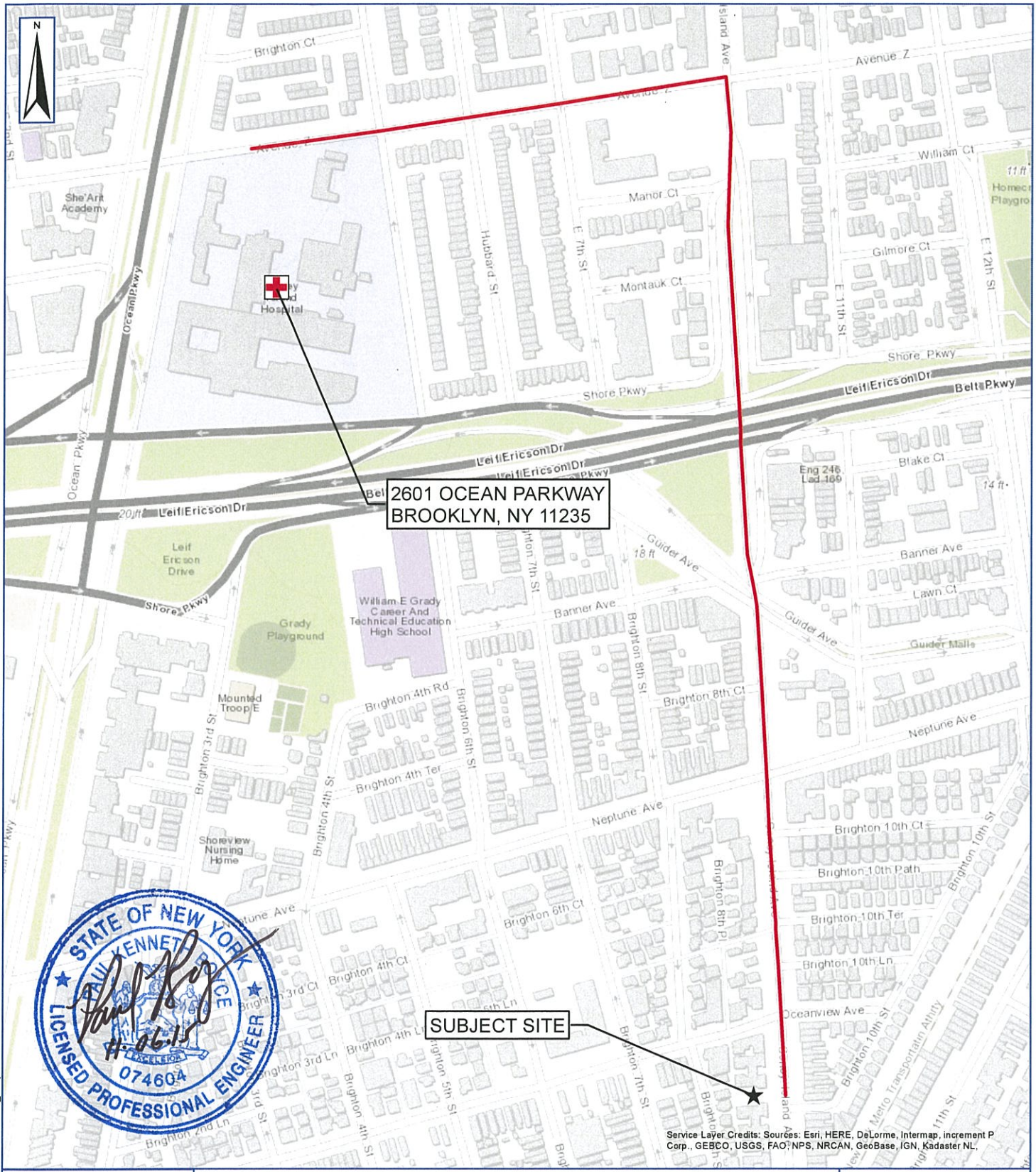
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 7/27/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 16

SHEET:

Document Path: G:\Projects\A-D\CIR\1301\mapfiles\VERF\FIG16_PotentialSoilVaporIntrusion.mxd




STATE OF NEW YORK
PAUL KENNETH PRICE
LICENSED PROFESSIONAL ENGINEER
074604

# HOSPITAL ROUTE

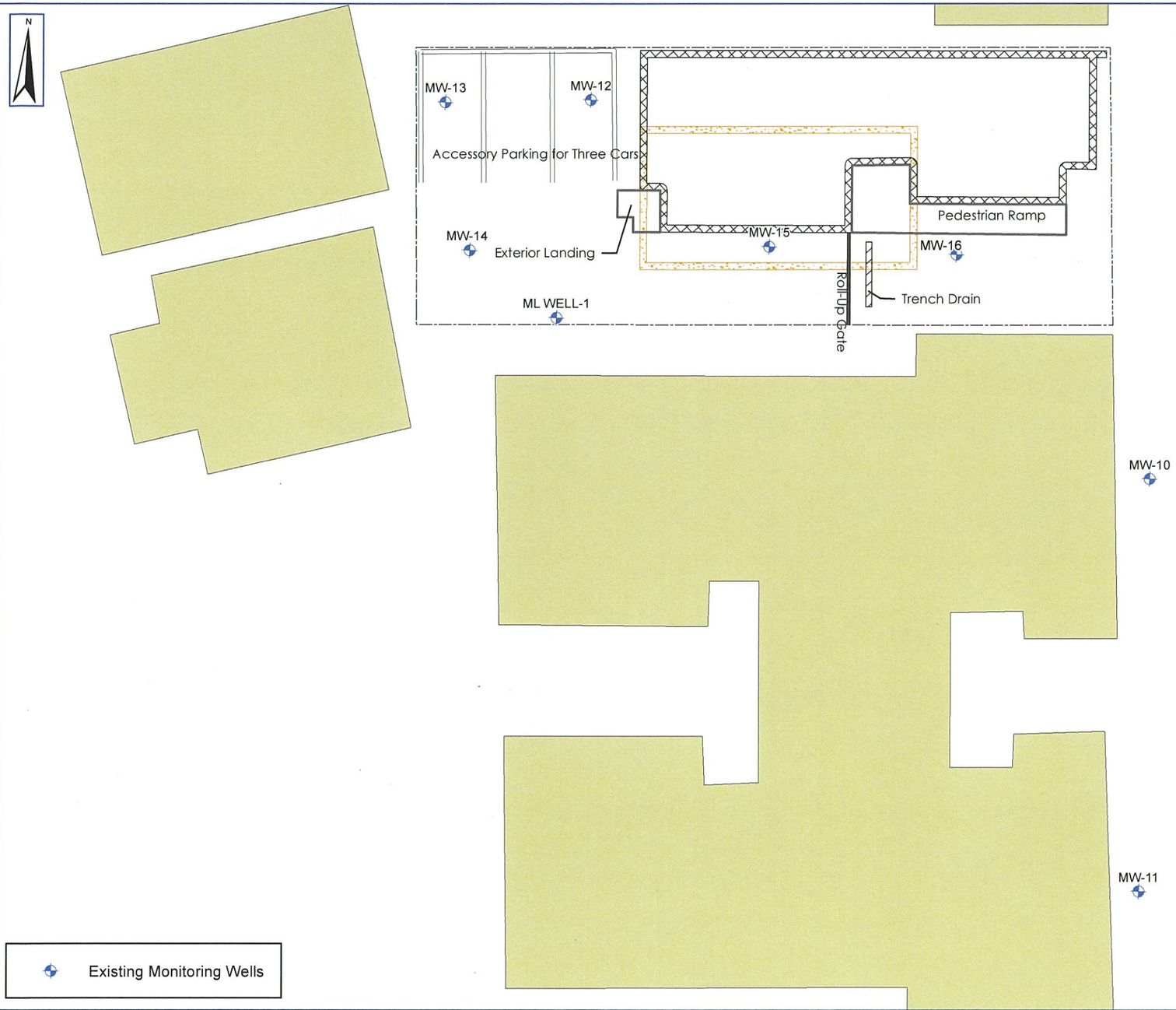
3140 Coney Island Avenue
Brooklyn, NY

Feet
0 300 600 900 1,200

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

| | |
|---|---|
| Project: | CIR1301 |
| Date: | 11/5/2015 |
| Designed by: | JLL |
| Drawn by: | JCG |
| Approved by: | JLL |
| Figure No: | 17 |

Document Path: G:\Projects\A-D\CIR1\1201\maps\files\SMP\FIG17_HospitalRoute.mxd




CONEY ISLAND AVENUE

# MONITORING WELL NETWORK

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH BOYCE
074604
LICENSED PROFESSIONAL ENGINEER
11.6.15

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

DRAWING INFORMATION:

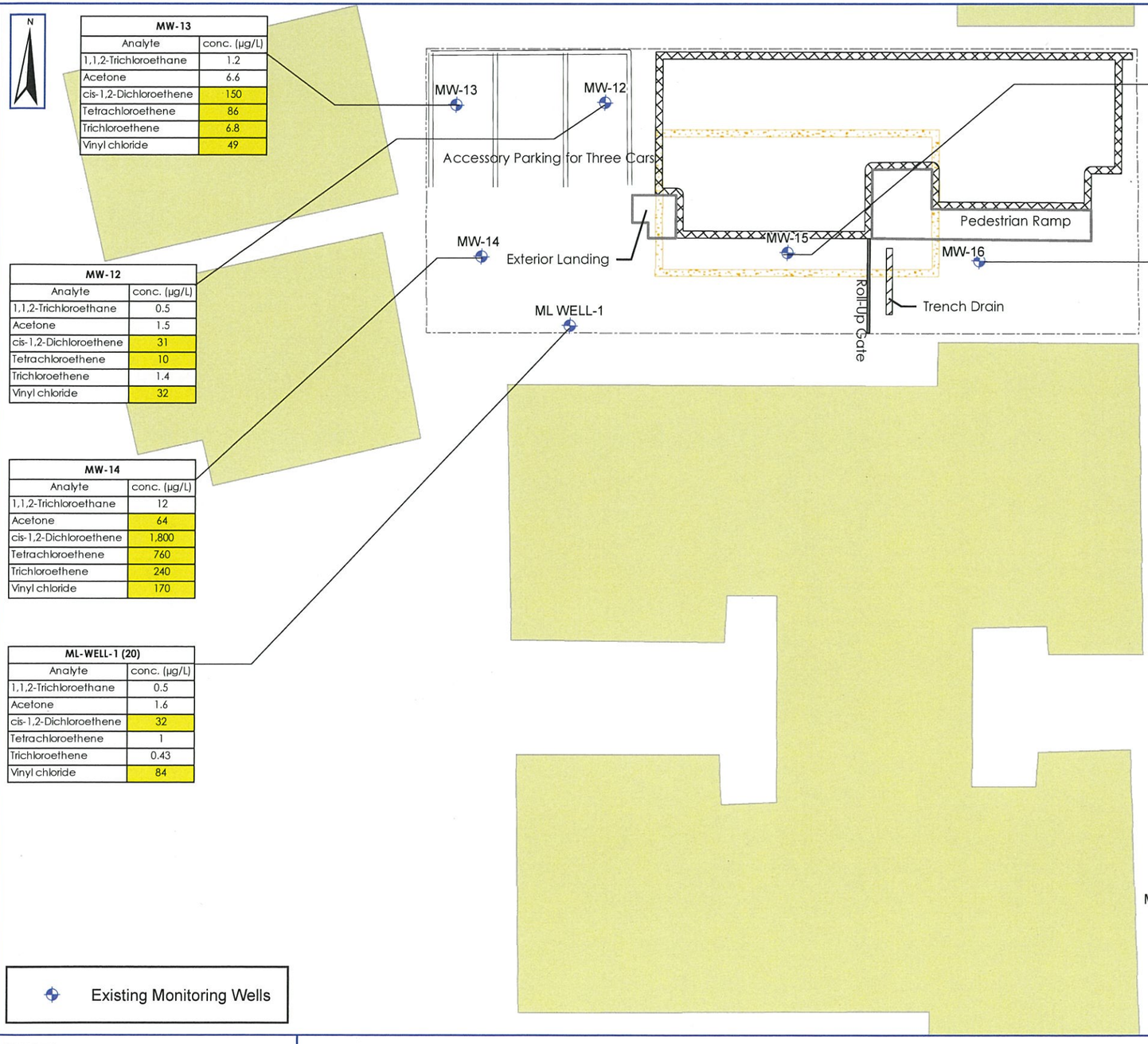
| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/2/2015 | Drawn by: | JCG |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO:

18

SHEET:

Document Path: G:\Projects\VA-D\CIR\1201\mapfiles\SMP\Fig18_MonitoringWellNetwork.mxd




| MW-13 | |
|---|---|
| Analyte | conc. (µg/L) |
| 1,1,2-Trichloroethane | 1.2 |
| Acetone | 6.6 |
| cis-1,2-Dichloroethene | 150 |
| Tetrachloroethene | 86 |
| Trichloroethene | 6.8 |
| Vinyl chloride | 49 |

| MW-12 | |
|---|---|
| Analyte | conc. (µg/L) |
| 1,1,2-Trichloroethane | 0.5 |
| Acetone | 1.5 |
| cis-1,2-Dichloroethene | 31 |
| Tetrachloroethene | 10 |
| Trichloroethene | 1.4 |
| Vinyl chloride | 32 |

| MW-14 | |
|---|---|
| Analyte | conc. (µg/L) |
| 1,1,2-Trichloroethane | 12 |
| Acetone | 64 |
| cis-1,2-Dichloroethene | 1,800 |
| Tetrachloroethene | 760 |
| Trichloroethene | 240 |
| Vinyl chloride | 170 |

| ML-WELL-1 (20) | |
|---|---|
| Analyte | conc. (µg/L) |
| 1,1,2-Trichloroethane | 0.5 |
| Acetone | 1.6 |
| cis-1,2-Dichloroethene | 32 |
| Tetrachloroethene | 1 |
| Trichloroethene | 0.43 |
| Vinyl chloride | 84 |

| MW-15 | |
|---|---|
| Analyte | conc. (µg/L) |
| 1,1,2-Trichloroethane | 5.6 |
| Acetone | 13 |
| cis-1,2-Dichloroethene | 56 |
| Tetrachloroethene | 7.4 |
| Trichloroethene | 13 |
| Vinyl chloride | 23 |

| MW-16 | |
|---|---|
| Analyte | conc. (µg/L) |
| 1,1,2-Trichloroethane | 10 |
| Acetone | 56 |
| cis-1,2-Dichloroethene | 740 |
| Tetrachloroethene | 3.7 |
| Trichloroethene | 7.2 |
| Vinyl chloride | 210 |

| Analyte | NYSDEC AWQS (µg/L) |
|---|---|
| 1,1,2-Trichloroethane | 1 |
| Acetone | 50 |
| cis-1,2-Dichloroethene | 5 |
| Tetrachloroethene | 5 |
| Trichloroethene | 5 |
| Vinyl chloride | 2 |

Existing Monitoring Wells

First Floor Exterior Wall
Cellar Footprint
Property Boundary
Adjacent Buildings

# MONITORING WELL NETWORK

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 20 40 60 80 Feet

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK · PAUL JENNEY BOSE · 074604 · LICENSED PROFESSIONAL ENGINEER
11-06-15

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

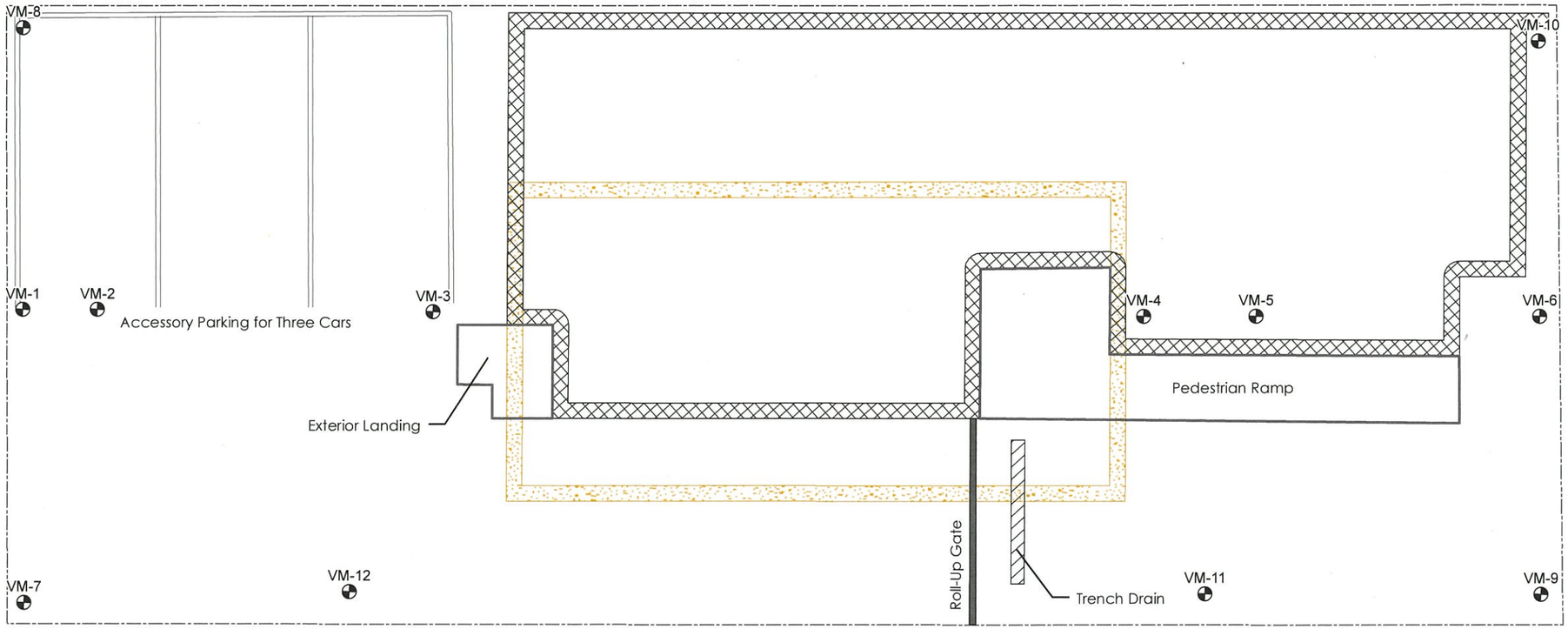
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/4/2015 | Drawn by: | JCG |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 19

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG19_BaselinePostRemediationGroundwaterQuality.mxd




# VACUUM MONITORING POINTS

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK


PWGC
Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM


STATE OF NEW YORK
PAUL KENNETH BOYCE
074604
LICENSED PROFESSIONAL ENGINEER
11-20-15


UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW


DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/16/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

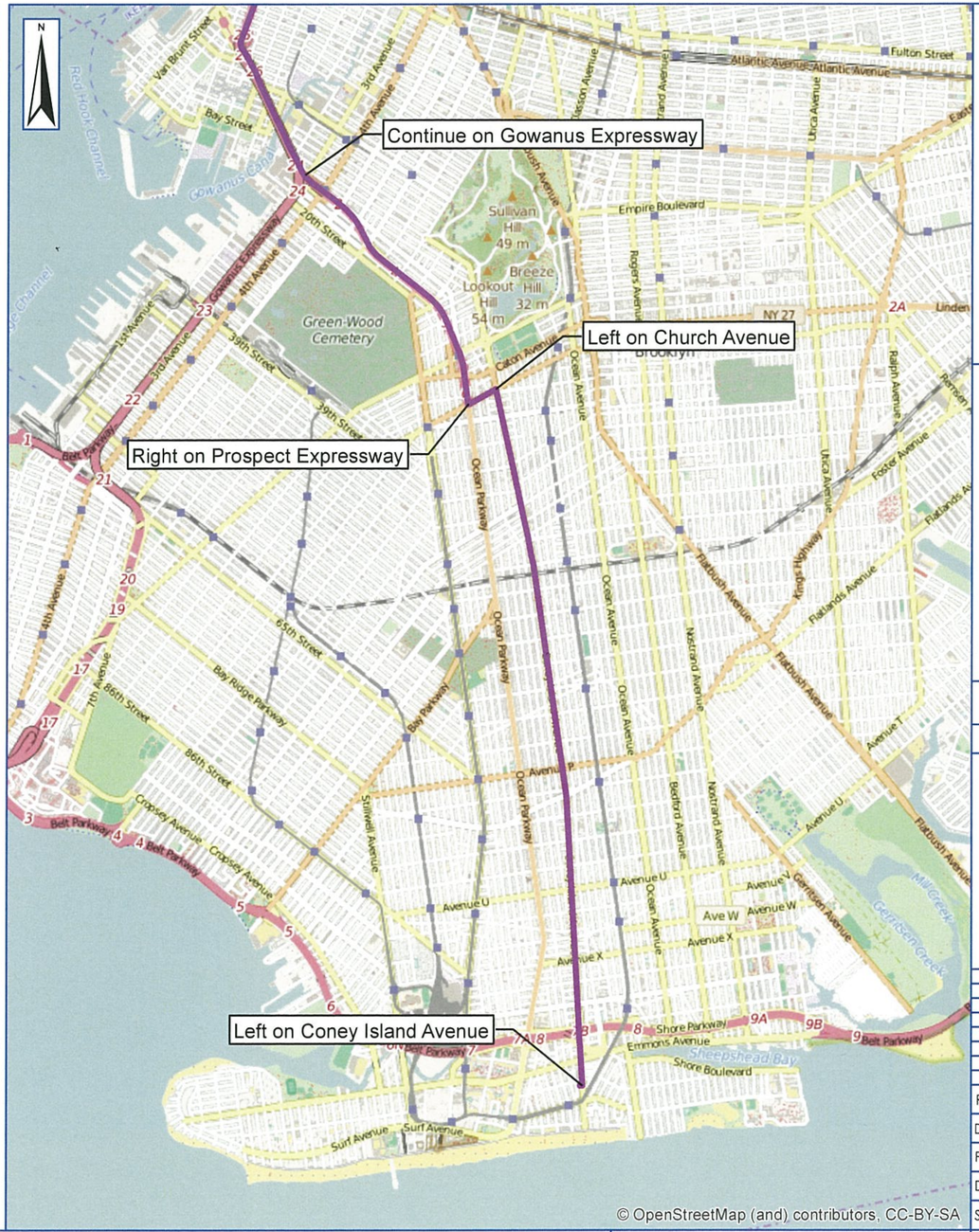
FIGURE NO:

20

SHEET:

Document Path: G:\Projects\VA-D\CIR\1201\mapfiles\SMPVFIG20_VacuumMonitoringPoints.mxd




Route To Site

Route From Site

# PROPOSED TRUCK ROUTES

BROOKLYN - QUEENS
NEW YORK

0 1 2 3 4 Miles


PWGC
Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM


STATE OF NEW YORK
PAUL KENNETH BOYCE
LICENSED PROFESSIONAL ENGINEER
074604


UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW


DRAWING PREPARED FOR:

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

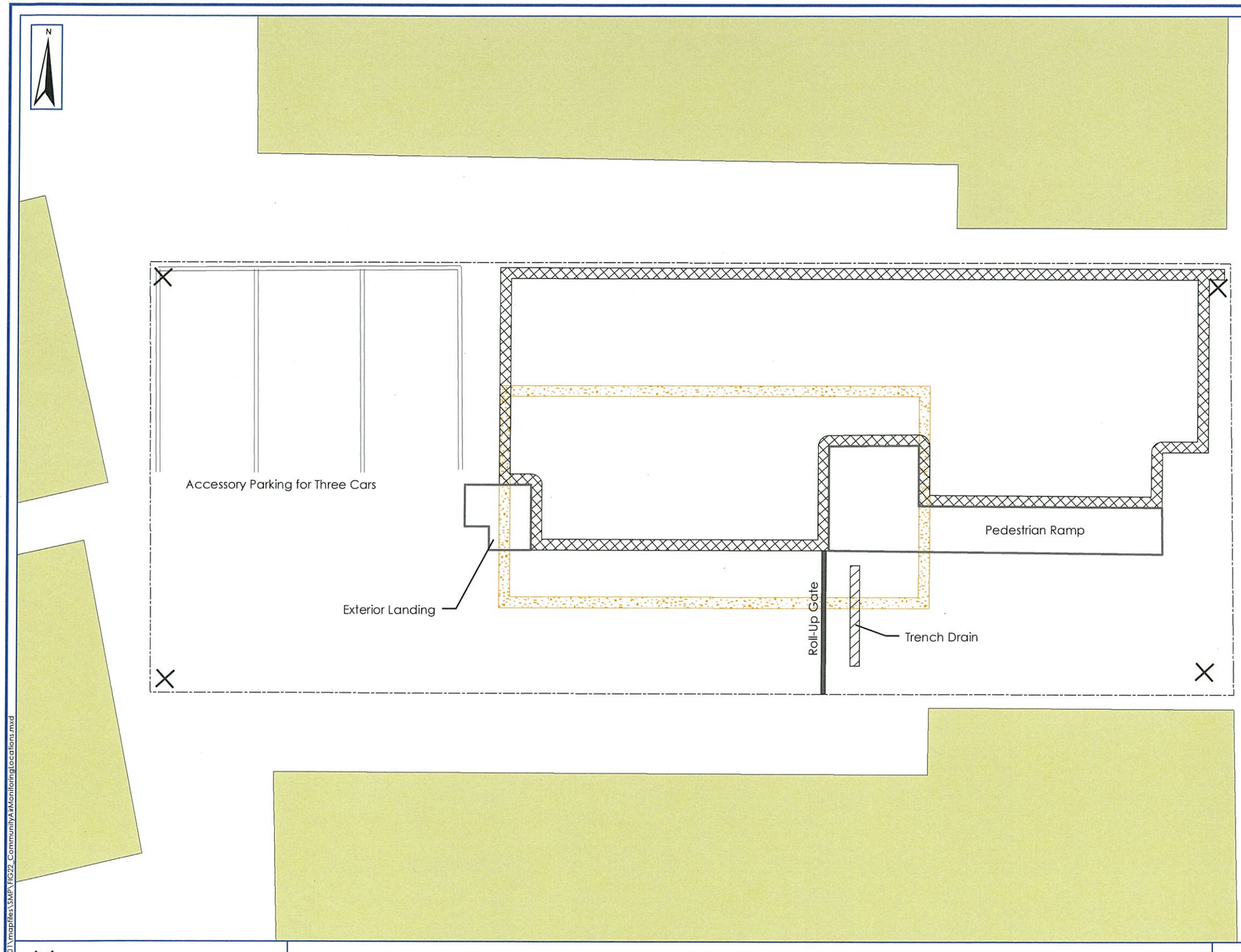
DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/6/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 21

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\maps\files\SMP\Fig21_truckRouteMap.mxd




CONEY ISLAND AVENUE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

STATE OF NEW YORK
PAUL KENNETH LOGE
074604
LICENSED PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|

DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/4/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

Air Monitoring Locations
Adjacent Buildings
Property Boundary

# COMMUNITY AIR MONITORING LOCATIONS

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet

NOTE: A minimum of four stations will be monitored under the Community Air Monitoring Plan. Locations may change based upon prevailing wind, site conditions, and work performed.

FIGURE NO: 22

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\maplfiles\SMP\FIG22_CommunityAirMonitoringLocations.mxd

# Tables

**Table 1A**

**Soil Analytical Data Prior to Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| | | | Soil Locations Remaining Following IRM Excavation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Client Sample ID:** | **NYSDEC [1] SCOs Unrestricted Use** | **NYSDEC [2] SCOs Restricted Residential** | **PWG-SB-1** | | **PWG-SB-2** | | **PWG-SB-2** | | **PWG-SB-4** | | **PWG-SB-4** | | **PWG-SB-5** | | **PWG-SB-5** | | **PWG-SB-7** | | **PWG-SB-8** | | **B-15** | | **EPE01** | | **EPE02** | | **EPN01** | | **EPW01** | | **EPS01** | | **EPB01** | | **EPB02** | | **EPTP01** | | **EPTP01B** | | **EPTP03** | | **EPTP04** | | **EPMW01B** | |
| **Sample Depth:** | | | **10-12'** | | **7-9'** | | **10-12'** | | **7-9'** | | **10-12'** | | **7-9'** | | **12-14'** | | **7-9'** | | **3-5'** | | **7-9'** | | **7.5'** | | **7.5'** | | **7.5'** | | **7.5'** | | **7.5'** | | **10'** | | **8'** | | **8'** | | **8'** | | **2.5'** | | **8'** | |
| **Laboratory ID:** | | | **L1212065-02** | | **L1212065-03** | | **L1212065-04** | | **L1212065-07** | | **L1212065-08** | | **L1212065-09** | | **L1212065-10** | | **L1212065-13** | | **L1212065-16** | | **-** | | **L1300917-01** | | **L1300917-02** | | **L1300917-03** | | **L1300917-04** | | **L1300917-05** | | **L1300917-06** | | **L1300917-07** | | **L1301224-01** | | **L1301347-01** | | **L1301224-03** | | **L1301224-04** | | **L1301347-02** | |
| **Sampling Date:** | | | **7/5/2012** | | **7/5/2012** | | **7/5/2012** | | **7/5/2012** | | **7/5/2012** | | **7/5/2012** | | **7/5/2012** | | **7/5/2012** | | **7/5/2012** | | **9/8/2007** | | **1/15/2013** | | **1/15/2013** | | **1/15/2013** | | **1/15/2013** | | **1/15/2013** | | **1/15/2013** | | **1/15/2013** | | **1/17/2013** | | **1/22/2003** | | **1/17/2013** | | **1/17/2013** | | **1/22/2013** | |
| **Volatile Organic Compounds in µg/kg** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | NS | NS | 3.4 | U | 2.9 | U | 4.3 | U | 130 | U | 180 | U | 2.8 | U | 3 | U | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| 1,1,1-Trichloroethane | 680 | 100,000[a] | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| 1,1,2,2-Tetrachloroethane | NS | NS | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| 1,1,2 Trichloroethane | NS | NS | 5.1 | U | 4.3 | U | 6.5 | J | 190 | U | 280 | U | 4.2 | U | 4.6 | J | 1,700 | U | 200 | U | NS | | 95 | U | 1,000 | U | 1,600 | U | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 980 | U | 1,200 | U | 1,600 | U | 1,800 | U | 1,600 | U |
| 1,1 Dichloroethane | 270 | 26,000 | 5.1 | U | 4.3 | U | 6.5 | U | 190 | U | 280 | U | 4.2 | U | 4.6 | U | 1,700 | U | 200 | U | NS | | 95 | U | 1,000 | U | 1,600 | U | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 980 | U | 1,200 | U | 1,600 | U | 1,800 | U | 1,600 | U |
| 1,1 Dichloroethene | 330 | 100,000[a] | 3.4 | U | 2.9 | U | 4.3 | U | 130 | U | 180 | U | 2.8 | U | 3 | U | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| 1,1-Dichloropropene | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 1,2,3-Trichlorobenzene | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 1,2,3-Trichloropropane | NS | NS | 34 | U | 29 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 11,000 | U | 1,300 | U | NS | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| 1,2,4,5-Tetramethylbenzene | NS | NS | 16 | | 11 | U | 39 | | 1,100 | | 740 | | 11 | U | 12 | U | 2,700 | J | 530 | U | ND | | 1,200 | | 1,800 | J | 1,700 | J | 93 | J | 320 | J | 2,000 | J | 4,000 | | 16,000 | | 6,200 | | 14,000 | | 290 | J | 4,400 | U |
| 1,2,4-Trichlorobenzene | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 1,2,4-Trimethylbenzene | 3,600 | 52,000 | 17 | | 14 | U | 6.5 | J | 400 | J | 48 | J | 14 | U | 15 | U | 5,700 | U | 660 | U | ND | | 390 | | 580 | J | 1,800 | J | 400 | U | 3,800 | U | 6,300 | | 12,000 | | 80,000 | | 13,000 | | 43,000 | | 6,200 | U | 5,500 | U |
| 1,2 Dibromo 3 chloropropane | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | ND | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 1,2 Dibromoethane | NS | NS | 14 | U | 11 | U | 17 | J | 510 | U | 740 | U | 11 | U | 12 | J | 4,600 | U | 530 | U | NS | | 250 | U | 2,700 | U | 4,300 | U | 320 | U | 3,100 | U | 2,600 | U | 3,300 | U | 2,600 | U | 3,200 | U | 4,200 | U | 5,000 | U | 4,400 | U |
| 1,2 Dichlorobenzene | 1,100 | 100,000[a] | 17 | U | 14 | U | 2.6 | J | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 1,2 Dichloroethane | 20[c] | 3,100 | 3.4 | U | 2.9 | U | 4.3 | U | 130 | U | 180 | U | 2.8 | U | 3 | U | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| 1,2 Dichloropropane | NS | NS | 12 | U | 10 | U | 15 | J | 450 | U | 650 | U | 9.8 | U | 11 | J | 4,000 | U | 460 | U | NS | | 220 | U | 2,400 | U | 3,800 | U | 280 | U | 2,700 | U | 2,300 | U | 2,900 | U | 2,300 | U | 2,800 | U | 3,600 | U | 4,300 | U | 3,900 | U |
| 1,3,5-Trimethylbenzene | 8,400 | 52,000 | 9.6 | J | 14 | U | 8.5 | J | 350 | J | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | ND | | 1,400 | | 2,000 | J | 1,100 | J | 70 | J | 3,800 | U | 3,500 | | 6,300 | | 32,000 | | 5,300 | | 5,600 | | 6,200 | U | 5,500 | U |
| 1,3 Dichlorobenzene | 2,400 | 49,000 | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 1,3-Dichloropropane | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 1,4 Dichlorobenzene | 1,800 | 13,000 | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | ND | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 1,4-Diethylbenzene | NS | NS | 13 | J | 11 | U | 33 | | 1,800 | | 740 | U | 11 | U | 12 | U | 3,100 | J | 530 | U | ND | | 2,900 | | 4,100 | | 3,100 | J | 180 | J | 1,200 | J | 5,400 | | 11,000 | | 48,000 | | 17,000 | | 22,000 | | 5,000 | U | 4,400 | U |
| 2,2-Dichloropropane | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| 2-Butanone / Methyl Ethyl Ket | 120 | 100,000[a] | 34 | U | 29 | U | 27 | J | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 11,000 | U | 1,300 | U | ND | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| 2-Hexanone | NS | NS | 34 | U | 29 | U | 43 | J | 1,300 | U | 1,800 | U | 28 | U | 30 | J | 11,000 | U | 1,300 | U | NS | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| 4-Ethyltoluene | NS | NS | 3.9 | J | 11 | U | 2.8 | J | 510 | U | 740 | U | 11 | U | 12 | U | 4,600 | U | 530 | U | ND | | 340 | | 480 | J | 540 | J | 22 | J | 180 | J | 1,600 | J | 2,300 | J | 3,400 | | 750 | J | 2,600 | J | 5,000 | U | 4,400 | U |
| 4-Methyl-2-pentanone | NS | NS | 34 | U | 29 | U | 43 | J | 1,300 | U | 1,800 | U | 28 | U | 30 | J | 11,000 | U | 1,300 | U | NS | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| Acetone | 50 | 100,000[a] | 81 | | 29 | U | 160 | | 1,300 | U | 1,800 | U | 10.7 | | 14.1 | | 11,000 | U | 1,300 | U | NS | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| Acrylonitrile | NS | NS | 34 | U | 29 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 11,000 | U | 1,300 | U | NS | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| Benzene | 60 | 4,800 | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | ND | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| Bromobenzene | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| Bromochloromethane | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| Bromodichloromethane | NS | NS | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| Bromoform | NS | NS | 14 | U | 11 | U | 17 | U | 510 | U | 740 | U | 11 | U | 12 | U | 4,600 | U | 530 | U | NS | | 250 | U | 2,700 | U | 4,300 | U | 320 | U | 3,100 | U | 2,600 | U | 3,300 | U | 2,600 | U | 3,200 | U | 4,200 | U | 5,000 | U | 4,400 | U |
| Bromomethane | NS | NS | 6.8 | U | 5.7 | U | 8.6 | U | 260 | U | 370 | U | 5.6 | U | 6.1 | U | 2,300 | U | 260 | U | NS | | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 1,300 | U | 1,600 | U | 2,100 | U | 2,500 | U | 2,200 | U |
| Carbon Disulfide | NS | NS | 6.6 | J | 29 | U | 19 | J | 1,300 | U | 1,800 | U | 2.1 | J | 2.4 | J | 11,000 | U | 1,300 | U | ND | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| Carbon Tetrachloride | 760 | 2,400 | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| Chlorobenzene | 1,100 | 100,000[a] | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| Chloroethane | NS | NS | 6.8 | U | 5.7 | U | 8.6 | U | 260 | U | 370 | U | 5.6 | U | 6.1 | U | 2,300 | U | 260 | U | NS | | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 1,300 | U | 1,600 | U | 2,100 | U | 2,500 | U | 2,200 | U |
| Chloroform | 370 | 49,000 | 5.1 | U | 4.3 | U | 6.5 | U | 190 | U | 280 | U | 4.2 | U | 4.6 | U | 1,700 | U | 200 | U | ND | | 95 | U | 1,000 | U | 1,600 | U | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 980 | U | 1,200 | U | 1,600 | U | 1,800 | U | 1,600 | U |
| Chloromethane | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| c-1,2-Dichloroethene | 250 | 100,000[a] | 82 | | 2.2 | J | 21 | | 290 | | 180 | U | 11 | | 4.2 | | 990 | J | 460 | | ND | | 1,800 | | 1,800 | | 5,400 | | 180 | | 3,600 | | 4,400 | | 6,400 | | 4,700 | | 1,200 | | 70,000 | | 4,000 | | 3,200 | |
| c-1,3-Dichloropropene | NS | NS | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| Dibromochloromethane | NS | NS | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| Dibromoethane | NS | NS | 34 | U | 29 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 11,000 | U | 1,300 | U | NS | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| Dichlordifluoromethane | NS | NS | 34 | U | 29 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 11,000 | U | 1,300 | U | NS | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| Diethy ether | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| Ethyl Benzene | 1,000 | 41,000 | 5.8 | | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | ND | | 42 | J | 670 | U | 420 | J | 79 | U | 770 | U | 180 | J | 310 | J | 2,700 | | 790 | U | 4,200 | | 1,200 | U | 1,100 | U |
| Hexachlorobutadiene | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | ND | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| Isopropylbenzene | 2,300 | NS | 6.3 | | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | ND | | 73 | | 670 | U | 1,100 | U | 79 | U | 770 | U | 230 | J | 460 | J | 2,800 | | 790 | U | 3,600 | | 1,200 | U | 1,100 | U |
| Methyl tert butyl ether | 930 | 100,000[a] | 6.8 | U | 5.7 | U | 8.6 | U | 260 | U | 370 | U | 5.6 | U | 6.1 | U | 2,300 | U | 260 | U | NS | | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 1,300 | U | 1,600 | U | 2,100 | U | 2,500 | U | 2,200 | U |
| Methylene Chloride | 50 | 100,000[a] | 3.7 | J | 2.5 | J | 6.7 | J | 210 | J | 350 | J | 4.4 | J | 4.6 | J | 2,400 | J | 270 | J | 12 | BC | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 3,500 | J | 2,700 | J | 4,500 | J | 5,000 | J | 4,200 | J |
| n-Butylbenzene | 12,000 | NS | 2.2 | J | 2.9 | U | 4.0 | J | 130 | U | 180 | U | 2.8 | U | 3 | U | 1,100 | U | 130 | U | ND | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 7,800 | | 2,800 | | 8,400 | | 1,200 | U | 1,100 | U |
| n-Propylbenzene | 3,900 | 100,000[a] | 7.4 | | 2.9 | U | 4.3 | U | 130 | U | 180 | U | 2.8 | U | 3 | U | 1,100 | U | 130 | U | ND | | 210 | | 670 | U | 560 | J | 79 | U | 770 | U | 690 | | 1,400 | | 7,500 | | 790 | U | 9,100 | | 1,200 | U | 1,100 | U |
| Naphthalene | 12,000 | NS | 17 | | 3.2 | J | 22 | U | 640 | U | 920 | U | 14 | U | 3.2 | J | 5,700 | U | 660 | U | ND | | 170 | J | 3,400 | U | 1,100 | J | 400 | U | 3,800 | U | 1,300 | J | 2,600 | J | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| o-Chlorotoluene | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| o Xylene | 260 | 100,000[a] | 2.4 | J | 5.7 | U | 8.6 | J | 260 | U | 370 | U | 5.6 | U | 6.1 | J | 2,300 | U | 260 | U | ND | | 87 | J | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 330 | J | 490 | J | 4,200 | | 1,600 | U | 2,200 | | 2,500 | U | 2,200 | U |
| p/m-Xylene | 260 | 100,000[a] | 1.6 | J | 5.7 | U | 8.6 | J | 260 | U | 370 | U | 5.6 | U | 6.1 | J | 2,300 | U | 260 | U | ND | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| p-Chlorotoluene | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | | 470 | J | 320 | J | 79 | U | 770 | U | 760 | | 1,400 | | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| p-Isopropyltoluene | 10,000 | NS | 1.2 | J | 2.9 | U | 4.0 | J | 130 | U | 180 | U | 2.8 | U | 3 | U | 1,100 | U | 130 | U | ND | | 45 | J | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 1,300 | U | 1,600 | U | 2,100 | U | 2,500 | U | 2,200 | U |
| sec-Butylbenzene | 11,000 | 100,000[a] | 2.7 | J | 2.9 | U | 3.6 | J | 56 | J | 180 | U | 2.8 | U | 3 | U | 1,100 | U | 130 | U | ND | | 310 | | 420 | J | 1,100 | U | 79 | U | 770 | U | 720 | | 1,400 | | 5,500 | | 1,400 | | 6,500 | | 1,200 | U | 1,100 | U |
| Styrene | NS | NS | 6.8 | U | 5.7 | U | 8.6 | J | 260 | U | 370 | U | 5.6 | U | 6.1 | J | 2,300 | U | 260 | U | NS | | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 1,300 | U | 1,600 | U | 2,100 | U | 2,500 | U | 2,200 | U |
| tert-Butylbenzene | 5,900 | 100,000[a] | 0.65 | J | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | ND | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| Tetrachloroethene | 1,300 | 19,000 | 18 | | 59 | | 7.3 | J | 370 | | 180 | U | 36 | | 25 | J | 3,200 | | 21,000 | | 2.7 | J | 61,000 | | 68,000 | | 150,000 | | 2,400 | | 50,000 | | 41,000 | | 110,000 | | 430 | J | 790 | U | 260,000 | | 520,000 | | 42,000 | |
| Toluene | 700 | 100,000[a] | 0.91 | J | 4.3 | U | 6.5 | J | 190 | U | 280 | U | 4.2 | U | 4.6 | J | 1,700 | U | 200 | U | ND | | 27 | J | 1,000 | U | 260 | J | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 980 | U | 1,200 | U | 1,600 | U | 1,800 | U | 1,600 | U |
| t-1,2-Dichloroethene | 190 | 100,000[a] | 2.3 | J | 4.3 | U | 6.5 | U | 190 | U | 280 | U | 4.2 | U | 4.6 | U | 1,700 | U | 200 | U | ND | | 95 | U | 1,000 | U | 1,600 | U | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 980 | U | 1,200 | U | 1,600 | U | 1,800 | U | 1,600 | U |
| t-1,3-Dichloropropene | NS | NS | 3.4 | U | 2.9 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 1,100 | U | 130 | U | NS | | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 650 | U | 790 | U | 1,000 | U | 1,200 | U | 1,100 | U |
| trans-1,4-Dichloro-2-butene | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| Trichloroethene | 470 | 21,000 | 2.0 | J | 1.7 | J | 6.1 | J | 130 | U | 180 | U | 9.9 | | 2.5 | J | 1,100 | U | 120 | J | ND | | 1,600 | | 1,400 | | 3,500 | | 39 | J | 1,000 | | 2,000 | | 4,900 | | 650 | U | 790 | U | 18,000 | | 3,100 | | 2,000 | |
| Trichlorofluoromethane | NS | NS | 17 | U | 14 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 5,700 | U | 660 | U | NS | | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 3,200 | U | 4,000 | U | 5,200 | U | 6,200 | U | 5,500 | U |
| Vinyl acetate | NS | NS | 34 | U | 29 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 11,000 | U | 1,300 | U | NS | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 6,500 | U | 7,900 | U | 10,000 | U | 12,000 | U | 11,000 | U |
| Vinyl Chloride | 20 | 900 | 0.56 | J | 5.7 | U | 8.6 | U | 260 | U | 370 | U | 5.6 | U | 6.1 | U | 2,300 | U | 260 | U | NS | | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 1,300 | U | 1,600 | U | 2,100 | U | 2,500 | U | 2,200 | U |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06
NS - No Standard
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.
U - The analyte was analyzed for, but was not detected above the reported sample quantification limit. The associated numerical value is the sample quantitation limit.
a - The SCOs for unrestricted use were capped at a maximum value of 100 ppm.
b - For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO.
c - For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentrationis used as the Track1 SCO value for this use of the site.
d - SCO is the sum of endosulfin I, endosulfin II and endosulfin sulfate.
e - The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.
f - Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) wish "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.
Highlighted text denotes concentrations exceeding NYSDEC Unrestricted Use SCO
Highlighted text denotes concentrations exceeding NYSDEC Restricted Residential SCO

**Table 1A**

**Soil Analytical Data Prior to Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| | | | Soil Locations Removed During IRM Excavation | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Client Sample ID:** | NYSDEC [1] | NYSDEC [2] | PWG-SB-1 | PWG-SB-3 | PWG-SB-3 | PWG-SB-6 | PWG-SB-6 | PWG-SB-7 | PWG-SB-8 | B-1 | B-8 | B-9 | B-10 | B-11 | B-12 | B-13 | B-14 | B-16 | OSB-1 | OSB-2 |
| **Sample Depth:** | SCOs | SCOs | 7-9' | 7-9' | 9-11' | 7-9' | 5-7' | 9-11' | 7-9' | 4-8' | 8-10' | 5-7' | 7-9' | 7-9' | 6-8' | 7-9' | 7-9' | 3-5' | 9-10' | 8-9' |
| **Laboratory ID:** | Unrestricted Use | Restricted Residential | L1212065-01 | L1212065-05 | L1212065-06 | L1212065-11 | L1212065-12 | L1212065-14 | L1212065-15 | - | - | - | - | - | - | - | - | - | - | - |
| **Sampling Date:** | | | 7/5/2012 | 7/5/2012 | 7/5/2012 | 7/5/2012 | 7/5/2012 | 7/5/2012 | 7/5/2012 | 9/8/2007 | 9/8/2007 | 9/8/2007 | 9/8/2007 | 9/8/2007 | 9/8/2007 | 9/8/2007 | 9/8/2007 | 9/8/2007 | 4/28/2011 | 4/28/2011 |
| **Volatile Organic Compounds in µg/kg** | | | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | NS | NS | 120 U | 3.2 U | 3.6 U | 1,200 U | 100 U | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,1-Trichloroethane | 680 | 100,000[a] | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,2,2-Tetrachloroethane | NS | NS | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,2 Trichloroethane | NS | NS | 180 U | 4.7 U | 5.4 U | 1,800 J | 160 J | 380 U | 4.7 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1 Dichloroethane | 270 | 26,000 | 180 U | 4.7 U | 5.4 U | 1,800 U | 160 U | 380 U | 4.7 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1 Dichloroethene | 330 | 100,000[a] | 120 U | 3.2 U | 3.6 U | 1,200 U | 100 U | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1-Dichloropropene | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,3-Trichlorobenzene | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,3-Trichloropropane | NS | NS | 1,200 U | 32 U | 36 U | 12,000 U | 1,000 U | 2,600 U | 32 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,4,5-Tetramethylbenzene | NS | NS | 36 J | 13 U | 61 | 21,000 | 49 J | 3,500 | 3.0 J | NS | 18,000 | 3,800 | 31,000 | ND | 53 | 19,000 | 2,200 | 60,000 | 10,000 | 2 J |
| 1,2,4-Trichlorobenzene | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,4-Trimethylbenzene | 3,600 | 52,000 | 130 J | 16 U | 34 | 83,000 | 150 J | 1,300 U | 16 U | 121 | 2,700 | 800 J | 21,000 | ND | 110 | 16,000 | 1,000 | 8,400 | 1,200 J | 16 |
| 1,2 Dibromo 3 chloropropane | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | ND | ND | ND | ND | 0.61 J | ND | ND | ND | ND | ND |
| 1,2 Dibromoethane | NS | NS | 480 U | 13 U | 14 U | 4,800 J | 420 J | 1,000 U | 13 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2 Dichlorobenzene | 1,100 | 100,000[a] | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2 Dichloroethane | 20[c] | 3,100 | 120 U | 3.2 U | 3.6 U | 1,200 U | 100 U | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2 Dichloropropane | NS | NS | 420 U | 11 U | 12 U | 4,200 J | 360 J | 900 U | 11 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,3,5-Trimethylbenzene | 8,400 | 52,000 | 600 U | 16 U | 38 | 31,000 | 520 U | 1,300 U | 16 U | 96 | 1,000 | 960 J | 9,100 | ND | 84 | 6,100 | 800 | 7,300 | 17,000 | 14 |
| 1,3 Dichlorobenzene | 2,400 | 49,000 | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,3-Dichloropropane | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,4 Dichlorobenzene | 1,800 | 13,000 | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | ND | 24 | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-Diethylbenzene | NS | NS | 110 J | 13 U | 59 | 64,000 | 230 J | 1,000 U | 13 U | NS | 6,000 | 4,000 | 22,000 | ND | 68 | 12,000 | 1,800 | 21,000 | 1,300 | 11 |
| 2,2-Dichloropropane | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Butanone / Methyl Ethyl Ket | 120 | 100,000[a] | 1,200 U | 32 U | 45 | 12,000 U | 1,000 U | 2,600 U | 32 U | 10 U | 6,900 | ND | 1,900 | ND | 9.7 | 4,600 | 7.6 | 5,400 | ND | ND |
| 2-Hexanone | NS | NS | 1,200 U | 32 U | 36 U | 12,000 J | 1,000 J | 2,600 U | 32 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 4-Ethyltoluene | NS | NS | 480 U | 13 U | 16 | 13,000 | 420 U | 58 J | 13 U | NS | 400 J | 150 | 2,100 | ND | 31 | 1,700 | 130 | 3,700 | 4,300 | 9.6 J |
| 4-Methyl-2-pentanone | NS | NS | 1,200 U | 32 U | 36 U | 12,000 J | 1,000 J | 2,600 U | 32 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acetone | 50 | 100,000[a] | 1,200 U | 32 U | 250 | 12,000 U | 1,000 U | 2,600 U | 32 U | 50 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acrylonitrile | NS | NS | 1,200 U | 32 U | 36 U | 12,000 U | 1,000 U | 2,600 U | 32 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Benzene | 60 | 4,800 | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | ND | ND | ND | ND | 0.69 J | ND | ND | ND | ND | ND |
| Bromobenzene | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromochloromethane | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromodichloromethane | NS | NS | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromoform | NS | NS | 480 U | 13 U | 14 U | 4,800 U | 420 U | 1,000 U | 13 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromomethane | NS | NS | 240 U | 6.3 U | 7.1 U | 2,400 U | 210 U | 510 U | 6.3 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Carbon Disulfide | NS | NS | 1,200 U | 32 U | 12 J | 12,000 U | 1,000 U | 2,600 U | 32 U | 5 U | ND | ND | 5.6 J | ND | 3.1 J | ND | 2.9 J | ND | ND | ND |
| Carbon Tetrachloride | 760 | 2,400 | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chlorobenzene | 1,100 | 100,000[a] | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | 1.2 J |
| Chloroethane | NS | NS | 240 U | 6.3 U | 7.1 U | 2,400 U | 210 U | 510 U | 6.3 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloroform | 370 | 49,000 | 180 U | 4.7 U | 5.4 U | 1,800 U | 160 U | 380 U | 4.7 U | 5 U | ND | 0.75 J | ND | ND | ND | ND | ND | ND | ND | ND |
| Chloromethane | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| c-1,2-Dichloroethene | 250 | 100,000[a] | 82 J | 64 | 300 | 16,000 | 510 | 1,200 | 3.4 | 17 | 5,000 | 200 | 1,600 | 6.9 | 140 | 23,000 | 19 | 15,000 | 800 | 1,200 |
| c-1,3-Dichloropropene | NS | NS | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dibromochloromethane | NS | NS | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dibromoethane | NS | NS | 1,200 U | 32 U | 36 U | 12,000 U | 1,000 U | 2,600 U | 32 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dichlordifluoromethane | NS | NS | 1,200 U | 32 U | 36 U | 12,000 U | 1,000 U | 2,600 U | 32 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Diethy ether | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethyl Benzene | 1,000 | 41,000 | 120 U | 3.2 U | 3.8 | 900 J | 100 J | 260 U | 3.2 U | 5 U | 210 J | 10 | 550 J | ND | 4.6 J | 670 J | 2.4 J | 190 J | 450 | 1.4 J |
| Hexachlorobutadiene | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | ND | 4.5 J | ND | ND | ND | ND | ND | ND | ND | ND |
| Isopropylbenzene | 2,300 | NS | 120 U | 3.2 U | 4.7 | 3,100 J | 100 J | 260 U | 3.2 U | 6 | 310 J | 35 | 900 | ND | 4.7 J | 960 | 6.5 | ND | 1,300 | 1.4 J |
| Methyl tert butyl ether | 930 | 100,000[a] | 240 U | 6.3 U | 7.1 U | 2,400 U | 210 U | 510 U | 6.3 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Methylene Chloride | 50 | 100,000[a] | 180 J | 3.0 J | 8.4 J | 1,400 J | 230 J | 520 J | 32 U | 5 U | ND | ND | 990 C | 23 BC | ND | 3,000 BC | 16 BC | 3,100 BC | 110 J | ND |
| n-Butylbenzene | 12,000 | NS | 120 U | 3.2 U | 8 | 1,200 U | 100 U | 340 | 3.2 U | 5 U | 1,600 | 120 | 2,700 | ND | 3 J | 2,800 | 14 | 670 J | ND | ND |
| n-Propylbenzene | 3,900 | 100,000[a] | 120 U | 3.2 U | 8.4 | 11,000 | 100 U | 330 | 3.2 U | 5 U | 1,300 | 100 | 2,200 | ND | 7.3 | 2,900 | 16 | 430 J | 3,600 | 2.4 J |
| Naphthalene | 12,000 | NS | 150 J | 3.2 J | 22 | 3,700 J | 120 J | 1,300 U | 16 U | 55 | 290 J | 6.1 | 4,000 | ND | 3.9 J | 1,700 | 54 | 4,500 | 2,600 | 5.8 J |
| o-Chlorotoluene | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 10 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| o Xylene | 260 | 100,000[a] | 240 U | 6.3 U | 2.7 J | 2,400 J | 210 J | 510 U | 6.3 U | NS | ND | 7 | 270 J | ND | 3.7 J | 260 J | 8.8 | 1,900 | 1,100 | 1.7 J |
| p/m-Xylene | 260 | 100,000[a] | 240 U | 6.3 U | 6.2 J | 540 J | 210 J | 510 U | 6.3 U | 30 | ND | 15 | 190 J | ND | 7.9 J | 120 J | 7.6 J | 1,100 J | 230 J | 1.8 J |
| p-Chlorotoluene | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| p-Isopropyltoluene | 10,000 | NS | 120 U | 3.2 U | 5.1 | 11,000 | 100 U | 1,000 | 3.2 U | 19 | 3,500 | 990 J | 6,100 | ND | 26 | 4,500 | 130 | 5,400 | 2,900 | ND |
| sec-Butylbenzene | 11,000 | 100,000[a] | 120 U | 3.2 U | 9.9 | 12,000 | 42 J | 500 | 3.2 U | 11 | 1,500 | 170 | 2,400 | ND | 8.3 | 2,700 | 23 | 740 J | 3,500 | 1.8 J |
| Styrene | NS | NS | 240 U | 6.3 U | 7.1 U | 2,400 J | 210 J | 510 U | 6.3 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| tert-Butylbenzene | 5,900 | 100,000[a] | 600 U | 16 U | 2.4 J | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | 240 J | ND | ND | ND | 3 J | 300 J | 5.3 | ND | ND | ND |
| Tetrachloroethene | 1,300 | 19,000 | 2,900 | 290 | 470 | 3,400,000 J | 160,000 | 740 J | 12 | 116 | 990 | 1,100,000 | 2,800 | 160 | 170,000 | 3,200,000 | 16 | 1,600,000 | 120 | 32,000 |
| Toluene | 700 | 100,000[a] | 180 U | 4.7 U | 5.4 U | 1,800 J | 160 J | 380 U | 4.7 U | 5 U | ND | 1.4 J | ND | ND | 1.7 J | ND | ND | 330 J | 46 J | ND |
| t-1,2-Dichloroethene | 190 | 100,000[a] | 180 U | 4.7 U | 9.6 | 1,800 U | 160 U | 380 U | 4.7 U | 5 U | ND | 3.2 J | ND | ND | 1.3 J | 86 J | 1.5 J | 530 J | ND | 27 |
| t-1,3-Dichloropropene | NS | NS | 120 U | 3.2 U | 3.6 U | 1,200 J | 100 J | 260 U | 3.2 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| trans-1,4-Dichloro-2-butene | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Trichloroethene | 470 | 21,000 | 140 | 48 | 140 | 290,000 J | 1,400 J | 260 U | 3.2 U | 10 | 380 J | 1,300 J | 160 J | 9.4 | 4,200 | 11,000 | 1.6 J | 71,000 | ND | 3,100 |
| Trichlorofluoromethane | NS | NS | 600 U | 16 U | 18 U | 6,000 U | 520 U | 1,300 U | 16 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Vinyl acetate | NS | NS | 1,200 U | 32 U | 36 U | 12,000 U | 1,000 U | 2,600 U | 32 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Vinyl Chloride | 20 | 900 | 240 U | 6.3 U | 2.59 J | 2,400 U | 210 U | 210 J | 6.3 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrest
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restric
NS - No Standard
J - Data indicates the presence of a compound that meets the identifica
U - The analyte was analyzed for, but was not detected above the reporte
a - The SCOs for unrestricted use were capped at a maximum value of 10
b - For constituents where the calculated SCO was lower than the contrac
c - For constituents where the calculated SCO was lower than the rural soi
d - SCO is the sum of endosulfin I, endosulfin II and endosulfin sulfate.
e - The SCO for this specific compound (or family of compounds) is consid
f - Protection of ecological resources SCOs were not developed for conta
Highlighted text denotes concentrations exceeding NYSDEC Unrestricted I
Highlighted text denotes concentrations exceeding NYSDEC Restricted Re

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06
NS - No Standard
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.
U - The analyte was analyzed for, but was not detected above the reported sample quantification limit. The associated numerical value is the sample quantitation limit.
a - The SCOs for unrestricted use were capped at a maximum value of 100 ppm.
b - For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO.
c - For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentrationis used as the Track1 SCO value for this use of the site.
d - SCO is the sum of endosulfin I, endosulfin II and endosulfin sulfate.
e - The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.
f - Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) wish "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.
Highlighted text denotes concentrations exceeding NYSDEC Unrestricted Use SCO
Highlighted text denotes concentrations exceeding NYSDEC Restricted Residential SCO

**Table 1B**

**Soil Analytical Data Prior to Remedy - SVOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| | | | Soil Sample Locations Before IRM | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE ID<br>SAMPLE DEPTH (ft.)<br>SAMPLING DATE<br>LAB SAMPLE ID | Unrestricted Use SCO [1] | Restricted Residential SCO [2] | PRB001<br>6-8'<br>09/10/13<br>L1317760-01 | | PRB001<br>8-10'<br>09/10/13<br>L1317760-02 | | PRB002<br>6-8'<br>09/10/13<br>L1317760-03 | | PRB002<br>8-10'<br>09/10/13<br>L1317760-04 | | PRB003<br>6-8'<br>09/10/13<br>L1317760-05 | |
| **Semivolatile Organics by EPA 8270C in µg/kg** | | | | | | | | | | | | |
| 1,2,4,5-Tetrachlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 1,2,4-Trichlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 1,2-Dichlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 1,3-Dichlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 1,4-Dichlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2,4,5-Trichlorophenol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2,4,6-Trichlorophenol | NS | NS | 110 | U | 110 | U | 110 | U | 120 | U | 110 | U |
| 2,4-Dichlorophenol | NS | NS | 160 | U | 160 | U | 170 | U | 170 | U | 160 | U |
| 2,4-Dimethylphenol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2,4-Dinitrophenol | NS | NS | 880 | U | 850 | U | 900 | U | 920 | U | 860 | U |
| 2,4-Dinitrotoluene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2,6-Dinitrotoluene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2-Chloronaphthalene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2-Chlorophenol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2-Methylnaphthalene | NS | NS | 220 | U | 210 | U | 220 | U | 230 | U | 210 | U |
| 2-Methylphenol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2-Nitroaniline | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 2-Nitrophenol | NS | NS | 400 | U | 380 | U | 400 | U | 410 | U | 380 | U |
| 3,3'-Dichlorobenzidine | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 3-Methylphenol/4-Methylphenol | NS | NS | 260 | U | 260 | U | 270 | U | 280 | U | 260 | U |
| 3-Nitroaniline | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 4,6-Dinitro-o-cresol | NS | NS | 480 | U | 460 | U | 480 | U | 500 | U | 460 | U |
| 4-Bromophenyl phenyl ether | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 4-Chloroaniline | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 4-Chlorophenyl phenyl ether | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 4-Nitroaniline | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| 4-Nitrophenol | NS | NS | 260 | U | 250 | U | 260 | U | 270 | U | 250 | U |
| Acenaphthene | 20,000 | 100,000 | 150 | U | 140 | U | 150 | U | 150 | U | 140 | U |
| Acenaphthylene | 100,000 | 100,000 | 150 | U | 140 | U | 150 | U | 150 | U | 140 | U |
| Acetophenone | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Anthracene | 100,000 | 100,000 | 110 | U | 110 | U | 110 | U | 120 | U | 110 | U |
| Benzo(a)anthracene | 1,000 | 1,000 | 48 | J | 110 | U | 110 | U | 120 | U | 110 | U |
| Benzo(a)pyrene | 1,000 | 1,000 | 54 | J | 140 | U | 150 | U | 150 | U | 140 | U |
| Benzo(b)fluoranthene | 1,000 | 1,000 | 72 | J | 110 | U | 110 | U | 120 | U | 110 | U |
| Benzo(ghi)perylene | 100,000 | 100,000 | 150 | U | 140 | U | 150 | U | 150 | U | 140 | U |
| Benzo(k)fluoranthene | 800 | 3,900 | 110 | U | 110 | U | 110 | U | 120 | U | 110 | U |
| Benzoic Acid | NS | NS | 600 | U | 570 | U | 600 | U | 620 | U | 580 | U |
| Benzyl Alcohol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Biphenyl | NS | NS | 420 | U | 400 | U | 420 | U | 440 | U | 410 | U |
| Bis(2-chloroethoxy)methane | NS | NS | 200 | U | 190 | U | 200 | U | 210 | U | 190 | U |
| Bis(2-chloroethyl)ether | NS | NS | 160 | U | 160 | U | 170 | U | 170 | U | 160 | U |
| Bis(2-chloroisopropyl)ether | NS | NS | 220 | U | 210 | U | 220 | U | 230 | U | 210 | U |
| Bis(2-Ethylhexyl)phthalate | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Butyl benzyl phthalate | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Carbazole | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Chrysene | 1,000 | 3,900 | 59 | J | 110 | U | 110 | U | 120 | U | 110 | U |
| Di-n-butylphthalate | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Di-n-octylphthalate | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Dibenzo(a,h)anthracene | 330 | 330 | 110 | U | 110 | U | 110 | U | 120 | U | 110 | U |
| Dibenzofuran | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Diethyl phthalate | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Dimethyl phthalate | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Fluoranthene | 100,000 | 100,000 | 72 | J | 110 | U | 38 | J | 120 | U | 110 | U |
| Fluorene | 30,000 | 100,000 | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Hexachlorobenzene | NS | NS | 110 | U | 110 | U | 110 | U | 120 | U | 110 | U |
| Hexachlorobutadiene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Hexachlorocyclopentadiene | NS | NS | 530 | U | 510 | U | 540 | U | 550 | U | 510 | U |
| Hexachloroethane | NS | NS | 150 | U | 140 | U | 150 | U | 150 | U | 140 | U |
| Indeno(1,2,3-cd)Pyrene | 500 | 500 | 150 | U | 140 | U | 150 | U | 150 | U | 140 | U |
| Isophorone | NS | NS | 160 | U | 160 | U | 170 | U | 170 | U | 160 | U |
| n-Nitrosodi-n-propylamine | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Naphthalene | 12,000 | 100,000 | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Nitrobenzene | NS | NS | 160 | U | 160 | U | 170 | U | 170 | U | 160 | U |
| NitrosoDiPhenylAmine(NDPA)/DPA | NS | NS | 150 | U | 140 | U | 150 | U | 150 | U | 140 | U |
| P-Chloro-M-Cresol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Pentachlorophenol | 800 | 6,700 | 150 | U | 140 | U | 150 | U | 150 | U | 140 | U |
| Phenanthrene | 100,000 | 100,000 | 110 | U | 110 | U | 110 | U | 120 | U | 110 | U |
| Phenol | 330 | 100,000 | 180 | U | 180 | U | 190 | U | 190 | U | 180 | U |
| Pyrene | 100,000 | 100,000 | 74 | J | 110 | U | 110 | U | 120 | U | 110 | U |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06
U - Analyte not detected above the laboratory MDL
J - Estimated value
NS - No standard established
Green highlighting indicates exceedance of Unrestricted Use SCO
Orange highlighting indicates exceedance of Restricted Residential SCO

**Table 1B**

**Soil Analytical Data Prior to Remedy - SVOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| | | | Soil Sample Locations Before IRM | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE ID<br>SAMPLE DEPTH (ft.)<br>SAMPLING DATE<br>LAB SAMPLE ID | Unrestricted Use SCO [1] | Restricted Residential SCO [2] | PRB003<br>8-10'<br>09/10/13<br>L1317760-06 | | PRB004<br>3-5'<br>09/10/13<br>L1317760-07 | | PRB004<br>8-10'<br>09/10/13<br>L1317760-08 | | PRB005<br>3-5'<br>09/10/13<br>L1317760-09 | | PRB005<br>8-10'<br>09/10/13<br>L1317760-10 | |
| **Semivolatile Organics by EPA 8270C in µg/kg** | | | | | | | | | | | | |
| 1,2,4,5-Tetrachlorobenzene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 1,2,4-Trichlorobenzene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 1,2-Dichlorobenzene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 1,3-Dichlorobenzene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 1,4-Dichlorobenzene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2,4,5-Trichlorophenol | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2,4,6-Trichlorophenol | NS | NS | 110 | U | 2,200 | U | 120 | U | 110 | U | 120 | U |
| 2,4-Dichlorophenol | NS | NS | 160 | U | 3,300 | U | 180 | U | 160 | U | 180 | U |
| 2,4-Dimethylphenol | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2,4-Dinitrophenol | NS | NS | 860 | U | 17,000 | U | 940 | U | 870 | U | 940 | U |
| 2,4-Dinitrotoluene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2,6-Dinitrotoluene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2-Chloronaphthalene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2-Chlorophenol | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2-Methylnaphthalene | NS | NS | 220 | U | 4,400 | U | 240 | U | 220 | U | 230 | U |
| 2-Methylphenol | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2-Nitroaniline | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 2-Nitrophenol | NS | NS | 390 | U | 7,900 | U | 420 | U | 390 | U | 420 | U |
| 3,3'-Dichlorobenzidine | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 3-Methylphenol/4-Methylphenol | NS | NS | 260 | U | 5,200 | U | 280 | U | 260 | U | 280 | U |
| 3-Nitroaniline | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 4,6-Dinitro-o-cresol | NS | NS | 470 | U | 9,500 | U | 510 | U | 470 | U | 510 | U |
| 4-Bromophenyl phenyl ether | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 4-Chloroaniline | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 4-Chlorophenyl phenyl ether | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 4-Nitroaniline | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| 4-Nitrophenol | NS | NS | 250 | U | 5,100 | U | 280 | U | 250 | U | 270 | U |
| Acenaphthene | 20,000 | 100,000 | 140 | U | 2,900 | U | 160 | U | 56 | J | 300 | |
| Acenaphthylene | 100,000 | 100,000 | 140 | U | 2,900 | U | 160 | U | 57 | J | 37 | J |
| Acetophenone | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Anthracene | 100,000 | 100,000 | 110 | U | 2,200 | U | 120 | U | 180 | | 660 | |
| Benzo(a)anthracene | 1,000 | 1,000 | 56 | J | 2,200 | U | 120 | U | 410 | | 2,400 | |
| Benzo(a)pyrene | 1,000 | 1,000 | 50 | J | 2,900 | U | 160 | U | 400 | | 2,000 | |
| Benzo(b)fluoranthene | 1,000 | 1,000 | 63 | J | 2,200 | U | 120 | U | 530 | | 2,900 | |
| Benzo(ghi)perylene | 100,000 | 100,000 | 140 | U | 2,900 | U | 160 | U | 250 | | 1,400 | |
| Benzo(k)fluoranthene | 800 | 3,900 | 110 | U | 2,200 | U | 120 | U | 250 | | 1,200 | |
| Benzoic Acid | NS | NS | 580 | U | 12,000 | U | 640 | U | 590 | U | 630 | U |
| Benzyl Alcohol | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Biphenyl | NS | NS | 410 | U | 8,300 | U | 450 | U | 410 | U | 440 | U |
| Bis(2-chloroethoxy)methane | NS | NS | 190 | U | 3,900 | U | 210 | U | 200 | U | 210 | U |
| Bis(2-chloroethyl)ether | NS | NS | 160 | U | 3,300 | U | 180 | U | 160 | U | 180 | U |
| Bis(2-chloroisopropyl)ether | NS | NS | 220 | U | 4,400 | U | 240 | U | 220 | U | 230 | U |
| Bis(2-Ethylhexyl)phthalate | NS | NS | 180 | U | 3,600 | U | 200 | U | 120 | J | 200 | U |
| Butyl benzyl phthalate | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Carbazole | NS | NS | 180 | U | 3,600 | U | 200 | U | 110 | J | 230 | |
| Chrysene | 1,000 | 3,900 | 80 | J | 2,200 | U | 120 | U | 440 | | 2,300 | |
| Di-n-butylphthalate | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Di-n-octylphthalate | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Dibenzo(a,h)anthracene | 330 | 330 | 110 | U | 2,200 | U | 120 | U | 65 | J | 400 | |
| Dibenzofuran | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 93 | J |
| Diethyl phthalate | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Dimethyl phthalate | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Fluoranthene | 100,000 | 100,000 | 160 | | 2,200 | U | 120 | U | 900 | | 4,700 | |
| Fluorene | 30,000 | 100,000 | 180 | U | 3,600 | U | 200 | U | 68 | J | 170 | J |
| Hexachlorobenzene | NS | NS | 110 | U | 2,200 | U | 120 | U | 110 | U | 120 | U |
| Hexachlorobutadiene | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Hexachlorocyclopentadiene | NS | NS | 510 | U | 10,000 | U | 560 | U | 520 | U | 560 | U |
| Hexachloroethane | NS | NS | 140 | U | 2,900 | U | 160 | U | 140 | U | 160 | U |
| Indeno(1,2,3-cd)Pyrene | 500 | 500 | 140 | U | 2,900 | U | 160 | U | 240 | | 1,300 | |
| Isophorone | NS | NS | 160 | U | 3,300 | U | 180 | U | 160 | U | 180 | U |
| n-Nitrosodi-n-propylamine | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Naphthalene | 12,000 | 100,000 | 180 | U | 3,600 | U | 200 | U | 65 | J | 200 | U |
| Nitrobenzene | NS | NS | 160 | U | 3,300 | U | 180 | U | 160 | U | 180 | U |
| NitrosoDiPhenylAmine(NDPA)/DPA | NS | NS | 140 | U | 2,900 | U | 160 | U | 140 | U | 160 | U |
| P-Chloro-M-Cresol | NS | NS | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Pentachlorophenol | 800 | 6,700 | 140 | U | 2,900 | U | 160 | U | 140 | U | 160 | U |
| Phenanthrene | 100,000 | 100,000 | 140 | | 2,200 | U | 120 | U | 700 | | 2,900 | |
| Phenol | 330 | 100,000 | 180 | U | 3,600 | U | 200 | U | 180 | U | 200 | U |
| Pyrene | 100,000 | 100,000 | 160 | | 2,200 | U | 120 | U | 750 | | 3,700 | |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Ur
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Re
U - Analyte not detected above the laboratory MDL
J - Estimated value
NS - No standard established
Green highlighting indicates exceedance of Unrestricted Use SCO
Orange highlighting indicates exceedance of Restricted Residential S

**Table 1C**

**Soil Analytical Data Prior to Remedy - SVOCs (CP-51)**
**3140 Coney Island Avenue, Brooklyn, New York**

| | | | Before IRM | Soil Locations Following IRM Implementation | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Client Sample ID:** | NYSDEC [1] SCOs Unrestricted Use | NYSDEC [2] SCOs Restricted Residential | B-1 | EPN02 | EPW02 | EPS02 | EPE03 | EPB03 | EPB04 |
| **Sample Depth:** | | | 4-8' | 7.5' | 7.5' | 7.5' | 7.5' | 10' | 10' |
| **Laboratory ID:** | | | - | L1301890-09 | L1301890-10 | L1301890-11 | L1301890-12 | L1301890-13 | L1301890-14 |
| **Sampling Date:** | | | 9/8/2007 | 1/30/2013 | 1/30/2013 | 1/30/2013 | 1/30/2013 | 1/30/2013 | 1/30/2013 |
| **Semi-Volatile Organic Compounds (CP-51 List) in µg/kg** | | | | | | | | | |
| Acenaphthene | 20,000 | 100,000[a] | 270 | 410 | 3,100 U | 190 | 150 | 270 | 280 |
| Anthracene | 100,000[a] | 100,000[a] | 333 | 300 | 1,700 J | 120 | 100 J | 130 | 120 |
| Benzo(a)anthracene | 1,000[c] | 1,000[f] | 843 | 40 J | 2,300 U | 57 J | 150 | 56 J | 200 |
| Benzo(a)pyrene | 1,000[c] | 1,000[f] | 559 | 150 U | 3,100 U | 54 J | 140 J | 60 J | 230 |
| Benzo(b)fluoranthene | 1,000[c] | 1,000[f] | 660 | 120 U | 2,300 U | 80 J | 210 | 72 J | 300 |
| Benzo(ghi)perylene | 100,000 | 100,000[a] | 434 | 150 U | 3,100 U | 56 J | 94 J | 160 U | 200 |
| Benzo(k)fluoranthene | 800[c] | 3,900 | 379 | 120 U | 2,300 U | 31 J | 53 J | 120 U | 120 |
| Chrysene | 1,000[c] | 3,900 | 711 | 60 J | 2,300 U | 78 J | 180 | 63 J | 260 |
| Dibenzo(a,h)anthracene | 330[b] | 330[e] | 127 | 120 U | 2,300 U | 120 U | 120 U | 120 U | 120 U |
| Fluoranthene | 100,000[a] | 100,000[a] | 1,665 | 120 U | 2,300 U | 140 | 300 | 100 J | 280 |
| Fluorene | 30,000 | 100,000[a] | 462 | 900 | 7,000 | 420 | 290 | 580 | 580 |
| Indeno(1,2,3-cd)Pyrene | 500[c] | 500[f] | 469 | 150 U | 3,100 U | 160 U | 98 J | 160 U | 190 |
| Naphthalene | 12,000 | 100,000[a] | 1,221 | 800 | 17,000 | 200 U | 100 J | 310 | 570 |
| Phenanthrene | 100,000 | 100,000[a] | 40 U | 1700 | 19,000 | 730 | 440 | 880 | 840 |
| Pyrene | 100,000 | 100,000[a] | 1,629 | 330 | 1,600 J | 280 | 340 | 200 | 410 |

Notes:

(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06

(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06

NS - No Standard

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.

U - The analyte was analyzed for, but was not detected above the reported sample quantification limit. The assocaited numerical value is the sample quantitation limit.

a - The SCOs for unrestricted use were capped at a maximum value of 100 ppm.

b - For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO.

c - For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentrationis used as the Track1 SCO value for this use of the site.

d - SCO is the sum of endosulfin I, endosulfin II and endosulfin sulfate.

e - The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

f - Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) wish "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.

Highlighted text denotes concentrations exceeding NYSDEC Unrestricted Use SCO

Highlighted text denotes concentrations exceeding NYSDEC Restricted Residential SCO

**Table 1D**

**Soil Analytical Data Prior to Remedy - Pesticides, PCBs, and Metals**
**3140 Coney Island Avenue, Brooklyn, New York**

| | | | Soil Sample Locations Before IRM | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE ID<br>SAMPLE DEPTH (ft.)<br>SAMPLING DATE<br>LAB SAMPLE ID | Unrestricted Use SCO [1] | Restricted Residential SCO [2] | PRB001<br>6-8'<br>09/10/13<br>L1317760-01 | | PRB001<br>8-10'<br>09/10/13<br>L1317760-02 | | PRB002<br>6-8'<br>09/10/13<br>L1317760-03 | | PRB002<br>8-10'<br>09/10/13<br>L1317760-04 | | PRB003<br>6-8'<br>09/10/13<br>L1317760-05 | |
| **Organochlorine Pesticides by EPA 8081A in µg/kg** | | | | | | | | | | | | |
| 4,4'-DDD | 3.3 | 13,000 | 1.71 | U | 1.7 | U | 1.81 | U | 1.78 | U | 1.66 | U |
| 4,4'-DDE | 3.3 | 8,900 | 1.71 | U | 1.7 | U | 1.81 | U | 1.78 | U | 1.66 | U |
| 4,4'-DDT | 3.3 | 7,900 | 3.21 | U | 3.19 | U | 3.4 | U | 3.33 | U | 3.12 | U |
| Aldrin | 5 | 97 | 1.71 | U | 1.7 | U | 1.81 | U | 1.78 | U | 1.66 | U |
| Alpha-BHC | 20 | 480 | 0.714 | U | 0.71 | U | 0.756 | U | 0.74 | U | 0.693 | U |
| Beta-BHC | 36 | 360 | 1.71 | U | 1.7 | U | 1.81 | U | 1.78 | U | 1.66 | U |
| Chlordane | 94 | 4,200 | 13.9 | U | 13.8 | U | 14.7 | U | 14.4 | U | 13.5 | U |
| cis-Chlordane | NS | NS | 2.14 | U | 2.13 | U | 2.27 | U | 2.22 | U | 2.08 | U |
| Delta-BHC | 40 | 100,000 | 1.71 | U | 1.7 | U | 1.81 | U | 1.78 | U | 1.66 | U |
| Dieldrin | 5 | 200 | 1.07 | U | 1.06 | U | 1.13 | U | 1.11 | U | 1.04 | U |
| Endosulfan I | 2,400 | 24,000 | 1.71 | U | 1.7 | U | 1.81 | U | 1.78 | U | 1.66 | U |
| Endosulfan II | 2,400 | 24,000 | 1.71 | U | 1.7 | U | 1.81 | U | 1.78 | U | 1.66 | U |
| Endosulfan sulfate | 2,400 | 24,000 | 0.714 | U | 0.71 | U | 0.756 | U | 0.74 | U | 0.693 | U |
| Endrin | 14 | 11,000 | 0.714 | U | 0.71 | U | 0.756 | U | 0.74 | U | 0.693 | U |
| Endrin ketone | NS | NS | 1.71 | U | 1.7 | U | 1.81 | U | 1.78 | U | 1.66 | U |
| Heptachlor | 42 | 2,100 | 0.857 | U | 0.852 | U | 0.907 | U | 0.888 | U | 0.831 | U |
| Heptachlor epoxide | NS | NS | 3.21 | U | 3.19 | U | 3.4 | U | 3.33 | U | 3.12 | U |
| Lindane | 100 | 1,300 | 0.714 | U | 0.71 | U | 0.756 | U | 0.74 | U | 0.693 | U |
| Methoxychlor | NS | NS | 3.21 | U | 3.19 | U | 3.4 | U | 3.33 | U | 3.12 | U |
| Toxaphene | NS | NS | 32.1 | U | 31.9 | U | 34 | U | 33.3 | U | 31.2 | U |
| trans-Chlordane | NS | NS | 2.14 | U | 2.13 | U | 2.27 | U | 2.22 | U | 2.08 | U |
| **Polychlorinated Biphenyls by EPA 8082 in µg/kg** | | | | | | | | | | | | |
| Aroclor 1016 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| Aroclor 1221 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| Aroclor 1232 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| Aroclor 1242 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| Aroclor 1248 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| Aroclor 1254 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| Aroclor 1260 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| Aroclor 1262 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| Aroclor 1268 | 100 | 1,000 | 36.6 | U | 34.6 | U | 37.6 | U | 38.2 | U | 35.7 | U |
| **Total Metals in mg/kg** | | | | | | | | | | | | |
| Aluminum | NS | NS | 8,400 | | 4,500 | | 6,300 | | 7,300 | | 8,200 | |
| Antimony | NS | NS | 4.4 | U | 1 | J | 4.4 | U | 4.4 | U | 4.1 | U |
| Arsenic | 13 | 16 | 3.3 | | 1.8 | | 3.4 | | 3.3 | | 3.2 | |
| Barium | 350 | 400 | 35 | | 28 | | 27 | | 35 | | 41 | |
| Beryllium | 7.2 | 72 | 0.57 | | 0.3 | J | 0.34 | J | 0.36 | J | 0.45 | |
| Cadmium | 2.5 | 4.3 | 0.26 | J | 0.38 | J | 0.46 | J | 0.66 | J | 0.32 | J |
| Calcium | NS | NS | 420 | | 890 | | 690 | | 720 | | 560 | |
| Chromium | 30 | 180 | 13 | | 11 | | 12 | | 14 | | 19 | |
| Cobalt | NS | NS | 8.7 | | 6.2 | | 6.7 | | 6.4 | | 6.6 | |
| Copper | 50 | 270 | 93 | | 22 | | 13 | | 15 | | 20 | |
| Iron | NS | NS | 14,000 | | 10,000 | | 12,000 | | 13,000 | | 13,000 | |
| Lead | 63 | 400 | 37 | | 7 | | 13 | | 24 | | 13 | |
| Magnesium | NS | NS | 2,000 | | 3,500 | | 2,200 | | 2,800 | | 3,400 | |
| Manganese | 1,600 | 2,000 | 330 | | 240 | | 310 | | 320 | | 250 | |
| Mercury | 0.18 | 0.81 | 0.03 | J | 0.07 | U | 0.11 | | 0.05 | J | 0.08 | U |
| Nickel | 30 | 310 | 31 | | 60 | | 39 | | 48 | | 54 | |
| Potassium | NS | NS | 600 | | 630 | | 750 | | 700 | | 1,100 | |
| Selenium | 3.9 | 180 | 1.8 | U | 1.6 | U | 1.8 | U | 1.8 | U | 1.6 | U |
| Silver | 2 | 180 | 0.88 | U | 0.83 | U | 0.88 | U | 0.88 | U | 0.82 | U |
| Sodium | NS | NS | 140 | J | 320 | | 48 | J | 150 | J | 280 | |
| Thallium | NS | NS | 1.8 | U | 1.6 | U | 1.8 | U | 1.8 | U | 1.6 | U |
| Vanadium | NS | NS | 22 | | 15 | | 18 | | 18 | | 20 | |
| Zinc | 109 | 10,000 | 38 | | 73 | | 100 | | 51 | | 120 | |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06
U - Analyte not detected above the laboratory MDL
J - Estimated value
NS - No standard established
Green highlighting indicates exceedance of Unrestricted Use SCO
Orange highlighting indicates exceedance of Restricted Residential SCO

**Table 1D**

**Soil Analytical Data Prior to Remedy - Pesticides, PCBs, and Metals**
**3140 Coney Island Avenue, Brooklyn, New York**

| | | | Soil Sample Locations Before IRM | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE ID<br>SAMPLE DEPTH (ft.)<br>SAMPLING DATE<br>LAB SAMPLE ID | Unrestricted Use SCO [1] | Restricted Residential SCO [2] | PRB003<br>8-10'<br>09/10/13<br>L1317760-06 | | PRB004<br>3-5'<br>09/10/13<br>L1317760-07 | | PRB004<br>8-10'<br>09/10/13<br>L1317760-08 | | PRB005<br>3-5'<br>09/10/13<br>L1317760-09 | | PRB005<br>8-10'<br>09/10/13<br>L1317760-10 | |
| **Organochlorine Pesticides by EPA 8081A in µg/kg** | | | | | | | | | | | | |
| 4,4'-DDD | 3.3 | 13,000 | 1.76 | U | 17.7 | U | 1.83 | U | 17.1 | U | 1.78 | U |
| 4,4'-DDE | 3.3 | 8,900 | 1.76 | U | 17.7 | U | 1.83 | U | 11.8 | J | 2 | U |
| 4,4'-DDT | 3.3 | 7,900 | 3.29 | U | 33.1 | U | 3.44 | U | 48.1 | | 2 | J |
| Aldrin | 5 | 97 | 1.76 | U | 17.7 | U | 1.83 | U | 261 | | 2 | |
| Alpha-BHC | 20 | 480 | 0.732 | U | 7.36 | U | 0.763 | U | 7.14 | U | 1 | U |
| Beta-BHC | 36 | 360 | 1.76 | U | 17.7 | U | 1.83 | U | 17.1 | U | 2 | U |
| Chlordane | 94 | 4,200 | 14.3 | U | 144 | U | 14.9 | U | 139 | U | 15 | U |
| cis-Chlordane | NS | NS | 2.2 | U | 22.1 | U | 2.29 | U | 21.4 | U | 2 | U |
| Delta-BHC | 40 | 100,000 | 1.76 | U | 17.7 | U | 1.83 | U | 17.1 | U | 2 | U |
| Dieldrin | 5 | 200 | 1.1 | U | 11 | U | 1.14 | U | 99.1 | | 2 | |
| Endosulfan I | 2,400 | 24,000 | 1.76 | U | 17.7 | U | 1.83 | U | 17.1 | U | 2 | U |
| Endosulfan II | 2,400 | 24,000 | 1.76 | U | 17.7 | U | 1.83 | U | 17.1 | U | 2 | U |
| Endosulfan sulfate | 2,400 | 24,000 | 0.732 | U | 7.36 | U | 0.763 | U | 7.14 | U | 1 | U |
| Endrin | 14 | 11,000 | 0.732 | U | 7.36 | U | 0.763 | U | 7.14 | U | 1 | U |
| Endrin ketone | NS | NS | 1.76 | U | 17.7 | U | 1.83 | U | 17.1 | U | 2 | U |
| Heptachlor | 42 | 2,100 | 0.878 | U | 8.83 | U | 0.916 | U | 8.57 | U | 1 | U |
| Heptachlor epoxide | NS | NS | 3.29 | U | 33.1 | U | 3.44 | U | 32.1 | U | 3 | U |
| Lindane | 100 | 1,300 | 0.732 | U | 7.36 | U | 0.763 | U | 7.14 | U | 1 | U |
| Methoxychlor | NS | NS | 3.29 | U | 33.1 | U | 3.44 | U | 32.1 | U | 3 | U |
| Toxaphene | NS | NS | 32.9 | U | 331 | U | 34.4 | U | 321 | U | 33 | U |
| trans-Chlordane | NS | NS | 2.2 | U | 22.1 | U | 2.29 | U | 21.4 | U | 2 | U |
| **Polychlorinated Biphenyls by EPA 8082 in µg/kg** | | | | | | | | | | | | |
| Aroclor 1016 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 36.6 | U | 39 | U |
| Aroclor 1221 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 36.6 | U | 39 | U |
| Aroclor 1232 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 36.6 | U | 39 | U |
| Aroclor 1242 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 36.6 | U | 39 | U |
| Aroclor 1248 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 36.6 | U | 39 | U |
| Aroclor 1254 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 36.6 | U | 39 | U |
| Aroclor 1260 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 36.6 | U | 39 | U |
| Aroclor 1262 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 36.6 | U | 39 | U |
| Aroclor 1268 | 100 | 1,000 | 36.7 | U | 37.2 | U | 39.9 | U | 24.6 | J | 39 | U |
| **Total Metals in mg/kg** | | | | | | | | | | | | |
| Aluminum | NS | NS | 5,100 | | 5,700 | | 2,400 | | 7,600 | | 2,400 | |
| Antimony | NS | NS | 4.4 | U | 4.3 | U | 4.7 | U | 4.3 | U | 5 | U |
| Arsenic | 13 | 16 | 2.6 | | 2 | | 1.4 | | 3.6 | | 2 | |
| Barium | 350 | 400 | 31 | | 51 | | 14 | | 71 | | 16 | |
| Beryllium | 7.2 | 72 | 0.29 | J | 0.21 | J | 0.11 | J | 0.36 | J | 0 | J |
| Cadmium | 2.5 | 4.3 | 0.21 | J | 0.26 | J | 0.08 | J | 0.39 | J | 0 | J |
| Calcium | NS | NS | 610 | | 24,000 | | 590 | | 3,700 | | 850 | |
| Chromium | 30 | 180 | 9.6 | | 12 | | 5.8 | | 16 | | 6 | |
| Cobalt | NS | NS | 4.7 | | 3.3 | | 1.7 | J | 6.7 | | 2 | |
| Copper | 50 | 270 | 11 | | 20 | | 12 | | 25 | | 44 | |
| Iron | NS | NS | 10,000 | | 6,800 | | 4,600 | | 15,000 | | 5,500 | |
| Lead | 63 | 400 | 10 | | 54 | | 20 | | 74 | | 69 | |
| Magnesium | NS | NS | 2,100 | | 3,200 | | 670 | | 2,500 | | 680 | |
| Manganese | 1,600 | 2,000 | 260 | | 120 | | 62 | | 300 | | 79 | |
| Mercury | 0.18 | 0.81 | 0.31 | | 0.05 | J | 0.1 | U | 0.13 | | 0.18 | |
| Nickel | 30 | 310 | 20 | | 8.6 | | 5.6 | | 22 | | 8 | |
| Potassium | NS | NS | 560 | | 490 | | 280 | | 910 | | 320 | |
| Selenium | 3.9 | 180 | 1.7 | U | 1.7 | U | 1.9 | U | 1.7 | U | 2 | U |
| Silver | 2 | 180 | 0.87 | U | 0.86 | U | 0.94 | U | 0.87 | U | 1 | U |
| Sodium | NS | NS | 340 | | 130 | J | 86 | J | 110 | J | 90 | J |
| Thallium | NS | NS | 1.7 | U | 1.7 | U | 1.9 | U | 1.7 | U | 2 | U |
| Vanadium | NS | NS | 14 | | 13 | | 9.8 | | 23 | | 9 | |
| Zinc | 109 | 10,000 | 22 | | 67 | | 10 | | 76 | | 14 | |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 3
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 3
U - Analyte not detected above the laboratory MDL
J - Estimated value
NS - No standard established
Green highlighting indicates exceedance of Unrestricted Use SC
Orange highlighting indicates exceedance of Restricted Residen

**Table 2A**

**Groundwater Analytical Data Prior to Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| Client Sample ID: | NYSDEC [1] | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | MW-7 | Multi-Level Well | | | | | | Multi-Level Well | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth: | Ambient Water Quality Standards | 9-19' | 9-19' | 9-19' | 6.5-16.5' | 6.5-16.5' | 6.9-16.9' | 7-17' | 15-20' | 35-40' | 55-60' | 75-80' | 95-100' | 115-120' | 15-20' | 35-40' | 55-60' | 75-80' | 95-100' | 115-120' |
| Sampling Date: | | 7/19/2012 | 7/19/2012 | 7/19/2012 | 7/19/2012 | 7/19/2012 | 7/19/2012 | 7/19/2012 | 10/17/2012 | 10/17/2012 | 10/17/2012 | 10/17/2012 | 10/17/2012 | 10/17/2012 | 1/30/2013 | 1/30/2013 | 1/30/2013 | 1/30/2013 | 1/30/2013 | 1/30/2013 |
| Laboratory ID: | | L1212940-01 | L1212940-02 | L1212940-03 | L1212940-04 | L1212940-05 | L1212940-06 | L1212940-07 | L1218814-01 | L1218814-02 | L1218814-03 | L1218814-04 | L1218814-05 | L1218814-06 | L1301890-01 | L1301890-02 | L1301890-03 | L1301890-04 | L1301890-05 | L1301890-06 |
| **Volatile Organic Compounds in µg/L** | | | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,1,1-Trichloroethane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,1,2,2-Tetrachloroethane | 5 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.5 U | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| 1,1,2-Trichloroethane | 1 | 75 U | 1,500 U | 30 U | 3.8 U | 1.5 U | 1.5 U | 150 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 6 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U |
| 1,1-Dichloroethane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,1-Dichloroethene | 5 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.5 U | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| 1,1-Dichloropropene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,2,3-Trichlorobenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,2,3-Trichloropropane | 0.04 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,2,4,5-Tetramethylbenzene | NS | 100 U | 2,000 U | 40 U | 5 U | 8.3 | 2.8 | 200 U | 20 | 0.7 J | 2 U | 2 U | 2 U | 2 U | 9.5 | 0.75 J | 2 U | 2 U | 2 U | 2 U |
| 1,2,4-Trichlorobenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,2,4-Trimethylbenzene | 5 | 120 U | 1,400 J | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 0.9 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,2-Dibromo-3-chloropropane | 0.04 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,2-Dibromoethane | 0.0006 | 100 U | 2,000 U | 40 U | 5 U | 2 U | 2 U | 200 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 8 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| 1,2-Dichlorobenzene | 3 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,2-Dichloroethane | 0.6 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.5 U | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| 1,2-Dichloropropane | 1 | 50 U | 1,000 U | 20 U | 2.5 U | 1 U | 1 U | 100 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 4 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,3,5-Trimethylbenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 5.5 | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,3-Dichlorobenzene | 3 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,3-Dichloropropane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,4-Dichlorobenzene | 3 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 1,4-Diethylbenzene | NS | 100 U | 2,000 U | 40 U | 5 U | 1.3 J | 2 U | 200 U | 13 | 0.18 J | 2 U | 2 U | 2 U | 2 U | 5.6 J | 2 U | 2 U | 2 U | 2 U | 2 U |
| 2,2-Dichloropropane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| 2-Butanone | 50 | 250 U | 5,000 U | 100 U | 12 U | 5 U | 5 U | 500 U | 5 U | 27 | 84 | 19 | 82 | 5 U | 12 J | 5 U | 5 U | 25 | 5 U | 5 U |
| 2-Hexanone | 50 | 250 U | 5,000 U | 100 U | 12 U | 5 U | 5 U | 500 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 4-Ethyltoluene | NS | 100 U | 2,000 U | 40 U | 5 U | 2 U | 2 U | 200 U | 1.9 J | 2 U | 2 U | 2 U | 2 U | 2 U | 8 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| 4-Methyl-2-pentanone | NS | 250 U | 5,000 U | 100 U | 12 U | 5 U | 5 U | 500 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Acetone | 50 | 250 U | 5,000 U | 100 U | 12 U | 5 U | 2.1 | 500 U | 26 | 12 | 30 | 6.4 | 29 | 2 J | 70 | 5 | 1.6 J | 68 | 4.3 J | 9 |
| Acrylonitrile | 5 | 250 U | 5,000 U | 100 U | 12 U | 5 U | 5 U | 500 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Benzene | 1 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.34 | 50 U | 0.21 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| Bromobenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Bromochloromethane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Bromodichloromethane | 50 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.5 U | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.33 J | 0.5 U | 0.5 U |
| Bromoform | 50 | 100 U | 2,000 U | 40 U | 5 U | 2 U | 2 U | 200 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 8 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| Bromomethane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Carbon disulfide | 60 | 250 U | 5,000 U | 100 U | 12 U | 5 U | 5 U | 500 U | 0.28 J | 5 U | 5 U | 5 U | 5 U | 5 U | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Carbon tetrachloride | 5 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.5 U | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| Chlorobenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 0.22 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Chloroethane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Chloroform | 7 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Chloromethane | NS | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| cis-1,2-Dichloroethene | 5 | 2,700 | 25,000 | 870 | 74 | 23 | 3.9 | 5,200 | 86 | 0.37 J | 2.5 U | 2.5 U | 2.5 U | 0.43 J | 210 | 3.8 | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| cis-1,3-Dichloropropene | 0.4 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.5 U | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| Dibromochloromethane | 50 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.5 U | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| Dibromomethane | 5 | 250 U | 5,000 U | 100 U | 12 U | 5 U | 5 U | 500 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Dichlorodifluoromethane | 5 | 250 U | 5,000 U | 100 U | 12 U | 5 U | 5 U | 500 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Ethyl ether | NS | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Ethylbenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 0.79 | 250 U | 2.5 | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Hexachlorobutadiene | 0.5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Isopropylbenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 1.8 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 0.71 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Methyl tert butyl ether | 10 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Methylene chloride | 5 | 120 U | 2,500 U | 50 U | 2.3 J | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| n-Butylbenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.7 | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| n-Propylbenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.2 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Naphthalene | 10 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 4.1 | 0.24 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| o-Chlorotoluene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| o-Xylene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 3.8 | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 3.7 J | 1 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| p-Chlorotoluene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| p-Isopropyltoluene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 0.55 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| p/m-Xylene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| sec-Butylbenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 1.9 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Styrene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| tert-Butylbenzene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Tetrachloroethene | 5 | 700 | 340,000 E | 410 | 120 | 3.8 | 1.9 | 1,400 | 78 | 0.53 | 0.81 | 0.79 | 1 | 19 | 17 | 2.5 U | 2.5 U | 2.5 U | 0.71 J | 15 |
| Toluene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 0.34 J | 0.25 J | 0.7 J | 0.4 J | 0.32 J | 0.27 J | 10 U | 2.5 U | 2.5 U | 2.4 J | 2.5 U | 2.5 U |
| trans-1,2-Dichloroethene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 12 | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 12 | 1.2 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| trans-1,3-Dichloropropene | 0.4 | 25 U | 500 U | 10 U | 1.2 U | 0.5 U | 0.5 U | 50 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| trans-1,4-Dichloro-2-butene | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Trichloroethene | 5 | 1,100 | 26,000 | 100 | 6.3 | 6.2 | 0.95 | 1,500 | 13 | 0.17 J | 0.5 U | 0.5 U | 0.5 U | 0.22 J | 5.3 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| Trichlorofluoromethane | 5 | 120 U | 2,500 U | 50 U | 6.2 U | 2.5 U | 2.5 U | 250 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Vinyl acetate | NS | 250 U | 5,000 U | 100 U | 12 U | 5 U | 5 U | 500 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Vinyl chloride | 2 | 480 | 1,000 U | 290 | 15 | 13 | 2 | 1,200 | 180 | 1 U | 1 U | 1 U | 1 U | 1 U | 160 | 13 | 1 U | 1 U | 1 U | 1 U |

Notes:
(1) NYSDEC Ambient Water Quality Standards and Guidance Values 6/1998
NS - No Standard
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.
U - The analyte was analyzed for, but was not detected above the reported sample quantification limit. The assocaited numerical value is the sample quantitation limit.
Highlighted values indicate exceedance of the NYSDEC AWQS

**Table 2A**

**Groundwater Analytical Data Prior to Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| Client Sample ID: | | PWG-VP-01 | | | | | | | | | | PWG-VP-02 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth: | NYSDEC [1] Ambient Water Quality Standards | 10-12' | 20-22' | 30-32' | 40-42' | 50-52' | 60-62' | 70-72' | 80-82' | 90-92' | 100-102' | 10-12' | 20-22' | 30-32' | 40-42' | 50-52' | 60-62' | 70-72' | 80-82' | 90-92' | 100-102' |
| Sampling Date: | | 7/10/2012 | 7/10/2012 | 7/10/2012 | 7/10/2012 | 7/10/2012 | 7/10/2012 | 7/10/2012 | 7/10/2012 | 7/10/2012 | 7/10/2012 | 7/6/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 |
| Laboratory ID: | | L1212340-14 | L1212340-15 | L1212340-16 | L1212340-17 | L1212340-18 | L1212340-19 | L1212340-20 | L1212340-21 | L1212340-22 | L1212340-23 | L1212340-01 | L1212340-04 | L1212340-06 | L1212340-07 | L1212340-08 | L1212340-09 | L1212340-10 | L1212340-11 | L1212340-12 | L1212340-13 |
| **Volatile Organic Compounds in µg/L** | | | | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,1,1-Trichloroethane | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,1,2,2-Tetrachloroethane | 5 | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| 1,1,2-Trichloroethane | 1 | 6 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 1.5 U | 3 U |
| 1,1-Dichloroethane | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,1-Dichloroethene | 5 | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| 1,1-Dichloropropene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,2,3-Trichlorobenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,2,3-Trichloropropane | 0.04 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,2,4,5-Tetramethylbenzene | NS | 4.5 J | 0.12 J | 0.32 J | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2.5 | 2 U | 0.15 J | 2 U | 2 U | 0.12 J | 0.19 J | 0.33 J | 0.17 J | 1.15 J |
| 1,2,4-Trichlorobenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,2,4-Trimethylbenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.11 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.8 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,2-Dibromo-3-chloropropane | 0.04 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,2-Dibromoethane | 0.0006 | 8 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 4 U |
| 1,2-Dichlorobenzene | 3 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,2-Dichloroethane | 0.6 | 2 U | 0.5 U | 0.62 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| 1,2-Dichloropropane | 1 | 4 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 2 U |
| 1,3,5-Trimethylbenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.73 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,3-Dichlorobenzene | 3 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,3-Dichloropropane | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,4-Dichlorobenzene | 3 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 1,4-Diethylbenzene | NS | 0.97 J | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 0.84 J | 2 U | 0.26 J | 2 U | 2 U | 0.12 J | 2 U | 0.31 J | 0.18 J | 1.26 J |
| 2,2-Dichloropropane | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| 2-Butanone | 50 | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| 2-Hexanone | 50 | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| 4-Ethyltoluene | NS | 0.47 J | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 0.39 J | 2 U | 0.12 J | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 4 U |
| 4-Methyl-2-pentanone | NS | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| Acetone | 50 | 20 U | 1.3 J | 1.92 J | 2.03 J | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 1.59 J | 5 U | 5 U | 5 U | 5 U | 1.55 J | 1.89 J | 10 U |
| Acrylonitrile | 5 | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| Benzene | 1 | 1.8 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| Bromobenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Bromochloromethane | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Bromodichloromethane | 50 | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| Bromoform | 50 | 8 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 4 U |
| Bromomethane | 5 | 10 U | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 5 J |
| Carbon disulfide | 60 | 1.81 J | 0.52 J | 0.36 J | 0.42 J | 0.41 J | 5 U | 5 U | 5 U | 5 U | 5 U | 0.87 J | 0.38 J | 0.35 J | 5 U | 0.3 J | 5 U | 5 U | 5 U | 5 U | 10 U |
| Carbon tetrachloride | 5 | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| Chlorobenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Chloroethane | 5 | 10 U | 2.5 U | 1.9 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Chloroform | 7 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Chloromethane | NS | 10 U | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 5 U |
| cis-1,2-Dichloroethene | 5 | 1,100 | 0.7 J | 6.6 | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.11 J | 0.19 J | 74 J | 2.5 U | 2.6 | 2.5 U | 0.34 J | 0.42 J | 0.45 J | 1.4 J | 0.99 J | 7.7 |
| cis-1,3-Dichloropropene | 0.4 | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| Dibromochloromethane | 50 | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| Dibromomethane | 5 | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| Dichlorodifluoromethane | 5 | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| Ethyl ether | NS | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Ethylbenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.17 J | 0.1 J | 2.5 U | 2.5 U | 2.5 U | 0.34 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Hexachlorobutadiene | 0.5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Isopropylbenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Methyl tert butyl ether | 10 | 10 U | 2.5 U | 2.5 U | 0.81 J | 0.47 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 1.8 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Methylene chloride | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.92 J |
| n-Butylbenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| n-Propylbenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Naphthalene | 10 | 10 U | 0.35 J | 2.5 U | 2.5 U | 2.5 U | 1 J | 0.31 J | 0.19 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.47 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| o-Chlorotoluene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| o-Xylene | 5 | 1.11 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.52 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| p-Chlorotoluene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| p-Isopropyltoluene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| p/m-Xylene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.12 J | 0.16 J | 0.13 J | 0.11 J | 0.1 J | 0.53 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| sec-Butylbenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.31 | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Styrene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| tert-Butylbenzene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Tetrachloroethene | 5 | 4.4 | 0.55 | 0.5 U | 0.5 U | 0.5 U | 0.56 | 0.17 J | 0.12 J | 0.8 | 1.3 | 84 | 0.53 | 100 | 16 J | 36 J | 21 | 15 | 62 J | 41 | 230 |
| Toluene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 0.14 J | 0.14 J | 0.16 J | 0.19 J | 0.34 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| trans-1,2-Dichloroethene | 5 | 4.8 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 8.1 J | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| trans-1,3-Dichloropropene | 0.4 | 2 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1 U |
| trans-1,4-Dichloro-2-butene | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 2.5 J | 5 J |
| Trichloroethene | 5 | 1.3 J | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 6.2 | 0.5 U | 8.7 | 0.92 | 1.6 | 1.1 | 1 | 3.1 | 2.4 | 15 |
| Trichlorofluoromethane | 5 | 10 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 5 U |
| Vinyl acetate | NS | 20 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 10 U |
| Vinyl chloride | 2 | 580 | 1.5 | 300 | 0.52 J | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 610 | 0.42 J | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 2 U |

Notes:
(1) NYSDEC Ambient Water Quality Standards and Guidanc
NS - No Standard
J - Data indicates the presence of a compound that meet
U - The analyte was analyzed for, but was not detected ab
Highlighted values indicate exceedance of the NYSDEC AV

**Table 2A**

**Groundwater Analytical Data Prior to Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| Client Sample ID: | | B-2 | B-3 | B-4 | B-5 | B-6 | B-7 | GW-1 | | | | GW-2 | | | | GW-3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth: | NYSDEC [1] Ambient Water Quality Standards | 9-13' | 9-13' | 9-13' | 9-13' | 9-13' | 9-13' | 10-14' | 21-25' | 33-37' | 48-52' | 10-14' | 21-25' | 33-37' | 48-52' | 10-14' | 21-25' | 33-37' | 48-52' |
| Sampling Date: | | 9/28/2007 | 9/28/2007 | 9/28/2007 | 9/28/2007 | 9/28/2007 | 9/28/2007 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 | 1/13/2010 |
| Laboratory ID: | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Volatile Organic Compounds in µg/L** | | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,1-Trichloroethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,2,2-Tetrachloroethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,2-Trichloroethane | 1 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1-Dichloroethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1-Dichloroethene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | ND | ND | ND | ND | 1.9 | ND | ND | ND | 1.6 | 3.8 | ND | ND |
| 1,1-Dichloropropene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,3-Trichlorobenzene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,3-Trichloropropane | 0.04 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,4,5-Tetramethylbenzene | NS | NS | NS | NS | NS | NS | NS | 700 | 0.96 J | ND | ND | 43 | 1.2 | ND | 2.8 | 7.3 | 1.6 | ND | ND |
| 1,2,4-Trichlorobenzene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2,4-Trimethylbenzene | 5 | 16 | 63 | 36 | 25 U | 5 U | 5 U | ND | ND | ND | ND | 65 | 0.54 J | ND | ND | 2 | ND | ND | 0.61 J |
| 1,2-Dibromo-3-chloropropane | 0.04 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dibromoethane | 0.0006 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichlorobenzene | 3 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichloroethane | 0.6 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichloropropane | 1 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,3,5-Trimethylbenzene | 5 | 6 | 21 | 9 | 25 U | 5 U | 5 U | ND | ND | ND | ND | 27 | ND | ND | ND | 0.99 J | ND | ND | ND |
| 1,3-Dichlorobenzene | 3 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,3-Dichloropropane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,4-Dichlorobenzene | 3 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,4-Diethylbenzene | NS | NS | NS | NS | NS | NS | NS | 80 | ND | ND | ND | 29 | 0.6 J | ND | ND | 3.8 | 0.66 J | ND | 0.68 J |
| 2,2-Dichloropropane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Butanone | 50 | 10 U | 10 U | 10 U | 50 U | 10 U | 10 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Hexanone | 50 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 4-Ethyltoluene | NS | NS | NS | NS | NS | NS | NS | ND | ND | ND | ND | 14 | ND | ND | ND | 0.69 J | ND | ND | ND |
| 4-Methyl-2-pentanone | NS | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acetone | 50 | 50 U | 50 U | 50 U | 250 U | 50 U | 50 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acrylonitrile | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Benzene | 1 | 1.9 | 6.37 | 1.03 | 3.5 U | 0.7 U | 0.7 U | ND | ND | ND | ND | ND | ND | ND | ND | 0.98 J | ND | ND | ND |
| Bromobenzene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromochloromethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromodichloromethane | 50 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromoform | 50 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromomethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Carbon disulfide | 60 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Carbon tetrachloride | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chlorobenzene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloroethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloroform | 7 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloromethane | NS | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| cis-1,2-Dichloroethene | 5 | 12,800 | 670 | 114 | 568 | 33 | 17 | ND | ND | ND | ND | 470 | 1.3 | 0.68 J | ND | 940 | 1,200 | 2.8 | 4.2 |
| cis-1,3-Dichloropropene | 0.4 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dibromochloromethane | 50 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dibromomethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dichlorodifluoromethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethyl ether | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethylbenzene | 5 | 5 | 15 | 5 U | 25 U | 5 U | 5 U | 16 J | ND | ND | ND | 5.9 | ND | ND | ND | ND | ND | ND | ND |
| Hexachlorobutadiene | 0.5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Isopropylbenzene | 5 | 5 U | 11 | 5 U | 25 U | 5 U | 5 U | 11 J | ND | ND | ND | 5.7 | ND | ND | ND | 0.75 J | ND | ND | ND |
| Methyl tert butyl ether | 10 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | ND | ND | ND | 0.72 J | ND | ND | ND | ND | ND | ND | ND | ND |
| Methylene chloride | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| n-Butylbenzene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | 24 | ND | ND | ND | 5.8 | ND | ND | ND | 3.1 | ND | ND | ND |
| n-Propylbenzene | 5 | 5 U | 16 | 5 U | 25 U | 5 U | 5 U | 25 | ND | ND | ND | 13 | ND | ND | ND | 0.66 J | ND | ND | ND |
| Naphthalene | 10 | 6 | 36 | 21 | 25 U | 5 U | 5 U | 21 | ND | ND | ND | 2.2 C | ND | ND | ND | 0.67 J | ND | ND | ND |
| o-Chlorotoluene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| o-Xylene | 5 | 5 U | 7 | 5 U | 25 U | 5 U | 5 U | ND | ND | ND | ND | 1.6 | ND | ND | ND | ND | ND | ND | ND |
| p-Chlorotoluene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| p-Isopropyltoluene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | ND | ND | ND | ND | 17 | ND | ND | ND | 0.67 J | ND | ND | ND |
| p/m-Xylene | 5 | 10 U | 29 | 10 U | 50 U | 10 U | 10 U | ND | ND | ND | ND | 4.3 | ND | ND | ND | ND | ND | ND | ND |
| sec-Butylbenzene | 5 | 5 U | 6 | 5 U | 25 U | 5 U | 5 U | 23 | ND | ND | ND | 7.6 | ND | ND | ND | 1.1 | ND | ND | ND |
| Styrene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| tert-Butylbenzene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Tetrachloroethene | 5 | 22 | 105 | 8 | 25 U | 31 | 14 | 20 | 1.3 | 1.2 | 1.7 | 20,000 | 86 | 53 | 18 | 72 | 220 C | 8.3 | 35 |
| Toluene | 5 | 5 U | 8 | 5 U | 25 U | 5 U | 5 U | ND | ND | ND | ND | 1.1 | ND | ND | ND | ND | ND | ND | ND |
| trans-1,2-Dichloroethene | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | 16 J | ND | ND | ND | 11 | ND | ND | ND | 5.2 | 8.8 | ND | ND |
| trans-1,3-Dichloropropene | 0.4 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| trans-1,4-Dichloro-2-butene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Trichloroethene | 5 | 1,700 | 20 | 5 U | 25 U | 7 | 5 U | ND | ND | ND | ND | 1,600 | 4.4 | 2.2 | ND | 120 | 330 | 0.77 J | 1.4 |
| Trichlorofluoromethane | 5 | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Vinyl acetate | NS | 5 U | 5 U | 5 U | 25 U | 5 U | 5 U | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Vinyl chloride | 2 | 2,080 | 382 | 46 | 63 | 18 | 5 U | ND | ND | 0.65 J | ND | 160 | ND | ND | ND | 290 | 280 | ND | ND |

Notes:
(1) NYSDEC Ambient Water Quality Standards and Guidanc
NS - No Standard
J - Data indicates the presence of a compound that meets
U - The analyte was analyzed for, but was not detected ab
Highlighted values indicate exceedance of the NYSDEC AV

**Table 2A**

**Groundwater Analytical Data Prior to Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| Client Sample ID: | | GW-4 | | | | GW-5 | | | | GW-6 | | | | GW-7 | | | | GW-8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth: | NYSDEC [1] Ambient Water Quality Standards | 10-14' | 21-25' | 33-37' | 48-52' | 10-14' | 21-25' | 33-37' | 48-52' | 10-14' | 21-25' | 33-37' | 48-52' | 10-14' | 21-25' | 33-37' | 48-52' | 10-14' | 21-25' | 33-37' | 48-52' |
| Sampling Date: | | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 | 1/14/2010 |
| Laboratory ID: | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Volatile Organic Compounds in µg/L** | | | | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,1-Trichloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,2,2-Tetrachloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,2-Trichloroethane | 1 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1-Dichloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1-Dichloroethene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 9.3 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1-Dichloropropene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,3-Trichlorobenzene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,3-Trichloropropane | 0.04 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,4,5-Tetramethylbenzene | NS | ND | ND | ND | ND | ND | ND | ND | ND | 16 | 3.8 | ND | 0.97 J | ND | ND | ND | ND | 29 | 1.1 | ND | 0.74 J |
| 1,2,4-Trichlorobenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2,4-Trimethylbenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 10 | 0.66 J | ND | 0.68 J | ND | ND | ND | ND | 42 | ND | ND | ND |
| 1,2-Dibromo-3-chloropropane | 0.04 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dibromoethane | 0.0006 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichlorobenzene | 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichloroethane | 0.6 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichloropropane | 1 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,3,5-Trimethylbenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 5 | ND | ND | ND | ND | ND | ND | ND | 17 | ND | ND | ND |
| 1,3-Dichlorobenzene | 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,3-Dichloropropane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,4-Dichlorobenzene | 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,4-Diethylbenzene | NS | ND | ND | ND | ND | ND | ND | ND | ND | 8.8 | 1.5 | ND | 0.6 J | ND | ND | ND | ND | 23 | ND | ND | ND |
| 2,2-Dichloropropane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Butanone | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Hexanone | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 4-Ethyltoluene | NS | ND | ND | ND | ND | ND | ND | ND | ND | 1.6 | ND | ND | ND | ND | ND | ND | ND | 7.7 | ND | ND | ND |
| 4-Methyl-2-pentanone | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acetone | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acrylonitrile | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Benzene | 1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Bromobenzene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromochloromethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromodichloromethane | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromoform | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromomethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Carbon disulfide | 60 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Carbon tetrachloride | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chlorobenzene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloroform | 7 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloromethane | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| cis-1,2-Dichloroethene | 5 | ND | ND | ND | 1.6 | ND | ND | ND | ND | 5.1 | 260 | 2.4 | ND | ND | ND | ND | ND | 160 | 1.9 | 2 | 2 |
| cis-1,3-Dichloropropene | 0.4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dibromochloromethane | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dibromomethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dichlorodifluoromethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethyl ether | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethylbenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 0.74 J | ND | ND | ND | ND | ND | ND | ND | 2.8 | ND | ND | ND |
| Hexachlorobutadiene | 0.5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Isopropylbenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 1.1 | ND | ND | ND | ND | ND | ND | ND | 1.8 | ND | ND | ND |
| Methyl tert butyl ether | 10 | 11 | 11 | 21 | 350 | ND | ND | ND | ND | ND | ND | ND | 2 | ND | ND | ND | ND | ND | ND | ND | ND |
| Methylene chloride | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| n-Butylbenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 0.91 J | ND | ND | ND | ND | ND | ND | ND | 2.7 | ND | ND | ND |
| n-Propylbenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 1.6 | ND | ND | ND | ND | ND | ND | ND | 4.4 | ND | ND | ND |
| Naphthalene | 10 | ND | ND | ND | ND | ND | ND | ND | ND | 70 | ND | ND | ND | ND | ND | ND | 0.83 J | 9.3 | ND | ND | ND |
| o-Chlorotoluene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| o-Xylene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 0.68 J | ND | ND | ND | ND | ND | ND | ND | 2.3 | ND | ND | ND |
| p-Chlorotoluene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| p-Isopropyltoluene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 1.6 | ND | ND | ND | ND | ND | ND | ND | 6.4 | ND | ND | ND |
| p/m-Xylene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.4 | ND | ND | ND |
| sec-Butylbenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 1.2 | 0.85 J | ND | ND | ND | ND | ND | ND | 2.8 | ND | ND | ND |
| Styrene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| tert-Butylbenzene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Tetrachloroethene | 5 | 1.9 | 1.4 | 1.4 | 2.7 | ND | 0.91 J | ND | ND | 19 | 11 | 5.8 | 14 | 0.84 JC | ND | 0.84 JC | 0.92 J | 7.5 | 0.88 J | 0.63 JC | 1.3 |
| Toluene | 5 | ND | ND | ND | ND | 26 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.7 J | ND | ND | ND |
| trans-1,2-Dichloroethene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.3 | ND | ND | ND |
| trans-1,3-Dichloropropene | 0.4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| trans-1,4-Dichloro-2-butene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Trichloroethene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | 1.7 | 2.1 | ND | 0.59 J | ND | ND | ND | ND | 3.8 | ND | ND | ND |
| Trichlorofluoromethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Vinyl acetate | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Vinyl chloride | 2 | ND | ND | ND | ND | ND | ND | ND | ND | 3.7 | 350 | 8.5 | ND | ND | ND | ND | ND | 9.2 | ND | ND | ND |

Notes:
(1) NYSDEC Ambient Water Quality Standards and Guidanc
NS - No Standard
J - Data indicates the presence of a compound that meet
U - The analyte was analyzed for, but was not detected ab
Highlighted values indicate exceedance of the NYSDEC AV

**Table 2A**

**Groundwater Analytical Data Prior to Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| Client Sample ID: | | GW-9 | | | | GW-10 | | | | GW-11 | | | | OSB-1 | | | | OSB-2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth: | NYSDEC (1) Ambient Water Quality Standards | 10-14' | 21-25' | 33-37' | 48-52' | 10-14' | 21-25' | 33-37' | 48-52' | 10-14' | 21-25' | 33-37' | 48-52' | 10-12' | 23-25' | 35-37' | 50-52' | 10-12' | 23-25' | 35-37' | 50-52' |
| Sampling Date: | | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 1/15/2010 | 4/28/2011 | 4/28/2011 | 4/28/2011 | 4/28/2011 | 4/28/2011 | 4/28/2011 | 4/28/2011 | 4/28/2011 |
| Laboratory ID: | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Volatile Organic Compounds in µg/L** | | | | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,1-Trichloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,2,2-Tetrachloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1,2-Trichloroethane | 1 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1-Dichloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,1-Dichloroethene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1-Dichloropropene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,3-Trichlorobenzene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,3-Trichloropropane | 0.04 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2,4,5-Tetramethylbenzene | NS | 8.8 | ND | ND | ND | 3.4 | ND | ND | ND | 1.1 | ND | ND | ND | 4.6 | 0.25 J | 0.4 J | 1.1 J | ND | 2.3 J | 2.2 J | 2.5 |
| 1,2,4-Trichlorobenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2,4-Trimethylbenzene | 5 | 9.1 | ND | 0.6 J | ND | 1.6 | ND | ND | ND | ND | ND | ND | ND | 1.4 J | 0.37 J | 0.63 J | 2 J | ND | 1.6 J | ND | 6.8 |
| 1,2-Dibromo-3-chloropropane | 0.04 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dibromoethane | 0.0006 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichlorobenzene | 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichloroethane | 0.6 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,2-Dichloropropane | 1 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,3,5-Trimethylbenzene | 5 | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.92 J | ND | 0.89 J | ND | 2.8 |
| 1,3-Dichlorobenzene | 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,3-Dichloropropane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,4-Dichlorobenzene | 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 1,4-Diethylbenzene | NS | 1.2 | ND | ND | ND | 0.56 J | ND | ND | ND | ND | ND | ND | ND | 22 | ND | 0.15 J | 0.44 J | ND | 1 J | 2 J | 0.91 J |
| 2,2-Dichloropropane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Butanone | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 2-Hexanone | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| 4-Ethyltoluene | NS | 1.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.77 J |
| 4-Methyl-2-pentanone | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acetone | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Acrylonitrile | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Benzene | 1 | 0.61 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.4 | ND | ND | ND | ND | ND | ND | ND |
| Bromobenzene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromochloromethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromodichloromethane | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromoform | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Bromomethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Carbon disulfide | 60 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Carbon tetrachloride | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chlorobenzene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloroethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloroform | 7 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Chloromethane | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| cis-1,2-Dichloroethene | 5 | 3.8 | ND | 0.68 J | ND | 2 | ND | ND | ND | ND | ND | ND | ND | 3.2 | 5.2 | 1 | 0.99 | 27,000 | 72 | 300 | 65 |
| cis-1,3-Dichloropropene | 0.4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dibromochloromethane | 50 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dibromomethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Dichlorodifluoromethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethyl ether | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Ethylbenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.38 J |
| Hexachlorobutadiene | 0.5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Isopropylbenzene | 5 | 0.53 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 8.1 | ND | ND | ND | ND | ND | ND | ND |
| Methyl tert butyl ether | 10 | ND | ND | ND | ND | ND | 0.56 J | ND | ND | ND | ND | ND | ND | ND | 0.62 J | 1.1 | ND | ND | ND | ND | 0.57 J |
| Methylene chloride | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| n-Butylbenzene | 5 | 0.75 J | ND | ND | ND | 0.94 J | ND | ND | ND | ND | ND | ND | ND | 1.7 | ND | ND | ND | ND | ND | ND | 0.58 |
| n-Propylbenzene | 5 | 0.9 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.9 | ND | ND | ND | ND | ND | ND | 0.61 |
| Naphthalene | 10 | 2.4 | ND | ND | ND | ND | ND | ND | ND | 0.8 J | ND | ND | ND | 0.8 J | ND | ND | ND | ND | ND | ND | 0.96 J |
| o-Chlorotoluene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| o-Xylene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| p-Chlorotoluene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| p-Isopropyltoluene | 5 | 1.3 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| p/m-Xylene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.53 J | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| sec-Butylbenzene | 5 | 0.9 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.2 | ND | ND | ND | ND | ND | ND | ND |
| Styrene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| tert-Butylbenzene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Tetrachloroethene | 5 | 2.9 | 0.64 J | 1.3 | 0.97 J | ND | ND | ND | ND | ND | ND | 1.3 C | ND | 1 | 0.8 | ND | ND | ND | 6.5 | 7.7 | 14 |
| Toluene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| trans-1,2-Dichloroethene | 5 | 0.58 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| trans-1,3-Dichloropropene | 0.4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| trans-1,4-Dichloro-2-butene | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Trichloroethene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.66 | 1.4 | 2.4 | ND | 1.1 | ND | ND |
| Trichlorofluoromethane | 5 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Vinyl acetate | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Vinyl chloride | 2 | 2.3 | ND | ND | ND | 3.2 | ND | ND | ND | ND | ND | ND | ND | 15 | 5.5 | ND | ND | 8,300 | 24 | 10 | ND |

Notes:
(1) NYSDEC Ambient Water Quality Standards and Guidanc
NS - No Standard
J - Data indicates the presence of a compound that meet
U - The analyte was analyzed for, but was not detected ab
Highlighted values indicate exceedance of the NYSDEC AW

**Table 2B**

**Groundwater Analytical Data Prior to Remedy - SVOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| Client Sample ID:<br>Sample Depth:<br>Sampling Date:<br>Laboratory ID: | NYSDEC (1) Ambient Water Quality Standards | B-2<br>9-13'<br>9/28/2007<br>- | B-3<br>9-13'<br>9/28/2007<br>- | B-4<br>9-13'<br>9/28/2007<br>- | B-5<br>9-13'<br>9/28/2007<br>- | B-6<br>9-13'<br>9/28/2007<br>- | B-7<br>9-13'<br>9/28/2007<br>- |
|---|---|---|---|---|---|---|---|
| **Semi-Volatile Organic Compounds in µg/L** | | | | | | | |
| 1,2,4-Trichlorobenzene | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 1,2-Dichlorobenzene | 3 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 1,3-Dichlorobenzene | 3 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 1,4-Dichlorobenzene | 3 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2,4,5-Trichlorophenol | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2,4,6-Trichlorophenol | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2,4-Dichlorophenol | 1 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2,4-Dimethylphenol | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2,4-Dinitrophenol | 10 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2,4-Dinitrotoluene | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2,6-Dinitrotoluene | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2-Chloronaphthalene | 10 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2-Chlorophenol | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2-Methylnaphthalene | NS | 5 U | 690 | 235 | 14 | 6 | 5 U |
| 2-Methylphenol | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2-Nitroaniline | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 2-Nitrophenol | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 3,3'-Dichlorobenzidine | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 3-Nitroaniline | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 4,6-Dinitro-o-cresol | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 4-Bromophenyl phenyl ether | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 4-Chloroaniline | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 4-Chlorophenyl phenyl ether | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 4-Nitroaniline | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| 4-Nitrophenol | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Acenaphthene | 20 | 5 U | 27 | 18 | 5 U | 5 U | 5 U |
| Acenaphthylene | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Acetophenone | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Anthracene | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Benzo(a)anthracene | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Benzo(a)pyrene | ND | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Benzo(b)fluoranthene | 0.002 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Benzo(ghi)perylene | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Benzo(k)fluoranthene | 0.002 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Benzoic Acid | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 12 |
| Biphenyl | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Bis(2-chloroethoxy)methane | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Bis(2-chloroethyl)ether | 1 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Bis(2-chloroisopropyl)ether | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Bis(2-Ethylhexyl)phthalate | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Butyl benzyl phthalate | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Carbazole | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Chrysene | 0.002 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Dibenzo(a,h)anthracene | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Dibenzofuran | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Diethyl phthalate | 50 | 5 U | 25 U | 8 | 9 | 5 U | 5 U |
| Dimethyl phthalate | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Di-n-butylphthalate | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Di-n-octylphthalate | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Fluoranthene | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Fluorene | 50 | 5 U | 39 | 26 | 8 | 5 U | 5 U |
| Hexachlorobenzene | 0.04 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Hexachlorobutadiene | 0.5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Hexachlorocyclopentadiene | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Hexachloroethane | 5 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Indeno(1,2,3-cd)Pyrene | 0.002 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Isophorone | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Naphthalene | 10 | 5 U | 43 | 5 U | 5 U | 5 U | 5 U |
| Nitrobenzene | 0.4 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| NitrosoDiPhenylAmine(NDPA)/DPA | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| n-Nitrosodi-n-propylamine | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| P-Chloro-M-Cresol | NS | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Pentachlorophenol | 1 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Phenanthrene | 50 | 5 U | 71 | 46 | 5 U | 5 U | 5 U |
| Phenol | 1 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |
| Pyrene | 50 | 5 U | 25 U | 5 U | 5 U | 5 U | 5 U |

Notes:
(1) NYSDEC Ambient Water Quality Standards and Guidance Values 6/1998
NS - No Standard
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.
U - The analyte was analyzed for, but was not detected above the reported sample quantification limit. The associated numerical value is the sample quantitation limit.
Highlighted values indicate exceedance of the NYSDEC AWQS

**Table 3**

**Soil Vapor Analytical Data Prior to Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| Client Sample ID<br>Sample Depth:<br>Laboratory ID<br>Sampling Date | NYSDOH Air Guideline Values [1] | PWG-SG-01<br>6'<br>L1217157-04<br>9/24/2012 | | PWG-SG-02<br>6'<br>L1217157-01<br>9/24/2012 | | PWG-SG-03<br>6'<br>L1217157-02<br>9/24/2012 | | PWG-SG-04<br>6'<br>L1217157-03<br>9/24/2012 | | PWG-SG-05<br>8'<br>L1217157-05<br>9/24/2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOCs by TO-15 in µg/m³** | | | | | | | | | | | |
| 1,1,1-Trichloroethane | 100 [2] | 2.83 | U | 14 | U | 28.2 | U | 5.95 | U | 3.25 | U |
| 1,1,2,2-Tetrachloroethane | NS | 3.56 | U | 17.6 | U | 35.4 | U | 7.48 | U | 4.09 | U |
| 1,1,2- Trichloroethane | NS | 2.83 | U | 14 | U | 28.2 | U | 5.95 | U | 3.25 | U |
| 1,1 Dichloroethane | 100 [2] | 2.1 | U | 10.4 | U | 20.9 | U | 4.41 | U | 2.41 | U |
| 1,1 Dichloroethene | NS | 2.05 | U | 10.1 | U | 20.4 | U | 4.32 | U | 2.36 | U |
| 1,2,4-Trichlorobenzene | NS | 3.84 | J | 19 | J | 38.3 | J | 8.09 | J | 4.42 | J |
| 1,2,4-Trimethylbenzene | NS | 7.13 | | 12.6 | U | 25.4 | U | 15 | | 4.91 | |
| 1,2 Dibromoethane | NS | 3.98 | U | 19.7 | U | 39.6 | U | 8.38 | U | 4.58 | U |
| 1,2 Dichlorobenzene | NS | 3.11 | U | 15.4 | J | 31 | J | 6.55 | U | 3.58 | U |
| 1,2 Dichloroethane | NS | 2.1 | U | 10.4 | U | 20.9 | U | 4.41 | U | 2.41 | U |
| 1,2 Dichloropropane | NS | 2.39 | U | 11.8 | U | 23.8 | U | 5.04 | U | 2.75 | U |
| 1,3,5-Trimethylbenzene | NS | 2.55 | U | 12.6 | U | 25.4 | U | 5.36 | U | 2.93 | U |
| 1,3 Butadiene | NS | 10.8 | | 13.1 | | 11.4 | U | 21.8 | | 11 | |
| 1,3 Dichlorobenzene | NS | 3.11 | U | 15.4 | U | 31 | U | 6.55 | U | 3.58 | U |
| 1,4 Dichlorobenzene | NS | 3.11 | U | 15.4 | U | 31 | U | 6.55 | U | 3.58 | U |
| 1,4-Dioxane | NS | 1.87 | U | 9.22 | U | 18.6 | U | 3.93 | U | 2.15 | U |
| 2,2,4-Trimethylpentane | NS | 8.36 | | 25.5 | | 32.3 | | 27.6 | | 9.53 | |
| 2-Butanone | NS | 127 | | 65.5 | | 104 | | 105 | | 78.4 | |
| 2-Hexanone | NS | 2.12 | U | 10.5 | U | 21.1 | U | 4.47 | U | 2.44 | U |
| 3-Chloropropene | NS | 1.62 | U | 8.01 | U | 16.2 | U | 3.41 | U | 1.86 | U |
| p-Ethyltoluene | NS | 2.55 | U | 12.6 | U | 25.4 | U | 5.36 | U | 2.93 | U |
| 4-Methyl-2-pentanone | NS | 2.12 | U | 10.5 | U | 21.1 | U | 4.47 | U | 2.44 | U |
| Acetone | NS | 423 | | 130 | | 189 | | 256 | | 219 | J |
| Benzene | NS | 4.95 | | 19.4 | | 23 | | 24.5 | | 5.34 | |
| Benzyl Chloride | NS | 2.68 | U | 13.2 | U | 26.7 | U | 5.64 | U | 3.09 | U |
| Bromodichloromethane | NS | 3.47 | U | 17.2 | U | 34.6 | U | 7.3 | U | 3.99 | U |
| Bromoform | NS | 5.36 | U | 26.5 | U | 53.4 | U | 11.3 | U | 6.16 | U |
| Bromomethane | NS | 2.01 | U | 9.94 | U | 20 | U | 4.23 | U | 2.31 | U |
| Carbon disulfide | NS | 67.9 | | 84.7 | | 100 | | 50.4 | | 3.99 | |
| Carbon Tetrachloride | 5 [2] | 3.26 | U | 16.1 | U | 32.4 | U | 6.86 | U | 3.75 | U |
| Chlorobenzene | NS | 2.38 | U | 11.8 | U | 23.8 | U | 5.02 | U | 2.74 | U |
| Chloroethane | NS | 1.37 | U | 6.76 | U | 13.6 | U | 2.88 | U | 1.57 | U |
| Chloroform | NS | 21.8 | | 65.9 | | 133 | | 79.6 | | 2.91 | U |
| Chloromethane | NS | 2.42 | | 5.29 | U | 10.6 | U | 5.41 | | 3.51 | |
| c-1,2-Dichloroethene | 100 [2] | 674 | | 6,100 | | 6,500 | | 1,480 | | 62.2 | |
| c-1,3Dichloropropene | NS | 2.35 | U | 11.6 | U | 23.4 | U | 4.95 | U | 2.7 | U |
| Cyclohexane | NS | 6.3 | | 18.6 | | 29.3 | | 14.2 | | 5.89 | |
| Dibromochloromethane | NS | 4.41 | U | 21.8 | U | 44 | U | 9.29 | U | 5.08 | U |
| Dichlorodifluoromethane (Freon 12) | NS | 28.3 | | 12.6 | U | 25.5 | U | 233 | | 2.64 | J |
| Ethanol | NS | 67.4 | | 60.3 | U | 121 | U | 69.3 | | 45.6 | |
| Ethyl Acetate | NS | 4.68 | U | 23 | U | 46.5 | U | 9.87 | U | 5.37 | U |
| Ethyl Benzene | NS | 22.9 | | 21 | | 24 | | 38.4 | | 17.1 | |
| Freon 113 | NS | 3.97 | U | 19.6 | U | 39.5 | U | 8.35 | U | 4.57 | U |
| Freon 114 | NS | 3.62 | U | 17.9 | U | 36.1 | U | 7.62 | U | 4.16 | U |
| Heptane | NS | 2.12 | U | 25.9 | | 27.4 | | 34.5 | | 3.79 | |
| Hexachlorobutadiene | NS | 5.52 | J | 27.3 | R | 55 | R | 11.6 | J | 6.36 | J |
| Isopropanol | NS | 4.69 | | 15.7 | U | 31.7 | U | 6.74 | U | 1.76 | J |
| ter.ButylMethylEther | NS | 1.87 | U | 9.23 | U | 18.6 | U | 3.93 | U | 0.993 | J |
| Methylene Chloride | 60 | 9 | U | 44.5 | U | 89.6 | U | 15.5 | J | 10.4 | U |
| n-Hexane | NS | 4.02 | | 34.1 | | 43.3 | | 52.9 | | 26.7 | |
| o Xylene | NS | 13.1 | | 18 | | 22.4 | U | 30 | | 10.3 | |
| m + p Xylene | NS | 63 | | 64.3 | | 63.4 | | 114 | | 47.8 | |
| Propylene | NS | 250 | | 193 | | 22.2 | U | 169 | | 162 | |
| Styrene | NS | 2.2 | U | 10.9 | U | 22 | U | 4.64 | U | 2.54 | U |
| Tetrachloroethene | 100 | 10.8 | | 1,060 | | 610 | | 2,660 | | 4.04 | U |
| Tetrahydrofuran | NS | 288 | J | 176 | J | 316 | J | 360 | J | 291 | J |
| Toluene | NS | 12 | | 108 | | 98 | | 152 | | 13 | |
| t-1,2-Dichloroethene | NS | 8.92 | | 599 | | 118 | | 30.3 | | 2.36 | U |
| t-1,3Dichloropropene | NS | 2.35 | U | 11.6 | U | 23.4 | U | 4.95 | U | 2.7 | U |
| Trichloroethene | 5 | 38.7 | | 2,900 | | 656 | | 397 | | 3.2 | U |
| Trichlorofluoromethane (Freon 11) | NS | 212 | | 22 | | 29 | U | 730 | | 4.57 | |
| Vinyl Acetate | NS | 1.82 | U | 9.01 | U | 18.2 | U | 3.84 | U | 2.1 | U |
| Vinyl Bromide | NS | 2.26 | U | 11.2 | U | 22.6 | U | 4.76 | U | 2.6 | U |
| Vinyl Chloride | 5 [2] | 1.32 | U | 79.2 | | 112 | | 5.16 | | 1.74 | |
| Total VOCs | NS | 2,387 | | 11,885 | | 9,303 | | 7,190 | | 1,043 | |

Notes:

(1) New York State Department of Health "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" October 2006 Table 3.1.

(2) New York State Department of Health Memo Re: Soil Vapor/Indoor Air Matrices, dated June 25, 2007. Values are based on minimum sub-slab vapor concentration that may trigger mitigation.

NS - No Standard

U - The compound was not detected at the indicated concentration.

R - Analytical results are from sample re-analysis

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.

B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.

D - The reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.

E - Indicates the analyte 's concentration exceeds the calibrated range of the instrument for that specific analysis.

Highlighted values indicate exceedance higher than NYSDOH standard

**Table 4**

**Soil Cleanup Objectives**
**3140 Coney Island Avenue, Brooklyn, New York**

| Analyte | NYSDEC (1) SCOs Unrestricted Use | NYSDEC (2) SCOs Restricted Residential | NYSDEC (2) SCOs Restricted Commercial |
|---|---|---|---|
| **Volatile Organic Compounds in µg/kg** | | | |
| 1,1,1,2-Tetrachloroethane | NS | NS | NS |
| 1,1,1-Trichloroethane | 680 | 100,000[a] | 500,000[b] |
| 1,1,2,2-Tetrachloroethane | NS | NS | NS |
| 1,1,2 Trichloroethane | NS | NS | NS |
| 1,1 Dichloroethane | 270 | 26,000 | 240,000 |
| 1,1 Dichloroethene | 330 | 100,000[a] | 500,000[b] |
| 1,1-Dichloropropene | NS | NS | NS |
| 1,2,3-Trichlorobenzene | NS | NS | NS |
| 1,2,3-Trichloropropane | NS | NS | NS |
| 1,2,4,5-Tetramethylbenzene | NS | NS | NS |
| 1,2,4-Trichlorobenzene | NS | NS | NS |
| 1,2,4-Trimethylbenzene | 3,600 | 52,000 | NS |
| 1,2 Dibromo 3 chloropropane | NS | NS | NS |
| 1,2 Dibromoethane | NS | NS | NS |
| 1,2 Dichlorobenzene | 1,100 | 100,000[a] | 500,000[b] |
| 1,2 Dichloroethane | 20[c] | 3,100 | 30,000 |
| 1,2 Dichloropropane | NS | NS | NS |
| 1,3,5-Trimethylbenzene | 8,400 | 52,000 | 190,000 |
| 1,3 Dichlorobenzene | 2,400 | 49,000 | 280,000 |
| 1,3-Dichloropropane | NS | NS | NS |
| 1,4 Dichlorobenzene | 1,800 | 13,000 | 130,000 |
| 1,4-Diethylbenzene | NS | NS | NS |
| 2,2-Dichloropropane | NS | NS | NS |
| 2-Butanone / Methyl Ethyl Ketone | 120 | 100,000[a] | 500,000[b] |
| 2-Hexanone | NS | NS | NS |
| 4-Ethyltoluene | NS | NS | NS |
| 4-Methyl-2-pentanone | NS | NS | NS |
| Acetone | 50 | 100,000[a] | 500,000[b] |
| Acrylonitrile | NS | NS | NS |
| Benzene | 60 | 4,800 | 44,000 |
| Bromobenzene | NS | NS | NS |
| Bromochloromethane | NS | NS | NS |
| Bromodichloromethane | NS | NS | NS |
| Bromoform | NS | NS | NS |
| Bromomethane | NS | NS | NS |
| Carbon Disulfide | NS | NS | NS |
| Carbon Tetrachloride | 760 | 2,400 | 22,000 |
| Chlorobenzene | 1,100 | 100,000[a] | 500,000[b] |
| Chloroethane | NS | NS | NS |
| Chloroform | 370 | 49,000 | 350,000 |
| Chloromethane | NS | NS | NS |
| c-1,2-Dichloroethene | 250 | 100,000[a] | 500,000[b] |
| c-1,3-Dichloropropene | NS | NS | NS |
| Dibromochloromethane | NS | NS | NS |
| Dibromoethane | NS | NS | NS |
| Dichlordifluoromethane | NS | NS | NS |
| Diethy ether | NS | NS | NS |
| Ethyl Benzene | 1,000 | 41,000 | 390,000 |
| Hexachlorobutadiene | NS | NS | NS |
| Isopropylbenzene | 2,300 | NS | NS |
| Methyl tert butyl ether | 930 | 100,000[a] | 500,000[b] |
| Methylene Chloride | 50 | 100,000[a] | 500,000[b] |
| n-Butylbenzene | 12,000 | NS | NS |
| n-Propylbenzene | 3,900 | 100,000[a] | 500,000[b] |
| Naphthalene | 12,000 | NS | NS |
| o-Chlorotoluene | NS | NS | NS |
| o Xylene | 260 | 100,000[a] | 500,000[b] |
| p/m-Xylene | 260 | 100,000[a] | 500,000[b] |
| p-Chlorotoluene | NS | NS | NS |
| p-Isopropyltoluene | 10,000 | NS | NS |
| sec-Butylbenzene | 11,000 | 100,000[a] | 500,000[b] |
| Styrene | NS | NS | NS |
| tert-Butylbenzene | 5,900 | 100,000[a] | 500,000[b] |
| Tetrachloroethene | 1,300 | 19,000 | 150,000 |
| Toluene | 700 | 100,000[a] | 500,000[b] |
| t-1,2-Dichloroethene | 190 | 100,000[a] | 500,000[b] |
| t-1,3-Dichloropropene | NS | NS | NS |
| trans-1,4-Dichloro-2-butene | NS | NS | NS |
| Trichloroethene | 470 | 21,000 | 200,000 |
| Trichlorofluoromethane | NS | NS | NS |
| Vinyl acetate | NS | NS | NS |
| Vinyl Chloride | 20 | 900 | 13,000 |

| Analyte | NYSDEC (1) SCOs Unrestricted Use | NYSDEC (2) SCOs Restricted Residential | NYSDEC (2) SCOs Restricted Commercial |
|---|---|---|---|
| **Semi-Volatile Organic Compounds in µg/kg** | | | |
| 1,2,4,5-Tetrachlorobenzene | NS | NS | NS |
| 1,2,4-Trichlorobenzene | NS | NS | NS |
| 1,2-Dichlorobenzene | NS | NS | NS |
| 1,3-Dichlorobenzene | NS | NS | NS |
| 1,4-Dichlorobenzene | NS | NS | NS |
| 2,4,5-Trichlorophenol | NS | NS | NS |
| 2,4,6-Trichlorophenol | NS | NS | NS |
| 2,4-Dichlorophenol | NS | NS | NS |
| 2,4-Dimethylphenol | NS | NS | NS |
| 2,4-Dinitrophenol | NS | NS | NS |
| 2,4-Dinitrotoluene | NS | NS | NS |
| 2,6-Dinitrotoluene | NS | NS | NS |
| 2-Chloronaphthalene | NS | NS | NS |
| 2-Chlorophenol | NS | NS | NS |
| 2-Methylnaphthalene | NS | NS | NS |
| 2-Methylphenol | NS | NS | NS |
| 2-Nitroaniline | NS | NS | NS |
| 2-Nitrophenol | NS | NS | NS |
| 3,3'-Dichlorobenzidine | NS | NS | NS |
| 3-Methylphenol/4-Methylphenol | NS | NS | NS |
| 3-Nitroaniline | NS | NS | NS |
| 4,6-Dinitro-o-cresol | NS | NS | NS |
| 4-Bromophenyl phenyl ether | NS | NS | NS |
| 4-Chloroaniline | NS | NS | NS |
| 4-Chlorophenyl phenyl ether | NS | NS | NS |
| 4-Nitroaniline | NS | NS | NS |
| 4-Nitrophenol | NS | NS | NS |
| Acenaphthene | 20,000 | 100,000 | 500,000[b] |
| Acenaphthylene | 100,000 | 100,000 | 500,000[b] |
| Acetophenone | NS | NS | NS |
| Anthracene | 100,000 | 100,000 | 500,000[b] |
| Benzo(a)anthracene | 1,000 | 1,000 | 5,600 |
| Benzo(a)pyrene | 1,000 | 1,000 | 1,000 |
| Benzo(b)fluoranthene | 1,000 | 1,000 | 5,600 |
| Benzo(ghi)perylene | 100,000 | 100,000 | 500,000[b] |
| Benzo(k)fluoranthene | 800 | 3,900 | 56,000 |
| Benzoic Acid | NS | NS | NS |
| Benzyl Alcohol | NS | NS | NS |
| Biphenyl | NS | NS | NS |
| Bis(2-chloroethoxy)methane | NS | NS | NS |
| Bis(2-chloroethyl)ether | NS | NS | NS |
| Bis(2-chloroisopropyl)ether | NS | NS | NS |
| Bis(2-Ethylhexyl)phthalate | NS | NS | NS |
| Butyl benzyl phthalate | NS | NS | NS |
| Carbazole | NS | NS | NS |
| Chrysene | 1,000 | 3,900 | 56,000 |
| Di-n-butylphthalate | NS | NS | NS |
| Di-n-octylphthalate | NS | NS | NS |
| Dibenzo(a,h)anthracene | 330 | 330 | 560 |
| Dibenzofuran | NS | NS | NS |
| Diethyl phthalate | NS | NS | NS |
| Dimethyl phthalate | NS | NS | NS |
| Fluoranthene | 100,000 | 100,000 | 500,000[b] |
| Fluorene | 30,000 | 100,000 | 500,000[b] |
| Hexachlorobenzene | NS | NS | NS |
| Hexachlorobutadiene | NS | NS | NS |
| Hexachlorocyclopentadiene | NS | NS | NS |
| Hexachloroethane | NS | NS | NS |
| Indeno(1,2,3-cd)Pyrene | 500 | 500 | 5,600 |
| Isophorone | NS | NS | NS |
| n-Nitrosodi-n-propylamine | NS | NS | NS |
| Naphthalene | 12,000 | 100,000 | 500,000[b] |
| Nitrobenzene | NS | 15,000 | 69,000 |
| NitrosoDiPhenylAmine(NDPA)/DPA | NS | NS | NS |
| P-Chloro-M-Cresol | NS | NS | NS |
| Pentachlorophenol | 800 | 6,700 | 6,700 |
| Phenanthrene | 100,000 | 100,000 | 500,000[b] |
| Phenol | 330 | 100,000 | 500,000[b] |
| Pyrene | 100,000 | 100,000 | 500,000[b] |

| Analyte | NYSDEC (1) SCOs Unrestricted Use | NYSDEC (2) SCOs Restricted Residential | NYSDEC (2) SCOs Restricted Commercial |
|---|---|---|---|
| **Organochlorine Pesticides by EPA 8081A in µg/kg** | | | |
| 4,4'-DDD | 3.3 | 13,000 | 92,000 |
| 4,4'-DDE | 3.3 | 8,900 | 62,000 |
| 4,4'-DDT | 3.3 | 7,900 | 47,000 |
| Aldrin | 5 | 97 | 680 |
| Alpha-BHC | 20 | 480 | 3,400 |
| Beta-BHC | 36 | 360 | 3,000 |
| Chlordane | 94 | 4,200 | 24,000 |
| cis-Chlordane | NS | NS | NS |
| Delta-BHC | 40 | 100,000 | 500,000[d] |
| Dieldrin | 5 | 200 | 1,400 |
| Endosulfan I | 2,400 | 24,000 | 200,000[f] |
| Endosulfan II | 2,400 | 24,000 | 200,000[f] |
| Endosulfan sulfate | 2,400 | 24,000 | 200,000[f] |
| Endrin | 14 | 11,000 | 89,000 |
| Endrin ketone | NS | NS | NS |
| Heptachlor | 42 | 2,100 | 15,000 |
| Heptachlor epoxide | NS | NS | NS |
| Lindane | 100 | 1,300 | 9,200 |
| Methoxychlor | NS | NS | NS |
| Toxaphene | NS | NS | NS |
| trans-Chlordane | NS | NS | NS |
| **Polychlorinated Biphenyls by EPA 8082 in µg/kg** | | | |
| Aroclor 1016 | 100 | 1,000 | 1,000 |
| Aroclor 1221 | 100 | 1,000 | 1,000 |
| Aroclor 1232 | 100 | 1,000 | 1,000 |
| Aroclor 1242 | 100 | 1,000 | 1,000 |
| Aroclor 1248 | 100 | 1,000 | 1,000 |
| Aroclor 1254 | 100 | 1,000 | 1,000 |
| Aroclor 1260 | 100 | 1,000 | 1,000 |
| Aroclor 1262 | 100 | 1,000 | 1,000 |
| Aroclor 1268 | 100 | 1,000 | 1,000 |
| **Total Metals in mg/kg** | | | |
| Aluminum | NS | NS | NS |
| Antimony | NS | NS | NS |
| Arsenic | 13 | 16 | 16 |
| Barium | 350 | 400 | 400 |
| Beryllium | 7.2 | 72 | 590 |
| Cadmium | 2.5 | 4.3 | 9 |
| Calcium | NS | NS | NS |
| Chromium | 30 | 180 | 1,500 |
| Cobalt | NS | NS | NS |
| Copper | 50 | 270 | 270 |
| Iron | NS | NS | NS |
| Lead | 63 | 400 | 1,000 |
| Magnesium | NS | NS | NS |
| Manganese | 1,600 | 2,000 | 10,000 |
| Mercury | 0.18 | 0.81 | 3 |
| Nickel | 30 | 310 | 310 |
| Potassium | NS | NS | NS |
| Selenium | 3.9 | 180 | 1,500 |
| Silver | 2 | 180 | 1,500 |
| Sodium | NS | NS | NS |
| Thallium | NS | NS | NS |
| Vanadium | NS | NS | NS |
| Zinc | 109 | 10,000 | 10,000 |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06

**Table 5A**

**Soil Analytical Data Remaining Following Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| Client Sample ID: | | | PWG-SB-1 | | PWG-SB-2 | | PWG-SB-4 | | PWG-SB-4 | | PWG-SB-5 | | PWG-SB-5 | | EPE01 | | EPE02 | | EPN01 | | EPW01 | | EPS01 | | EPB01 | | EPB02 | | EPMW01B | | EP001 | | EP002 | | EP003 | | EP004 | | EP005 | | EP006 [3] | | EP007 | | DUP001 [4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth: | NYSDEC [1] SCOs | NYSDEC [2] SCOs | 10-12' | | 10-12' | | 7-9' | | 10-12' | | 7-9' | | 12-14' | | 7.5' | | 7.5' | | 7.5' | | 7.5' | | 7.5' | | 10' | | 10' | | 8' | | 9' | | 7' | | 7' | | 7' | | 7' | | 3.5' | | 4' | | 7' | |
| Laboratory ID: | Unrestricted Use | Restricted Residential | L1212065-02 | | L1212065-04 | | L1212065-07 | | L1212065-08 | | L1212065-09 | | L1212065-10 | | L1300917-01 | | L1300917-02 | | L1300917-03 | | L1300917-04 | | L1300917-05 | | L1300917-06 | | L1300917-07 | | L1301347-02 | | L1414997-01 | | L1423612-01 | | L1423612-02 | | L1425901-02 | | L1425901-04 | | L1425901-05 | | L1425901-06 | | L1425901-03 | |
| Sampling Date: | | | 7/5/2012 | | 7/5/2012 | | 7/5/2012 | | 7/5/2012 | | 7/5/2012 | | 7/5/2012 | | 1/15/2013 | | 1/15/2013 | | 1/15/2013 | | 1/15/2013 | | 1/15/2013 | | 1/15/2013 | | 1/15/2013 | | 1/22/2013 | | 7/7/2014 | | 10/7/2014 | | 10/7/2014 | | 10/28/2014 | | 10/28/2014 | | 10/28/2014 | | 10/28/2014 | | 10/28/2014 | |
| **Volatile Organic Compounds in µg/kg** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | NS | NS | 3.4 | U | 4.3 | U | 130 | U | 180 | U | 2.8 | U | 3 | U | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 47 | U | 58 | U | 54 | U | 44 | U | 19 | U | 19 | U | 53 | U |
| 1,1,1-Trichloroethane | 680 | 100,000[a] | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 16 | U | 20 | U | 19 | U | 15 | U | 7 | U | 7 | U | 19 | U |
| 1,1,2,2-Tetrachloroethane | NS | NS | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 15 | U | 18 | U | 17 | U | 14 | U | 6 | U | 6 | U | 17 | U |
| 1,1,2 Trichloroethane | NS | NS | 5.1 | U | 6.5 | J | 190 | U | 280 | U | 4.2 | U | 4.6 | J | 95 | U | 1,000 | U | 1,600 | U | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 1,600 | U | 680 | U | 45 | U | 55 | U | 52 | U | 42 | U | 18 | U | 18 | U | 51 | U |
| 1,1 Dichloroethane | 270 | 26,000 | 5.1 | U | 6.5 | U | 190 | U | 280 | U | 4.2 | U | 4.6 | U | 95 | U | 1,000 | U | 1,600 | U | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 1,600 | U | 680 | U | 13 | U | 16 | U | 15 | U | 12 | U | 5 | U | 5 | U | 14 | U |
| 1,1 Dichloroethene | 330 | 100,000[a] | 3.4 | U | 4.3 | U | 130 | U | 180 | U | 2.8 | U | 3 | U | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 39 | U | 48 | U | 45 | U | 36 | U | 15 | U | 16 | U | 44 | U |
| 1,1-Dichloropropene | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 21 | U | 26 | U | 24 | U | 20 | U | 8 | U | 9 | U | 24 | U |
| 1,2,3-Trichlorobenzene | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 22 | U | 27 | U | 25 | U | 20 | U | 9 | U | 9 | U | 25 | U |
| 1,2,3-Trichloropropane | NS | NS | 34 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 24 | U | 30 | U | 28 | U | 23 | U | 10 | U | 10 | U | 27 | U |
| 1,2,4,5-Tetramethylbenzene | NS | NS | 16 | | 39 | | 1,100 | | 740 | | 11 | U | 12 | U | 1,200 | | 1,800 | J | 1,700 | J | 93 | J | 320 | J | 2,000 | J | 4,000 | | 4,400 | U | 8,200 | | 19 | U | 24 | U | 22 | U | 18 | U | 8 | U | 8 | U | 22 | U |
| 1,2,4-Trichlorobenzene | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 27 | U | 33 | U | 31 | U | 25 | U | 11 | U | 11 | U | 30 | U |
| 1,2,4-Trimethylbenzene | 3,600 | 52,000 | 17 | | 6.5 | J | 400 | J | 48 | J | 14 | U | 15 | U | 390 | | 580 | J | 1,800 | J | 400 | U | 3,800 | U | 6,300 | | 12,000 | | 5,500 | U | 19,000 | | 21 | U | 26 | U | 24 | U | 20 | U | 8 | U | 9 | U | 24 | U |
| 1,2 Dibromo 3 chloropropane | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 58 | U | 72 | U | 68 | U | 55 | U | 23 | U | 24 | U | 66 | U |
| 1,2 Dibromoethane | NS | NS | 14 | U | 17 | J | 510 | U | 740 | U | 11 | U | 12 | J | 250 | U | 2,700 | U | 4,300 | U | 320 | U | 3,100 | U | 2,600 | U | 3,300 | U | 4,400 | U | 1,800 | U | 26 | U | 32 | U | 30 | U | 24 | U | 10 | U | 10 | U | 29 | U |
| 1,2 Dichlorobenzene | 1,100 | 100,000[a] | 17 | U | 2.6 | J | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 23 | U | 28 | U | 26 | U | 21 | U | 9 | U | 9 | U | 26 | U |
| 1,2 Dichloroethane | 20[c] | 3,100 | 3.4 | U | 4.3 | U | 130 | U | 180 | U | 2.8 | U | 3 | U | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 3,000 | | 17 | U | 21 | U | 19 | U | 16 | U | 7 | U | 7 | U | 19 | U |
| 1,2 Dichloropropane | NS | NS | 12 | U | 15 | J | 450 | U | 650 | U | 9.8 | U | 11 | J | 220 | U | 2,400 | U | 3,800 | U | 280 | U | 2,700 | U | 2,300 | U | 2,900 | U | 3,900 | U | 1,600 | U | 34 | U | 41 | U | 39 | U | 32 | U | 13 | U | 14 | U | 38 | U |
| 1,3 Dichloropropene, Total | NS | NS | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | 22,000 | | 21 | U | 26 | U | 24 | U | 20 | U | 8 | U | 9 | U | 24 | U |
| 1,3,5-Trimethylbenzene | 8,400 | 52,000 | 9.6 | J | 8.5 | J | 350 | J | 920 | U | 14 | U | 15 | U | 1,400 | | 2,000 | J | 1,100 | J | 70 | J | 3,800 | U | 3,500 | | 6,300 | | 5,500 | U | 2,300 | U | 20 | U | 24 | U | 23 | U | 19 | U | 8 | U | 8 | U | 23 | U |
| 1,3 Dichlorobenzene | 2,400 | 49,000 | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 21 | U | 26 | U | 25 | U | 20 | U | 9 | U | 9 | U | 24 | U |
| 1,3-Dichloropropane | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | NA | | NA | | NA | | 20 | U | 16 | U | 7 | U | 7 | U | 20 | U |
| 1,4 Dichlorobenzene | 1,800 | 13,000 | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 20 | U | 25 | U | 24 | U | 19 | U | 8 | U | 8 | U | 23 | U |
| 1,4-Diethylbenzene | NS | NS | 13 | J | 33 | | 1,800 | | 740 | U | 11 | U | 12 | U | 2,900 | | 4,100 | | 3,100 | J | 180 | J | 1,200 | J | 5,400 | | 11,000 | | 4,400 | U | 25,000 | | 24 | U | 29 | U | 27 | U | 22 | U | 23 | J | 10 | U | 27 | U |
| 2,2-Dichloropropane | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 33 | U | 41 | U | 39 | U | 31 | U | 13 | U | 14 | U | 38 | U |
| 2-Butanone / Methyl Ethyl Ket | 120 | 100,000[a] | 34 | U | 27 | J | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 40 | U | 49 | U | 47 | U | 38 | U | 16 | U | 16 | U | 46 | U |
| 2-Hexanone | NS | NS | 34 | U | 43 | J | 1,300 | U | 1,800 | U | 28 | U | 30 | J | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 98 | U | 120 | U | 110 | U | 93 | U | 39 | U | 40 | U | 110 | U |
| 4-Ethyltoluene | NS | NS | 3.9 | J | 2.8 | J | 510 | U | 740 | U | 11 | U | 12 | U | 340 | | 480 | J | 540 | J | 22 | J | 180 | J | 1,600 | J | 2,300 | J | 4,400 | U | 2,000 | | 18 | U | 22 | U | 21 | U | 17 | U | 7 | U | 8 | U | 21 | U |
| 4-Methyl-2-pentanone | NS | NS | 34 | U | 43 | J | 1,300 | U | 1,800 | U | 28 | U | 30 | J | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 36 | U | 44 | U | 42 | U | 34 | U | 14 | U | 15 | U | 41 | U |
| Acetone | 50 | 100,000[a] | 81 | | 160 | | 1,300 | U | 1,800 | U | 10.7 | | 14.1 | | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 470 | J | 200 | J | 290 | J | 180 | U | 140 | U | 61 | U | 63 | U | 170 | U |
| Acrylonitrile | NS | NS | 34 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 76 | U | 94 | U | 88 | U | 72 | U | 30 | U | 31 | U | 86 | U |
| Benzene | 60 | 4,800 | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 17 | U | 21 | U | 20 | U | 16 | U | 7 | U | 7 | U | 20 | U |
| Bromobenzene | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 31 | U | 38 | U | 36 | U | 29 | U | 12 | U | 12 | U | 35 | U |
| Bromochloromethane | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 41 | U | 50 | U | 47 | U | 38 | U | 16 | U | 17 | U | 46 | U |
| Bromodichloromethane | NS | NS | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 26 | U | 32 | U | 30 | U | 24 | U | 10 | U | 10 | U | 29 | U |
| Bromoform | NS | NS | 14 | U | 17 | U | 510 | U | 740 | U | 11 | U | 12 | U | 250 | U | 2,700 | U | 4,300 | U | 320 | U | 3,100 | U | 2,600 | U | 3,300 | U | 4,400 | U | 1,800 | U | 35 | U | 43 | U | 40 | U | 33 | U | 14 | U | 14 | U | 40 | U |
| Bromomethane | NS | NS | 6.8 | U | 8.6 | U | 260 | U | 370 | U | 5.6 | U | 6.1 | U | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 2,200 | U | 910 | U | 50 | U | 62 | U | 58 | U | 47 | U | 20 | U | 20 | U | 57 | U |
| Carbon Disulfide | NS | NS | 6.6 | J | 19 | J | 1,300 | U | 1,800 | U | 2.1 | J | 2.4 | J | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 160 | U | 200 | U | 190 | U | 150 | U | 65 | U | 67 | U | 180 | U |
| Carbon Tetrachloride | 760 | 2,400 | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 31 | U | 38 | U | 36 | U | 29 | U | 12 | U | 13 | U | 35 | U |
| Chlorobenzene | 1,100 | 100,000[a] | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 51 | U | 63 | U | 60 | U | 48 | U | 20 | U | 21 | U | 58 | U |
| Chloroethane | NS | NS | 6.8 | U | 8.6 | U | 260 | U | 370 | U | 5.6 | U | 6.1 | U | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 2,200 | U | 910 | U | 47 | U | 58 | U | 54 | U | 44 | U | 18 | U | 19 | U | 53 | U |
| Chloroform | 370 | 49,000 | 5.1 | U | 6.5 | U | 190 | U | 280 | U | 4.2 | U | 4.6 | U | 95 | U | 1,000 | U | 1,600 | U | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 1,600 | U | 680 | U | 55 | U | 67 | U | 63 | U | 51 | U | 22 | U | 22 | U | 62 | U |
| Chloromethane | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 43 | U | 53 | U | 50 | U | 41 | U | 17 | U | 18 | U | 49 | U |
| c-1,2-Dichloroethene | 250 | 100,000[a] | 82 | | 21 | | 290 | | 180 | U | 11 | | 4.2 | | 1,800 | | 1,800 | | 5,400 | | 180 | | 3,600 | | 4,400 | | 6,400 | | 3,200 | | 3,000 | | 310 | | 530 | | 380 | | 400 | | 280 | | 150 | | 290 | |
| c-1,3-Dichloropropene | NS | NS | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 17 | U | 21 | U | 20 | U | 16 | U | 7 | U | 7 | U | 20 | U |
| Dibromochloromethane | NS | NS | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 23 | U | 28 | U | 26 | U | 21 | U | 9 | U | 9 | U | 26 | U |
| Dibromoethane | NS | NS | 34 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 24 | U | 30 | U | 28 | U | 23 | U | 10 | U | 10 | U | 27 | U |
| Dichlordifluoromethane | NS | NS | 34 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 28 | U | 35 | U | 33 | U | 26 | U | 11 | U | 12 | U | 32 | U |
| Diethy ether | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | NA | | NA | | NA | | 44 | U | 36 | U | 15 | U | 16 | U | 44 | U |
| Ethyl ether | NS | NS | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | NA | | 2,300 | U | 210 | J | 300 | J | NA | | NA | | NA | | NA | | NA | |
| Ethyl Benzene | 1,000 | 41,000 | 5.8 | | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 42 | J | 670 | U | 420 | J | 79 | U | 770 | U | 180 | J | 310 | J | 1,100 | U | 460 | U | 19 | U | 23 | U | 22 | U | 18 | U | 8 | U | 8 | U | 21 | U |
| Hexachlorobutadiene | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 34 | U | 41 | U | 39 | U | 32 | U | 13 | U | 14 | U | 38 | U |
| Isopropylbenzene | 2,300 | NS | 6.3 | | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 73 | | 670 | U | 1,100 | U | 79 | U | 770 | U | 230 | J | 460 | J | 1,100 | U | 1,400 | | 15 | U | 19 | U | 18 | U | 14 | U | 6 | U | 6 | U | 17 | U |
| Methyl tert butyl ether | 930 | 100,000[a] | 6.8 | U | 8.6 | U | 260 | U | 370 | U | 5.6 | U | 6.1 | U | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 2,200 | U | 910 | U | 12 | U | 15 | U | 14 | U | 12 | U | 5 | U | 5 | U | 14 | U |
| Methylene Chloride | 50 | 100,000[a] | 3.7 | J | 6.7 | J | 210 | J | 350 | J | 4.4 | J | 4.6 | J | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 4,200 | J | 4,600 | U | 160 | U | 200 | U | 190 | U | 150 | U | 65 | U | 67 | U | 180 | U |
| n-Butylbenzene | 12,000 | NS | 2.2 | J | 4.0 | J | 130 | U | 180 | U | 2.8 | U | 3 | U | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 2,800 | | 17 | U | 21 | U | 20 | U | 16 | U | 7 | U | 7 | U | 19 | U |
| n-Propylbenzene | 3,900 | 100,000[a] | 7.4 | | 4.3 | U | 130 | U | 180 | U | 2.8 | U | 3 | U | 210 | | 670 | U | 560 | J | 79 | U | 770 | U | 690 | | 1,400 | | 1,100 | U | 2,600 | | 16 | U | 20 | U | 19 | U | 15 | U | 6 | U | 7 | U | 18 | U |
| Naphthalene | 12,000 | NS | 17 | | 22 | U | 640 | U | 920 | U | 14 | U | 3.2 | J | 170 | J | 3,400 | U | 1,100 | J | 400 | U | 3,800 | U | 1,300 | J | 2,600 | J | 5,500 | U | 2,300 | U | 20 | U | 25 | U | 24 | U | 19 | U | 8 | U | 8 | U | 23 | U |
| o-Chlorotoluene | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 24 | U | 29 | U | 27 | U | 22 | U | 9 | U | 10 | U | 27 | U |
| o Xylene | 260 | 100,000[a] | 2.4 | J | 8.6 | J | 260 | U | 370 | U | 5.6 | U | 6.1 | J | 87 | J | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 330 | J | 490 | J | 2,200 | U | 1,200 | | 25 | U | 31 | U | 29 | U | 24 | U | 10 | U | 10 | U | 29 | U |
| p/m-Xylene | 260 | 100,000[a] | 1.6 | J | 8.6 | J | 260 | U | 370 | U | 5.6 | U | 6.1 | J | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 910 | U | 29 | U | 36 | U | 34 | U | 28 | U | 12 | U | 12 | U | 33 | U |
| p-Chlorotoluene | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | | 470 | J | 320 | J | 79 | U | 770 | U | 760 | | 1,400 | | 1,100 | U | 2,300 | U | 20 | U | 24 | U | 23 | U | 18 | U | 8 | U | 8 | U | 22 | U |
| p-Isopropyltoluene | 10,000 | NS | 1.2 | J | 4.0 | J | 130 | U | 180 | U | 2.8 | U | 3 | U | 45 | J | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 2,200 | U | 3,200 | | 18 | U | 23 | U | 21 | U | 17 | U | 7 | U | 8 | U | 21 | U |
| sec-Butylbenzene | 11,000 | 100,000[a] | 2.7 | J | 3.6 | J | 56 | J | 180 | U | 2.8 | U | 3 | U | 310 | | 420 | J | 1,100 | U | 79 | U | 770 | U | 720 | | 1,400 | | 1,100 | U | 3,100 | | 18 | U | 22 | U | 21 | U | 17 | U | 7 | U | 7 | U | 20 | U |
| Styrene | NS | NS | 6.8 | U | 8.6 | J | 260 | U | 370 | U | 5.6 | U | 6.1 | J | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 2,200 | U | 910 | U | 59 | U | 73 | U | 69 | U | 56 | U | 24 | U | 24 | U | 68 | U |
| tert-Butylbenzene | 5,900 | 100,000[a] | 0.65 | J | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 880 | J | 20 | U | 25 | U | 23 | U | 19 | U | 8 | U | 8 | U | 23 | U |
| Tetrachloroethene | 1,300 | 19,000 | 18 | | 7.3 | J | 370 | | 180 | U | 36 | | 25 | J | 61,000 | | 68,000 | | 150,000 | | 2,400 | | 50,000 | | 41,000 | | 110,000 | | 42,000 | | 52,000 | | 18,000 | | 31,000 | | 20,000 | | 15,000 | | 11,000 | | 7,100 | | 12,000 | |
| Toluene | 700 | 100,000[a] | 0.91 | J | 6.5 | J | 190 | U | 280 | U | 4.2 | U | 4.6 | J | 27 | J | 1,000 | U | 260 | J | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 1,600 | U | 680 | U | 29 | U | 35 | U | 33 | U | 27 | U | 11 | U | 12 | U | 33 | U |
| t-1,2-Dichloroethene | 190 | 100,000[a] | 2.3 | J | 6.5 | U | 190 | U | 280 | U | 4.2 | U | 4.6 | U | 95 | U | 1,000 | U | 1,600 | U | 120 | U | 1,200 | U | 970 | U | 1,200 | U | 1,600 | U | 680 | U | 31 | U | 38 | U | 36 | U | 30 | U | 12 | U | 13 | U | 36 | U |
| t-1,3-Dichloropropene | NS | NS | 3.4 | U | 4.3 | J | 130 | U | 180 | U | 2.8 | U | 3 | J | 64 | U | 670 | U | 1,100 | U | 79 | U | 770 | U | 650 | U | 840 | U | 1,100 | U | 460 | U | 18 | U | 22 | U | 21 | U | 17 | U | 7 | U | 7 | U | 20 | U |
| trans-1,4-Dichloro-2-butene | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 58 | U | 71 | U | 67 | U | 54 | U | 23 | U | 24 | U | 66 | U |
| Trichloroethene | 470 | 21,000 | 2.0 | J | 6.1 | J | 130 | U | 180 | U | 9.9 | | 2.5 | J | 1,600 | | 1,400 | | 3,500 | | 39 | J | 1,000 | | 2,000 | | 4,900 | | 2,000 | | 2,800 | | 290 | | 440 | | 300 | | 190 | | 420 | | 210 | | 130 | J |
| Trichlorofluoromethane | NS | NS | 17 | U | 22 | U | 640 | U | 920 | U | 14 | U | 15 | U | 320 | U | 3,400 | U | 5,400 | U | 400 | U | 3,800 | U | 3,200 | U | 4,200 | U | 5,500 | U | 2,300 | U | 57 | U | 71 | U | 66 | U | 54 | U | 23 | U | 24 | U | 65 | U |
| Vinyl acetate | NS | NS | 34 | U | 43 | U | 1,300 | U | 1,800 | U | 28 | U | 30 | U | 640 | U | 6,700 | U | 11,000 | U | 790 | U | 7,700 | U | 6,500 | U | 8,400 | U | 11,000 | U | 4,600 | U | 20 | U | 24 | U | 23 | U | 18 | U | 8 | U | 8 | U | 22 | U |
| Vinyl Chloride | 20 | 900 | 0.56 | J | 8.6 | U | 260 | U | 370 | U | 5.6 | U | 6.1 | U | 130 | U | 1,300 | U | 2,200 | U | 160 | U | 1,500 | U | 1,300 | U | 1,700 | U | 2,200 | U | 910 | U | 17 | U | 21 | U | 20 | U | 16 | U | 7 | U | 7 | U | 20 | U |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06
(3) Soils from EP006 were removed to a depth of 4.5 feet due to lead concentrations; however, VOC concentrations are left here for reference.
(4) DUP001 is a blind duplicate of EP004.
NS - No Standard
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.
U - The analyte was analyzed for, but was not detected above the reported sample quantification limit. The assocaited numerical value is the sample quantitation limit.
a - The SCOs for unrestricted use were capped at a maximum value of 100 ppm.
b - For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO.
c - For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentrationis used as the Track1 SCO value for this use of the site.
d - SCO is the sum of endosulfin I, endosulfin II and endosulfin sulfate.
e - The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.
f - Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) wish "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.
Highlighted text denotes concentrations exceeding NYSDEC Unrestricted Use SCO
Highlighted text denotes concentrations exceeding NYSDEC Restricted Residential SCO

**Table 5B**

**Soil Analytical Data Remaining Following Remedy - SVOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| SAMPLE ID | | | PRB003 | | PRB003 | | EP006 [3] | | EP007 | | EPN02 | | EPW02 | | EPS02 | | EPE03 | | EPB03 [4] | | EPB04 [4] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH (ft.) | Unrestricted Use SCO [1] | Restricted Residential SCO [2] | 6-8' | | 8-10' | | 3.5' | | 4' | | 7.5' | | 7.5' | | 7.5' | | 7.5' | | 10' | | 10' | |
| SAMPLING DATE | | | 09/10/13 | | 09/10/13 | | 10/28/2014 | | 10/28/2014 | | 1/30/2013 | | 1/30/2013 | | 1/30/2013 | | 1/30/2013 | | 1/30/2013 | | 1/30/2013 | |
| LAB SAMPLE ID | | | L1317760-05 | | L1317760-06 | | LI425901-05 | | L1425901-06 | | L1301890-09 | | L1301890-10 | | L1301890-11 | | L1301890-12 | | L1301890-13 | | L1301890-14 | |
| **Semivolatile Organics by EPA 8270C in µg/kg** | | | | | | | | | | | | | | | | | | | | | | |
| 1,2,4,5-Tetrachlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 1,2,4-Trichlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 1,2-Dichlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 1,3-Dichlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 1,4-Dichlorobenzene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2,4,5-Trichlorophenol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2,4,6-Trichlorophenol | NS | NS | 110 | U | 110 | U | 110 | U | 120 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2,4-Dichlorophenol | NS | NS | 160 | U | 160 | U | 170 | U | 180 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2,4-Dimethylphenol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2,4-Dinitrophenol | NS | NS | 860 | U | 860 | U | 910 | U | 930 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2,4-Dinitrotoluene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2,6-Dinitrotoluene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2-Chloronaphthalene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2-Chlorophenol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2-Methylnaphthalene | NS | NS | 210 | U | 220 | U | 230 | U | 230 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2-Methylphenol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2-Nitroaniline | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 2-Nitrophenol | NS | NS | 380 | U | 390 | U | 410 | U | 420 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 3,3'-Dichlorobenzidine | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 3-Methylphenol/4-Methylphenol | NS | NS | 260 | U | 260 | U | 270 | U | 280 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 3-Nitroaniline | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 4,6-Dinitro-o-cresol | NS | NS | 460 | U | 470 | U | 490 | U | 510 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 4-Bromophenyl phenyl ether | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 4-Chloroaniline | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 4-Chlorophenyl phenyl ether | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 4-Nitroaniline | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| 4-Nitrophenol | NS | NS | 250 | U | 250 | U | 260 | U | 270 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Acenaphthene | 20,000 | 100,000 | 140 | U | 140 | U | 210 | | 87 | J | 410 | | 3,100 | U | 190 | | 150 | | 270 | | 280 | |
| Acenaphthylene | 100,000 | 100,000 | 140 | U | 140 | U | 52 | J | 55 | J | NS | | NS | | NS | | NS | | NS | | NS | |
| Acetophenone | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Anthracene | 100,000 | 100,000 | 110 | U | 110 | U | 410 | | 230 | | 300 | | 1,700 | J | 120 | | 100 | J | 130 | | 120 | |
| Benzo(a)anthracene | 1,000 | 1,000 | 110 | U | 56 | J | 840 | | 560 | | 40 | J | 2,300 | U | 57 | J | 150 | | 56 | J | 200 | |
| Benzo(a)pyrene | 1,000 | 1,000 | 140 | U | 50 | J | 670 | | 480 | | 150 | U | 3,100 | U | 54 | J | 140 | J | 60 | J | 230 | |
| Benzo(b)fluoranthene | 1,000 | 1,000 | 110 | U | 63 | J | 650 | | 440 | | 120 | U | 2,300 | U | 80 | J | 210 | | 72 | J | 300 | |
| Benzo(ghi)perylene | 100,000 | 100,000 | 140 | U | 140 | U | 400 | | 300 | | 150 | U | 3,100 | U | 56 | J | 94 | J | 160 | U | 200 | |
| Benzo(k)fluoranthene | 800 | 3,900 | 110 | U | 110 | U | 640 | | 460 | | 120 | U | 2,300 | U | 31 | J | 53 | J | 120 | U | 120 | |
| Benzoic Acid | NS | NS | 580 | U | 580 | U | 610 | U | 630 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Benzyl Alcohol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Biphenyl | NS | NS | 410 | U | 410 | U | 430 | U | 440 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Bis(2-chloroethoxy)methane | NS | NS | 190 | U | 190 | U | 200 | U | 210 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Bis(2-chloroethyl)ether | NS | NS | 160 | U | 160 | U | 170 | U | 180 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Bis(2-chloroisopropyl)ether | NS | NS | 210 | U | 220 | U | 230 | U | 230 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Bis(2-Ethylhexyl)phthalate | NS | NS | 180 | U | 180 | U | 83 | J | 150 | J | NS | | NS | | NS | | NS | | NS | | NS | |
| Butyl benzyl phthalate | NS | NS | 180 | U | 180 | U | 190 | U | 80 | J | NS | | NS | | NS | | NS | | NS | | NS | |
| Carbazole | NS | NS | 180 | U | 180 | U | 210 | | 120 | J | NS | | NS | | NS | | NS | | NS | | NS | |
| Chrysene | 1,000 | 3,900 | 110 | U | 80 | J | 820 | | 580 | | 60 | J | 2,300 | U | 78 | J | 180 | | 63 | J | 260 | |
| Di-n-butylphthalate | NS | NS | 180 | U | 180 | U | 120 | | 88 | J | NS | | NS | | NS | | NS | | NS | | NS | |
| Di-n-octylphthalate | NS | NS | 180 | U | 180 | U | 130 | J | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Dibenzo(a,h)anthracene | 330 | 330 | 110 | U | 110 | U | 190 | U | 190 | U | 120 | U | 2,300 | U | 120 | U | 120 | U | 120 | U | 120 | U |
| Dibenzofuran | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Diethyl phthalate | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Dimethyl phthalate | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Fluoranthene | 100,000 | 100,000 | 110 | U | 160 | | 2,200 | | 1,400 | | 120 | U | 2,300 | U | 140 | | 300 | | 100 | J | 280 | |
| Fluorene | 30,000 | 100,000 | 180 | U | 180 | U | 200 | | 71 | J | 900 | | 7,000 | | 420 | | 290 | | 580 | | 580 | |
| Hexachlorobenzene | NS | NS | 110 | U | 110 | U | 110 | U | 120 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Hexachlorobutadiene | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Hexachlorocyclopentadiene | NS | NS | 510 | U | 510 | U | 540 | U | 560 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Hexachloroethane | NS | NS | 140 | U | 140 | U | 150 | U | 160 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Indeno(1,2,3-cd)Pyrene | 500 | 500 | 140 | U | 140 | U | 460 | | 340 | | 150 | U | 3,100 | U | 160 | U | 98 | J | 160 | U | 190 | |
| Isophorone | NS | NS | 160 | U | 160 | U | 170 | U | 180 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| n-Nitrosodi-n-propylamine | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Naphthalene | 12,000 | 100,000 | 180 | U | 180 | U | 170 | U | 180 | U | 800 | | 17,000 | | 200 | U | 100 | J | 310 | | 570 | |
| Nitrobenzene | NS | NS | 160 | U | 160 | U | 150 | U | 160 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| NitrosoDiPhenylAmine(NDPA)/DPA | NS | NS | 140 | U | 140 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| P-Chloro-M-Cresol | NS | NS | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Pentachlorophenol | 800 | 6,700 | 140 | U | 140 | U | 150 | U | 160 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Phenanthrene | 100,000 | 100,000 | 110 | U | 140 | | 1,800 | | 980 | | 1700 | | 19,000 | | 730 | | 440 | | 880 | | 840 | |
| Phenol | 330 | 100,000 | 180 | U | 180 | U | 190 | U | 190 | U | NS | | NS | | NS | | NS | | NS | | NS | |
| Pyrene | 100,000 | 100,000 | 110 | U | 160 | | 1,700 | | 1,100 | | 330 | | 1,600 | J | 280 | | 340 | | 200 | | 410 | |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06
(3) Soils from EP006 were removed to a depth of 4.5 feet due to lead concentrations; however, SVOC concentrations are left here for reference.
(4) Samples EPB03 and EPB04 were collected in the same locations as EPB01 and EPB02, respectively.
U - Analyte not detected above the laboratory MDL
J - Estimated value
NS - No standard established
NA - Not Analyzed
Yellow highlighting indicates exceedance of Unrestricted Use SCO
Orange highlighting indicates exceedance of Restricted Residential SCO

## Table 5C

## Soil Analytical Data Remaining Following Remedy - Pesticides, PCBs, and Metals
## 3140 Coney Island Avenue, Brooklyn, New York

| SAMPLE ID<br>SAMPLE DEPTH (ft.)<br>SAMPLING DATE<br>LAB SAMPLE ID | Unrestricted Use SCO [1] | Restricted Residential SCO [2] | PRB003<br>6-8'<br>09/10/13<br>L1317760-05 | PRB003<br>8-10'<br>09/10/13<br>L1317760-06 | EP006<br>4.5'<br>L1427327-03<br>11/12/2014 | EP006<br>5.5'<br>L1427327-04<br>11/12/2014 | EP007<br>4'<br>L1425901-06<br>10/28/2014 | EP008<br>4'<br>L1427327-01<br>11/12/2014 | EP009<br>4'<br>L1427327-02<br>11/12/2014 |
|---|---|---|---|---|---|---|---|---|---|
| **Organochlorine Pesticides by EPA 8081A in µg/kg** | | | | | | | | | |
| 4,4'-DDD | 3.3 | 13,000 | 1.66 U | 1.76 U | NA | NA | NA | NA | NA |
| 4,4'-DDE | 3.3 | 8,900 | 1.66 U | 1.76 U | NA | NA | NA | NA | NA |
| 4,4'-DDT | 3.3 | 7,900 | 3.12 U | 3.29 U | NA | NA | NA | NA | NA |
| Aldrin | 5 | 97 | 1.66 U | 1.76 U | NA | NA | NA | NA | NA |
| Alpha-BHC | 20 | 480 | 0.693 U | 0.732 U | NA | NA | NA | NA | NA |
| Beta-BHC | 36 | 360 | 1.66 U | 1.76 U | NA | NA | NA | NA | NA |
| Chlordane | 94 | 4,200 | 13.5 U | 14.3 U | NA | NA | NA | NA | NA |
| cis-Chlordane | NS | NS | 2.08 U | 2.2 U | NA | NA | NA | NA | NA |
| Delta-BHC | 40 | 100,000 | 1.66 U | 1.76 U | NA | NA | NA | NA | NA |
| Dieldrin | 5 | 200 | 1.04 U | 1.1 U | NA | NA | NA | NA | NA |
| Endosulfan I | 2,400 | 24,000 | 1.66 U | 1.76 U | NA | NA | NA | NA | NA |
| Endosulfan II | 2,400 | 24,000 | 1.66 U | 1.76 U | NA | NA | NA | NA | NA |
| Endosulfan sulfate | 2,400 | 24,000 | 0.693 U | 0.732 U | NA | NA | NA | NA | NA |
| Endrin | 14 | 11,000 | 0.693 U | 0.732 U | NA | NA | NA | NA | NA |
| Endrin ketone | NS | NS | 1.66 U | 1.76 U | NA | NA | NA | NA | NA |
| Heptachlor | 42 | 2,100 | 0.831 U | 0.878 U | NA | NA | NA | NA | NA |
| Heptachlor epoxide | NS | NS | 3.12 U | 3.29 U | NA | NA | NA | NA | NA |
| Lindane | 100 | 1,300 | 0.693 U | 0.732 U | NA | NA | NA | NA | NA |
| Methoxychlor | NS | NS | 3.12 U | 3.29 U | NA | NA | NA | NA | NA |
| Toxaphene | NS | NS | 31.2 U | 32.9 U | NA | NA | NA | NA | NA |
| trans-Chlordane | NS | NS | 2.08 U | 2.2 U | NA | NA | NA | NA | NA |
| **Polychlorinated Biphenyls by EPA 8082 in µg/kg** | | | | | | | | | |
| Aroclor 1016 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| Aroclor 1221 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| Aroclor 1232 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| Aroclor 1242 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| Aroclor 1248 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| Aroclor 1254 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| Aroclor 1260 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| Aroclor 1262 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| Aroclor 1268 | 100 | 1,000 | 35.7 U | 36.7 U | NA | NA | NA | NA | NA |
| **Total Metals in mg/kg** | | | | | | | | | |
| Aluminum | NS | NS | 8,200 | 5,100 | NA | NA | 5,600 | NA | NA |
| Antimony | NS | NS | 4.1 U | 4.4 U | NA | NA | 1.5 J | NA | NA |
| Arsenic | 13 | 16 | 3.2 | 2.6 | NA | NA | 3.6 | NA | NA |
| Barium | 350 | 400 | 41 | 31 | NA | NA | 68 | NA | NA |
| Beryllium | 7.2 | 72 | 0.45 | 0.29 J | NA | NA | 0.28 J | NA | NA |
| Cadmium | 2.5 | 4.3 | 0.32 J | 0.21 J | NA | NA | 0.16 J | NA | NA |
| Calcium | NS | NS | 560 | 610 | NA | NA | 11,000 | NA | NA |
| Chromium | 30 | 180 | 19 | 9.6 | NA | NA | 14 | NA | NA |
| Cobalt | NS | NS | 6.6 | 4.7 | NA | NA | 4 | NA | NA |
| Copper | 50 | 270 | 20 | 11 | NA | NA | 28 | NA | NA |
| Iron | NS | NS | 13,000 | 10,000 | NA | NA | 11,000 | NA | NA |
| Lead | 63 | 400 | 13 | 10 | 72 | 210 | 120 | 96 | 130 |
| Magnesium | NS | NS | 3,400 | 2,100 | NA | NA | 2500 | NA | NA |
| Manganese | 1,600 | 2,000 | 250 | 260 | NA | NA | 190 | NA | NA |
| Mercury | 0.18 | 0.81 | 0.08 U | 0.31 | NA | NA | 0.22 | NA | NA |
| Nickel | 30 | 310 | 54 | 20 | NA | NA | 15 | NA | NA |
| Potassium | NS | NS | 1,100 | 560 | NA | NA | 750 | NA | NA |
| Selenium | 3.9 | 180 | 1.6 U | 1.7 U | NA | NA | 0.43 J | NA | NA |
| Silver | 2 | 180 | 0.82 U | 0.87 U | NA | NA | 0.29 J | NA | NA |
| Sodium | NS | NS | 280 | 340 | NA | NA | 180 | NA | NA |
| Thallium | NS | NS | 1.6 U | 1.7 U | NA | NA | 0.37 U | NA | NA |
| Vanadium | NS | NS | 20 | 14 | NA | NA | 18 | NA | NA |
| Zinc | 109 | 10,000 | 120 | 22 | NA | NA | 93 | NA | NA |

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestriced Use of Soil Cleanup Objective Table 375-6.8a 12/06
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restriced Use of Soil Cleanup Objective Table 375-6.8b 12/06
U - Analyte not detected above the laboratory MDL
J - Estimated value
NS - No standard established
NA - Not Analyzed
Yellow highlighting indicates exceedance of Unrestricted Use SCO
Orange highlighting indicates exceedance of Restricted Residential SCO

**Table 6**

**Groundwater Analytical Data Following Remedy - VOCs**
**3140 Coney Island Avenue, Brooklyn, New York**

| | | Following First ISCO | | | | | | | Following Second ISCO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Client Sample ID:** | **NYSDEC (1)** | **ML-Well (15-20')** | **MW-10** | **MW-11** | **TP-001** | **TP-002** | **TP-003** | **TP-004** | **TP-005** | **TP-006** | **ML-Well (15-20')** |
| **Laboratory ID:** | **Ambient Water Quality** | **L1423615-01** | **L1423615-02** | **L1423615-03** | **L1423615-04** | **L1423615-05** | **L1424055-01** | **L1424055-02** | **L1510117-01** | **L1510117-02** | **L1510117-03** |
| **Sampling Date:** | **Standards** | **10/7/2014** | **10/7/2014** | **10/9/2014** | **10/7/2014** | **10/9/2014** | **10/9/2014** | **10/9/2014** | **5/11/2015** | **5/11/2015** | **5/11/2015** |
| **Volatile Organic Compounds in µg/L** | | | | | | | | | | | |
| 1,1,1,2-Tetrachloroethane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,1,1-Trichloroethane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,1,2,2-Tetrachloroethane | 5 | 0.14 U | 0.1 U | 0.14 U | 7 U | 0.36 U | 0.14 U | 36 U | 0.14 U | 0.14 U | 0.14 U |
| 1,1,2-Trichloroethane | 1 | 0.5 U | 0.5 U | 0.5 U | 25 U | 1.2 U | 0.5 U | 120 U | 0.5 U | 0.5 U | 0.5 U |
| 1,1-Dichloroethane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,1-Dichloroethene | 5 | 0.34 J | 0.1 U | 0.14 U | 7 U | 0.44 J | 0.64 | 47 J | 0.15 J | 0.14 U | 0.22 J |
| 1,1-Dichloropropene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,2,3-Trichlorobenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,2,3-Trichloropropane | 0.04 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,2,4,5-Tetramethylbenzene | NS | 3.8 | 0.7 U | 0.65 U | 32 U | 1.6 U | 2.4 | 160 U | 0.65 U | 12 | 1.6 J |
| 1,2,4-Trichlorobenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,2,4-Trimethylbenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,2-Dibromo-3-chloropropane | 0.04 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,2-Dibromoethane | 0.0006 | 0.65 U | 0.7 U | 0.65 U | 32 U | 1.6 U | 0.65 U | 160 U | 0.65 U | 0.65 U | 0.65 U |
| 1,2-Dichlorobenzene | 3 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,2-Dichloroethane | 0.6 | 0.13 U | 0.1 U | 0.13 U | 7 U | 0.33 U | 0.13 U | 33 U | 0.79 | 0.13 U | 0.13 U |
| 1,2-Dichloropropane | 1 | 0.13 U | 0.1 U | 0.13 U | 7 U | 0.33 U | 0.13 U | 33 U | 0.13 U | 0.13 U | 0.13 U |
| 1,3,5-Trimethylbenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,3-Dichlorobenzene | 3 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,3-Dichloropropane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 1,4-Dichlorobenzene | 3 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 2,2-Dichloropropane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| 2-Butanone | 50 | 1.9 U | 1.9 U | 1.9 U | 97 U | 4.8 U | 1.9 U | 480 U | 1.9 U | 1.9 U | 1.9 U |
| 2-Hexanone | 50 | 1 U | 1.0 U | 1 U | 50 U | 2.5 U | 1 U | 250 U | 1 U | 1 U | 1 U |
| 4-Methyl-2-pentanone | NS | 1 U | 1.0 U | 1 U | 50 U | 2.5 U | 1 U | 250 U | 1 U | 1 U | 1 U |
| Acetone | 50 | 1.5 U | 1.5 U | 1.5 U | 73 U | 3.6 U | 2.6 J | 360 U | 4.6 J | 2.8 J | 1.5 U |
| Acrylonitrile | 5 | 1.5 U | 1.5 U | 1.5 U | 75 U | 3.8 U | 1.5 U | 380 U | 1.5 U | 1.5 U | 1.5 U |
| Benzene | 1 | 0.16 U | 0.2 U | 0.16 U | 8 U | 0.4 U | 0.71 | 40 U | 0.38 J | 0.16 U | 0.16 U |
| Bromobenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Bromochloromethane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Bromodichloromethane | 50 | 0.19 U | 0.2 U | 0.19 U | 10 U | 0.48 U | 0.19 U | 48 U | 0.19 U | 0.19 U | 0.19 U |
| Bromoform | 50 | 0.65 U | 0.7 U | 0.65 U | 32 U | 1.6 U | 0.65 U | 160 U | 0.65 U | 0.65 U | 0.65 U |
| Bromomethane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Carbon disulfide | 60 | 1 U | 1.0 U | 1 U | 50 U | 2.5 U | 1 U | 250 U | 6.1 | 1 U | 1 U |
| Carbon tetrachloride | 5 | 0.13 U | 0.1 U | 0.13 U | 7 U | 0.34 U | 0.13 U | 34 U | 0.13 U | 0.13 U | 0.13 U |
| Chlorobenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Chloroethane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 1.4 J | 180 U | 0.87 J | 0.7 U | 0.7 U |
| Chloroform | 7 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Chloromethane | NS | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| cis-1,2-Dichloroethene | 5 | 140 | 0.7 U | 0.7 U | 3,900 | 140 | 140 | 16,000 | 71 | 37 | 100 |
| cis-1,3-Dichloropropene | 0.4 | 0.14 U | 0.1 U | 0.14 U | 7 U | 0.36 U | 0.14 U | 36 U | 0.14 U | 0.14 U | 0.14 U |
| Dibromochloromethane | 50 | 0.15 U | 0.2 U | 0.15 U | 7 U | 0.37 U | 0.15 U | 37 U | 0.15 U | 0.15 U | 0.15 U |
| Dibromomethane | 5 | 1 U | 1.0 U | 1 U | 50 U | 2.5 U | 1 U | 250 U | 1 U | 1 U | 1 U |
| Dichlorodifluoromethane | 5 | 1 U | 1.0 U | 1 U | 50 U | 2.5 U | 1 U | 250 U | 1 U | 1 U | 1 U |
| Ethyl ether | NS | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Ethylbenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Hexachlorobutadiene | 0.5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Isopropylbenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 2.8 | 0.7 U |
| Methyl tert butyl ether | 10 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Methylene chloride | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 1.2 J | 0.7 U | 0.7 U |
| n-Butylbenzene | 5 | 0.77 J | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| n-Propylbenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Naphthalene | 10 | 0.83 J | 0.7 U | 0.7 U | 35 U | 1.8 U | 29 | 180 U | 0.7 U | 0.7 U | 0.7 U |
| o-Chlorotoluene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| o-Xylene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.96 J | 180 U | 0.7 U | 0.7 U | 0.7 U |
| p-Chlorotoluene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| p-Diethylbenzene | NS | 5 | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.82 J | 180 U | 0.7 U | 1.2 J | 3.4 |
| p-Ethyltoluene | NS | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| p-Isopropyltoluene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| p/m-Xylene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| sec-Butylbenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 1.3 J | 180 U | 0.7 U | 0.94 J | 0.7 U |
| Styrene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| tert-Butylbenzene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Tetrachloroethene | 5 | 2.5 | 0.2 U | 0.18 U | 9 U | 36 | 0.29 J | 73 J | 12 | 4.5 | 2.2 |
| Toluene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| trans-1,2-Dichloroethene | 5 | 2.8 | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 1.5 J | 1.6 J | 1.3 J |
| trans-1,3-Dichloropropene | 0.4 | 0.16 U | 0.2 U | 0.16 U | 8 U | 0.41 U | 0.16 U | 41 U | 0.16 U | 0.16 U | 0.16 U |
| trans-1,4-Dichloro-2-butene | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Trichloroethene | 5 | 1 | 0.2 U | 0.18 U | 9 U | 5.6 | 0.43 J | 70 J | 1 | 1.4 | 0.77 |
| Trichlorofluoromethane | 5 | 0.7 U | 0.7 U | 0.7 U | 35 U | 1.8 U | 0.7 U | 180 U | 0.7 U | 0.7 U | 0.7 U |
| Vinyl acetate | NS | 1 U | 1.0 U | 1 U | 50 U | 2.5 U | 1 U | 250 U | 1 U | 1 U | 1 U |
| Vinyl chloride | 2 | 65 | 0.3 U | 0.33 U | 1,400 | 94 | 200 | 1,100 | 21 | 5.5 | 65 |

Notes:
(1) NYSDEC Ambient Water Quality Standards and Guidance Values 6/1998
NS - No Standard
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.
U - The analyte was analyzed for, but was not detected above the reported sample quantification limit. The assocaited numerical value is the sample quantitation limit.
E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument
Highlighted values indicate exceedance of the NYSDEC AWQS

# SMP – Appendix A

NYC Finance

September 08, 2015

GEORGE C.D. DUKE, ESQ.,P.G.
1450 BROADWAY, 35TH FLOOR
NEW YORK, NY 10018

**RE: Submitted Transaction Successfully Recorded**

Dear GEORGE C.D. DUKE, ESQ.,P.G.:

Document Identification Number 2015090100109001 which was electronically submitted and intaken for Recording on 9/1/2015 9:51:58 AM, was successfully recorded on 9/8/2015 at 5:12 PM.

Below summarizes the status of the document(s).

Recording & Endorsement Cover Page(s) attached

2015090100109001

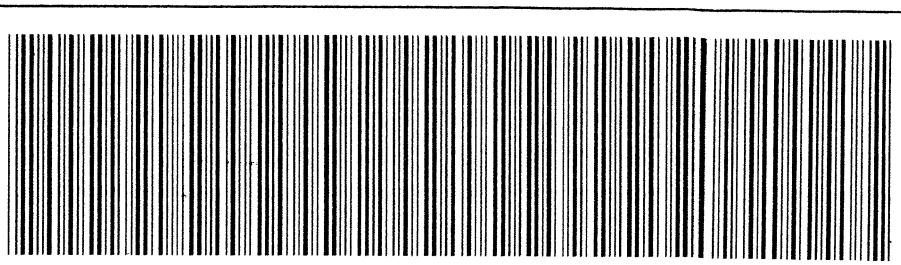
If you have questions or require further information, please send an email to acrishelp@finance.nyc.gov and someone will get back to you.

Thank you.

City Register

**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.



2015090100109001001EA65E

**RECORDING AND ENDORSEMENT COVER PAGE** **PAGE 1 OF 11**

**Document ID:** 2015090100109001 Document Date: 08-12-2015 Preparation Date: 09-01-2015
Document Type: EASEMENT
Document Page Count: 10

**PRESENTER:**
THE GREAT AMERICAN TITLE AGENCY
170 HAMILTON AVENUE
WHITE PLAINS, NY 10601
914-761-1776
AZHINA@GAMERICANTITLE.COM

**RETURN TO:**
GEORGE C.D. DUKE, ESQ.,P.G.
1450 BROADWAY, 35TH FLOOR
NEW YORK, NY 10018

**PROPERTY DATA**

| Borough | Block | Lot | Unit | Address |
|---|---|---|---|---|
| BROOKLYN | 8678 | 64 | Entire Lot | 3140 CONEY ISLAND AVENUE |

**Property Type:** COMMERCIAL REAL ESTATE Easement

**CROSS REFERENCE DATA**

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

**PARTIES**

**GRANTOR/SELLER:**
3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NY 11235

**GRANTEE/BUYER:**
THE PEOPLE OF THE STATE OF NEW YORK
COMMISSIONER OF THE DEPARTMENT OF
ENVIRONMENTAL , CONSERVATION 625
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: | $ | 87.00 |
| 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 09-08-2015 17:12
City Register File No.(CRFN): **2015000313884**

*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 12th day of AUGUST, 2015, between Owner(s) 3140 Coney Island Realty, LLC, having an office at 3061 Brighton 6th Street, County of Kings, 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 3140 Coney Island 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 8678 Lot 64, being the same as that property conveyed to Grantor by deed dated April 22, 2009 and recorded in the City Register of the City of New York in Instrument No. 2009042300223001. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately .090 +/- acres, and is hereinafter more fully described in the Land Title Survey dated October 6, 2014 prepared by Richard Tom of Perfect Point Land Surveying RT, 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: C224157-03-12, 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: C224157
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

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

3140 Coney Island Realty, LLC:

By: _____

Print Name: Oleg Blinshteyn

Title: Pres. Date: 7/24/15

**Grantor's Acknowledgment**

STATE OF NEW YORK )
) ss:
COUNTY OF )

On the 24 day of July, in the year 20 15, before me, the undersigned, personally appeared Oleg Blinshteyn, 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

GEORGE C.D. DUKE
Notary Public, State of New York
Qual. in New York Co. No. 02DU6104497
Commission Expires May 7, 2016

**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 12TH day of AUGUST, in the year 2015, 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

PATRICK EUGENE FOSTER
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN KINGS COUNTY
NO. 02FO6278032
COMMISSION EXPIRES 03/18/2017

## SCHEDULE "A" PROPERTY DESCRIPTION

All that certain plot, 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 further described as follows:

BEGINNING at a point on the westerly side of Coney Island Avenue distant one hundred fifty-six and twenty-seven hundredths feet southerly from the corner formed by the intersection of the westerly side of Coney Island Avenue with the southerly side of Ocean View Avenue;

RUNNING THENCE westerly at right angles to Coney Island Avenue, one hundred feet;

THENCE southerly parallel with Coney Island Avenue, forty feet;

THENCE easterly at right angles to Coney Island Avenue, one hundred feet to the westerly side of Coney Island Avenue; and

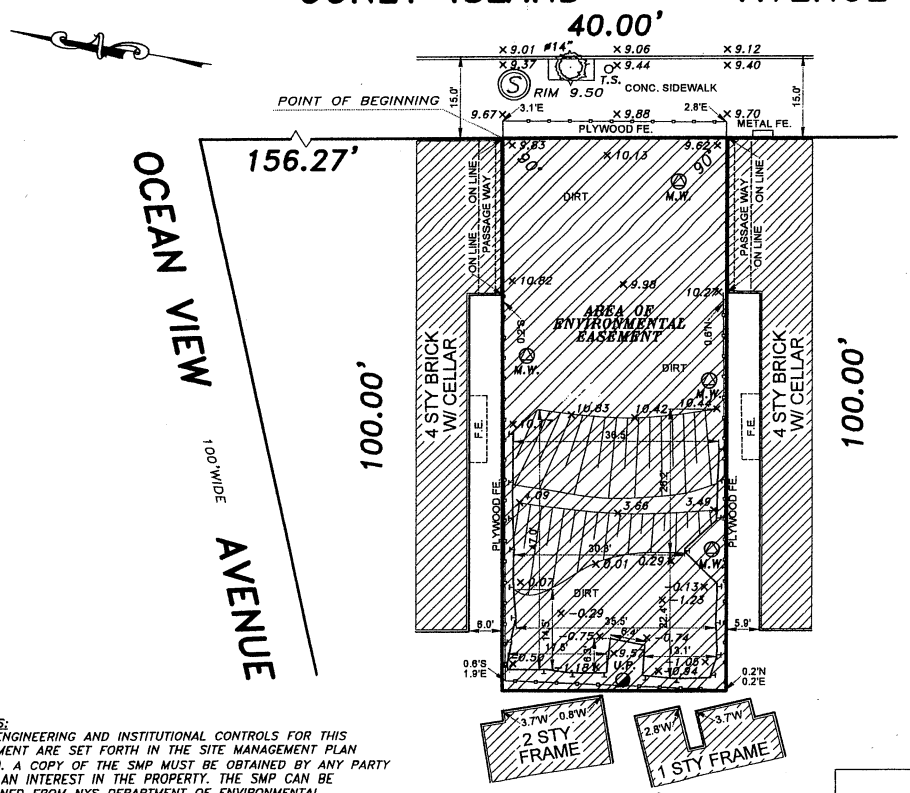
THENCE northerly along the westerly side of Coney Island Avenue, forty feet to the point or place of BEGINNING.

Said premises being more commonly known as 3140 Coney Island Avenue, Brooklyn, NY

JOB NO.: B 8678-64-ENV

DATE: OCTOBER 6, 2014

ENVIRONMENTAL EASEMENT PLAN




– *ENVIRONMENTAL EASEMENT*

ENVIRONMENTAL EASEMENT
DESCRIPTION/BCP INDEX No. C224157-03-12
"SCHEDULE A"

**All that certain plot, 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 further described as follows:**

**BEGINNING at a point on the westerly side of Coney Island Avenue distant one hundred fifty-six and twenty-seven hundredths feet southerly from the corner formed by the intersection of the westerly side of Coney Island Avenue with the southerly side of Ocean View Avenue;**

**RUNNING THENCE westerly at right angles to Coney Island Avenue, one hundred feet;**

**THENCE southerly parallel with Coney Island Avenue, forty feet;**

**THENCE easterly at right angles to Coney Island Avenue, one hundred feet to the westerly side of Coney Island Avenue;**

**THENCE northerly along the westerly side of Coney Island Avenue, forty feet to the point or place of BEGINNING.**

**Said premises being more commonly known as 3140 Coney Island Avenue, Brooklyn, NY**

SYMBOLS AND ABBREVIATIONS

| | | | |
|---|---|---|---|
| PLATFORM | PL. or PLTF. | MONITORING WELL | M.W. |
| BASEMENT ENTRANCE | B.E. | TRAFFIC LIGHT | T.L. |
| CELLAR ENTRANCE | C.E. | LIGHT | |
| AIR WAY | A.W. | STREET LIGHT | L.P. |
| BAY WINDOW | B.W. | FIRE HYDRANT | HYD. |
| CONCRETE | CONC. | SIAMESE CONNECTION | S.P.R. |
| OVERHANG | O.H. | CURB AND CURB CUT | CURB CUT |
| AIR CONDITION | AC | OVERHEAD SERVICE | O.H.S.W. |
| METAL | MET. | CABLE TV MANHOLE | CTV |
| NORTH OF PROPERTY LINE | N | MANHOLES | (W) (E) (T) (S) RIM EL. INV. EL. |
| SOUTH OF PROPERTY LINE | S | CATCH BASIN | C.B. |
| EAST OF PROPERTY LINE | E | EXISTING ELEVATIONS | × 44.18 TOP OF CURB; × 42.33 BOTTOM OF CURB; × 43.78 |
| WEST OF PROPERTY LINE | W | CITY ESTABLISHED GRADES | L.G.7.52 |
| ROOF OVER | R.O. | SHUT OFF VALVE | G.V. T.V. H.V. W.V. |
| FIRE ESCAPE | F.E. | HANDICAPPED PARKING | |
| UTILITY POLE | U.P. | EXISTING TREE | #12" |
| PARKING METER | P.M. | DRAINS | D.R. |
| OIL FILL | O.F. | FENCE | O.L./F. WOOD F. |

*NOTES:*
*THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT derweb@gw.dec.state.ny.us.*

*ALL ELEVATIONS SHOWN REFER TO THE BROOKLYN DATUM WHICH IS 2.560 FEET ABOVE MEAN SEA LEVEL AT SANDY HOOK AS ESTABLISHED THE U.S. COAST AND GEODETIC SURVEY.*

GRAPHIC SCALE

ALL WRITTEN MEASUREMENTS AND OFFSETS NOTED ON THIS SURVEY SUPERSEDE MEASUREMENTS SCALED OF THIS PLOT.

SCALE 1:20

0 5 10 15 20 25 30 35 40 45 50 100

## ENVIRONMENTAL EASEMENT PLAN

## 3140 CONEY ISLAND AVENUE, BROOKLYN, KINGS CO., NY,


**PERFECT POINT**
LAND SURVEYING RT
brooklyn - queens - manhattan - bronx
staten island - nassau
phone: (718) 474-7700
fax: (718) 872-9699
info@ppsurveying.com
www.ppsurveying.com


STATE OF NEW YORK RICHARD T. SKINNER 049844 LICENSED LAND SURVEYOR

N.Y.S. L.S. 049844

SEC. ..... BLOCK 8678 LOT 64

GUARANTEED TO: New York City Department of Environmental Conservation

TITLE NO. .....


UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW. COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYOR'S INKED SEAL OR EMBOSSED SEAL SHALL NOT BE CONSIDERED TO BE A VALID COPY. GUARANTEES OR CERTIFICATIONS INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED AND ON HIS BEHALF TO THE TITLE COMPANY, GOVERNMENTAL AGENCY AND LENDING INSTITUTION LISTED HEREON AND TO THE ASSIGNEES OF THE LENDING INSTITUTION. GUARANTEES OR CERTIFICATIONS ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.

NEW YORK CITY DEPARTMENT OF FINANCE

# NYC-RPT Finance

# REAL PROPERTY TRANSFER TAX RETURN

(Pursuant to Title 11, Chapter 21, NYC Administrative Code)

▲ DO NOT WRITE IN THIS SPACE ▲
FOR OFFICE USE ONLY

## GRANTOR

● Name: 3140 CONEY ISLAND REALTY, LLC

● Grantor is a(n): (check one) ☐ individual ☐ partnership ☐ corporation ☐ single member LLC ☑ multiple member LLC ☐ other _____ | Telephone Number

● Permanent mailing address after transfer (number and street): 3061 BRIGHTON 6TH STREET

● City and State: BROOKLYN, NY | Zip Code: 11235

● Single member's name if grantor is a single member LLC

SOCIAL SECURITY NUMBER: ___ - ___ - ____

OR

EMPLOYER IDENTIFICATION NUMBER: 26 - 4206489

SINGLE MEMBER EIN OR SSN:

## GRANTEE

● Name: THE PEOPLE OF THE STATE OF NEW YORK

● Grantee is a(n): (check one) ☐ individual ☐ partnership ☑ corporation ☐ single member LLC ☐ multiple member LLC ☐ other _____ | Telephone Number

● Permanent mailing address after transfer (number and street): COMMISSIONER OF THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION 625 BROADWAY

● City and State: ALBANY, NY | Zip Code: 12233

● Single member's name if grantee is a single member LLC

SOCIAL SECURITY NUMBER: ___ - ___ - ____

OR

EMPLOYER IDENTIFICATION NUMBER: 14 - 6013200

SINGLE MEMBER EIN OR SSN:

## PROPERTY LOCATION

LIST EACH LOT SEPARATELY. ATTACH A RIDER IF ADDITIONAL SPACE IS REQUIRED

| ● Address (number and street) | Apt. No. | Borough | Block | Lot | # of Floors | Square Feet | ● Assessed Value of Property |
|---|---|---|---|---|---|---|---|
| 3140 CONEY ISLAND AVENUE | | BROOKLYN | 8678 | 64 | 0 | 3,920 | 19,380.00 |
| | | | | | | | |

● DATE OF TRANSFER TO GRANTEE: 8/12/2015

● PERCENTAGE OF INTEREST TRANSFERRED: 100 %

## CONDITION OF TRANSFER. See Instructions

● Check (✓) all of the conditions that apply and fill out the appropriate schedules on pages 5-11 of this return. Additionally, Schedules1 and 2 **must** be completed for all transfers.

a. ☐ .....Arms length transfer
b. ☐ .....Transfer in exercise of option to purchase
c. ☐ .....Transfer from cooperative sponsor to cooperative corporation
d. ☐ .....Transfer by referee or receiver (complete Schedule A, page 5)
e. ☐ .....Transfer pursuant to marital settlement agreement or divorce decree (complete Schedule I, page 9)
f. ☐ .....Deed in lieu of foreclosure (complete Schedule C, page 6)
g. ☐ .....Transfer pursuant to liquidation of an entity (complete Schedule D, page 6)
h. ☐ .....Transfer from principal to agent, dummy, strawman or conduit or vice-versa (complete Schedule E, page 7)
i. ☐ .....Transfer pursuant to trust agreement or will (attach a copy of trust agreement or will)
j. ☐ .....Gift transfer not subject to indebtedness
k. ☐ .....Gift transfer subject to indebtedness
l. ☐ .....Transfer to a business entity in exchange for an interest in the business entity (complete Schedule F, page 7)
m. ☐ .....Transfer to a governmental body
n. ☐ .....Correction deed
o. ☐ .....Transfer by or to a tax exempt organization (complete Schedule G, page 8).
p. ☐ .....Transfer of property partly within and partly without NYC
q. ☐ .....Transfer of successful bid pursuant to foreclosure
r. ☐ .....Transfer by borrower solely as security for a debt or a transfer by lender solely to return such security
s. ☐ .....Transfer wholly or partly exempt as a mere change of identity or form of ownership. Complete Schedule M, page 9)
t. ☐ .....Transfer to a REIT or to a corporation or partnership controlled by a REIT. (Complete Schedule R, pages 10 and 11)
u. ☐ .....Other transfer in connection with financing (describe): _____
v. ☐ .....A grant or assignment of a leasehold interest in a tax-free NY area
w. ☑ .....Other (describe): ENVIRONMENTAL EASEMENT



2015072900303101O4

| ● TYPE OF PROPERTY (✓) | ● TYPE OF INTEREST (✓) |
|---|---|
| a. ☐ ..... 1-3 family house<br>b. ☐ ..... Individual residential condominium unit<br>c. ☐ ..... Individual cooperative apartment<br>d. ☐ ..... Commercial condominium unit<br>e. ☐ ..... Commercial cooperative<br>f. ☐ ..... Apartment building<br>g. ☐ ..... Office building<br>h. ☐ ..... Industrial building<br>i. ☐ ..... Utility<br>j. ☑ ..... OTHER. (describe): COMMERCIAL REAL ESTATE | Check box at LEFT if you intend to record a document related to this transfer. Check box at RIGHT if you do not intend to record a document related to this transfer.<br>REC. NON REC.<br>a. ☐ ..... Fee ..... ☐<br>b. ☐ ..... Leasehold Grant ..... ☐<br>c. ☐ ..... Leasehold Assignment or Surrender ..... ☐<br>d. ☐ ..... Easement ..... ☑<br>e. ☐ ..... Subterranean Rights ..... ☐<br>f. ☐ ..... Development Rights ..... ☐<br>g. ☐ ..... Stock ..... ☐<br>h. ☐ ..... Partnership Interest ..... ☐<br>i. ☐ ..... OTHER. (describe): ..... ☐ |

## SCHEDULE 1 - DETAILS OF CONSIDERATION

COMPLETE THIS SCHEDULE FOR ALL TRANSFERS AFTER COMPLETING THE APPROPRIATE SCHEDULES ON PAGES 5 THROUGH 11. ENTER "ZERO" ON LINE 11 IF THE TRANSFER REPORTED WAS WITHOUT CONSIDERATION.

| | | |
|---|---|---|
| 1. Cash | 1. | 0 00 |
| 2. Purchase money mortgage | 2. | 0 00 |
| 3. Unpaid principal of pre-existing mortgage(s) | 3. | 0 00 |
| 4. Accrued interest on pre-existing mortgage(s) | 4. | 0 00 |
| 5. Accrued real estate taxes | 5. | 0 00 |
| 6. Amounts of other liens on property | 6. | 0 00 |
| 7. Value of shares of stock or of partnership interest received | 7. | 0 00 |
| 8. Value of real or personal property received in exchange | 8. | 0 00 |
| 9. Amount of Real Property Transfer Tax and/or other taxes or expenses of the grantor which are paid by the grantee | 9. | 0 00 |
| 10. Other (describe): _____ | 10. | 0 00 |
| 11. **TOTAL CONSIDERATION** (add lines 1 through 10 - must equal amount entered on line 1 of Schedule 2) (see instructions) | 11. | $ 0 00 |

**See instructions for special rules relating to transfers of cooperative units, liquidations, marital settlements and transfers of property to a business entity in return for an interest in the entity.**

## SCHEDULE 2 - COMPUTATION OF TAX

| A. **Payment** | Pay amount shown on line 12 - *See Instructions* | Payment Enclosed |
|---|---|---|

| | | |
|---|---|---|
| 1. Total Consideration (from line 11, above) | 1. | 0 00 |
| 2. Excludable liens (see instructions) | 2. | 0 00 |
| 3. Consideration (Line 1 less line 2) | 3. | 0 00 |
| 4. Tax Rate (see instructions) | 4. | 0 % |
| 5. Percentage change in beneficial ownership (see instructions) | 5. | 100 % |
| 6. Taxable consideration (multiply line 3 by line 5) | 6. | 0 00 |
| 7. Tax (multiply line 6 by line 4) | 7. | 0 00 |
| 8. Credit (see instructions) | 8. | 0 00 |
| 9. Tax due (line 7 less line 8) (if the result is negative, enter zero) | 9. | 0 00 |
| 10. Interest (see instructions) | 10. | 0 00 |
| 11. Penalty (see instructions) | 11. | 0 00 |
| 12. **Total Tax Due** (add lines 9, 10 and 11) | 12. | $ 0 00 |



2015072900303101O4

## GRANTOR'S ATTORNEY ▼

| | | | |
|---|---|---|---|
| Name of Attorney: GEORGE C.D. DUKE, ESQ. | | | Telephone Number: ( 646 ) 915-0236 |
| Address (number and street): 1450 BROADWAY, 35TH FLOOR | | City and State: NEW YOKR, NY | Zip Code: 10018 |
| EMPLOYER IDENTIFICATION NUMBER: [ ] - [ ] | OR | SOCIAL SECURITY NUMBER: [ ] - [ ] - [ ] | |

## GRANTEE'S ATTORNEY ▼

| | | | |
|---|---|---|---|
| Name of Attorney: GEORGE C.D. DUKE, ESQ. | | | Telephone Number: ( 646 ) 915-0236 |
| Address (number and street): 1450 BROADWAY, 35TH FLOOR | | City and State: NEW YORK, NY | Zip Code: 10018 |
| EMPLOYER IDENTIFICATION NUMBER: [ ] - [ ] | OR | SOCIAL SECURITY NUMBER: [ ] - [ ] - [ ] | |

## CERTIFICATION ▼

I swear or affirm that this return, including any accompanying schedules, affidavits and attachments, has been examined by me and is, to the best of my knowledge, a true and complete return made in good faith, pursuant to Title 11, Chapter 21 of the Administrative Code and the regulations issued thereunder.

### GRANTOR

Sworn to and subscribed to before me on this 6 day of August, 2015.

Signature of Notary

26-4206489
EMPLOYER IDENTIFICATION NUMBER OR SOCIAL SECURITY NUMBER

3140 CONEY ISLAND REALTY, LLC
Name of Grantor

Signature of Grantor

Notary's stamp or seal

GEORGE C.D. DUKE
Notary Public, State of New York
Qual. in New York Co. No. 02DU6104497
Commission Expires May 7, 2016

### GRANTEE

Sworn to and subscribed to before me on this 4th day of August, 2015.

Signature of Notary

14-6013200
EMPLOYER IDENTIFICATION NUMBER OR SOCIAL SECURITY NUMBER

PEOPLE OF THE STATE OF NEW YORK
Name of Grantee

Andrew Guglielmi, Esq

Signature of Grantee

Notary's stamp or seal

PATRICK EUGENE FOSTER
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN KINGS COUNTY
NO. 02FO6278032
COMMISSION EXPIRES 03/18/2017



2015072900303101

## GRANTOR'S ATTORNEY ▼

| | | | |
|---|---|---|---|
| Name of Attorney | GEORGE C.D. DUKE, ESQ. | Telephone Number | ( 646 ) 915-0236 |
| Address (number and street) | 1450 BROADWAY, 35TH FLOOR | City and State | NEW YOKR, NY |
| | | Zip Code | 10018 |
| EMPLOYER IDENTIFICATION NUMBER | - | OR SOCIAL SECURITY NUMBER | - - |

## GRANTEE'S ATTORNEY ▼

| | | | |
|---|---|---|---|
| Name of Attorney | GEORGE C.D. DUKE, ESQ. | Telephone Number | ( 646 ) 915-0236 |
| Address (number and street) | 1450 BROADWAY, 35TH FLOOR | City and State | NEW YORK, NY |
| | | Zip Code | 10018 |
| EMPLOYER IDENTIFICATION NUMBER | - | OR SOCIAL SECURITY NUMBER | - - |

## CERTIFICATION ▼

I swear or affirm that this return, including any accompanying schedules, affidavits and attachments, has been examined by me and is, to the best of my knowledge, a true and complete return made in good faith, pursuant to Title 11, Chapter 21 of the Administrative Code and the regulations issued thereunder.

### GRANTOR

Sworn to and subscribed to

before me on this _____ day

of _____, _____.

Signature of Notary

Notary's stamp or seal

26-4206489
EMPLOYER IDENTIFICATION NUMBER OR SOCIAL SECURITY NUMBER

3140 CONEY ISLAND REALTY, LLC
Name of Grantor

Signature of Grantor

### GRANTEE

Sworn to and subscribed to

before me on this _____ day

of _____, _____.

Signature of Notary

Notary's stamp or seal

14-6013200
EMPLOYER IDENTIFICATION NUMBER OR SOCIAL SECURITY NUMBER

THE PEOPLE OF THE STATE OF NEW YORK
Name of Grantee

Signature of Grantee

## SCHEDULE I - TRANSFERS PURSUANT TO A SEPARATION AGREEMENT, MARITAL SETTLEMENT AGREEMENT OR DIVORCE DECREE

**NOTE** The consideration for a transfer pursuant to a separation agreement, marital settlement agreement or divorce decree includes the value of any marital rights exchanged for the property or economic interest as well as any other types of consideration paid by the grantee for the transfer. The consideration **will be presumed to be equal to the fair market value of the portion of the property or interest transferred,** unless you establish the consideration to be a different amount.

1. What was the fair market value of property at the time of transfer? ..... $ 0.00

2. Is the property a 1, 2 or 3 family house, residential condominium or residential cooperative apartment? .. ☐ YES ☑ NO

   If yes, was there a mortgage on the property at the time of transfer? ..... ☐ YES ☐ NO

   If yes, what was the balance due? (Enter also on Schedule 2, line 2) ..... $ 0.00

3. What was the Grantor's percentage of ownership at the time of the transfer? ..... 0 %
   If the transfer was between husband and wife jointly as Grantor and either husband or wife individually as Grantee it is presumed that the percentage of ownership transferred will be 50% unless the deed specifies another percentage.

4. ***Rebuttable Presumption of Fair Market Value:*** if the marital settlement agreement, separation agreement or divorce decree specifies a value for the portion of the property or interest transferred that is different from fair market value, enter that value here. You may choose to submit relevant portions of your separation agreement, marital settlement agreement or divorce decree, or any other information in support of the value attributed to the transferred property if you have evidence that the consideration was other than fair market value ..... $ 0.00

**PLEASE LIST AND ATTACH ANY ADDITIONAL INFORMATION SUBMITTED**

## SCHEDULE M - MERE CHANGE OF FORM TRANSFERS

**For transfers occurring on or after June 9, 1994, a transfer that represents a mere change in identity or form of ownership or organization is not taxable to the extent the beneficial ownership of the real property or economic interest therein remains the same.** *(See instructions)* ATTACH COPIES OF ALL RELEVANT DOCUMENTS.

- For each person or entity who, prior to the transaction being reported on this Schedule M, owned a beneficial interest in the property or economic interest therein transferred, report above the percentage of beneficial interest in that real property or economic interest therein owned by that owner before and after the transfer, and describe the relationship of each beneficial owner to the grantor and grantee. Attach additional pages, if necessary.
- If, for any owner, the amount reported in column D is less than the amount reported in column E, enter zero in column F.

| A<br>1. NAME OF BENEFICIAL OWNER | B (attach rider if necessary)<br>RELATIONSHIP TO GRANTOR | C<br>RELATIONSHIP TO GRANTEE | D<br>PERCENTAGE INTEREST BEFORE | E<br>PERCENTAGE INTEREST AFTER | F<br>CHANGE<br>D minus E |
|---|---|---|---|---|---|
| | | | % | % | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 2. TOTAL CHANGE *(total of column F) Enter here and on Schedule 2, line 5.* | | | | | |

TP-584 (4/13)

New York State Department of Taxation and Finance

# Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax

*Recording office time stamp*

*See Form TP-584-I,* Instructions for Form TP-584, *before completing this form. Print or type.*

**Schedule A — Information relating to conveyance**

**Grantor/Transferor**

☐ Individual
☐ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☑ Other

Name *(if individual, last, first, middle initial)* ( ☐ *check if more than one grantor)*
3140 CONEY ISLAND REALTY, LLC

Social security number

Mailing address 3061 BRIGHTON 6TH STREET

Social security number

| City | State | ZIP code |
|---|---|---|
| BROOKLYN | NY | 11235 |

Federal EIN 26 | 4206489

Single member's name if grantor is a single member LLC *(see instructions)*

Single member EIN or SSN

**Grantee/Transferee**

☐ Individual
☑ Corporation
☐ Partnership
☐ Estate/Trust
☐ Single member LLC
☐ Other

Name *(if individual, last, first, middle initial)* ( ☐ *check if more than one grantee)*
THE PEOPLE OF THE STATE OF NEW YORK

Social security number

Mailing address COMMISSIONER OF THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION 625 BROADWAY

Social security number

| City | State | ZIP code |
|---|---|---|
| ALBANY | NY | 12233 |

Federal EIN 14 | 6013200

Single member's name if grantee is a single member LLC *(see instructions)*

Single member EIN or SSN

Location and description of property conveyed

| Tax map designation - Section, block & lot *(include dots and dashes)* | SWIS code (six digits) | Street address | City, town, or village | County |
|---|---|---|---|---|
| 3 - 8678 - 64 | 650000 | 3140 CONEY ISLAND AVENUE | NEW YORK | BROOKLYN / KINGS |

Type of property conveyed *(check applicable box)*

1 ☐ One- to three-family house
2 ☐ Residential cooperative
3 ☐ Residential condominium
4 ☐ Vacant land
5 ☑ Commercial/Industrial
6 ☐ Apartment building
7 ☐ Office building
8 ☐ Other _____

Date of conveyance: 8 (month) | 12 (day) | 2015 (year)

Percentage of real property conveyed which is residential real property 100.00 % *(see instructions)*

Condition of conveyance *(check all that apply)*

a. ☐ Conveyance of fee interest
b. ☐ Acquisition of a controlling interest (state percentage acquired _____ %)
c. ☐ Transfer of a controlling interest (state percentage transferred _____ %)
d. ☐ Conveyance to cooperative housing corporation
e. ☐ Conveyance pursuant to or in lieu of foreclosure or enforcement of security interest *(attach Form TP-584.1, Schedule E)*
f. ☐ Conveyance which consists of a mere change of identity or form of ownership or organization *(attach Form TP-584.1, Schedule F)*
g. ☐ Conveyance for which credit for tax previously paid will be claimed *(attach Form TP-584.1, Schedule G)*
h. ☐ Conveyance of cooperative apartment(s)
i. ☐ Syndication
j. ☐ Conveyance of air rights or development rights
k. ☐ Contract assignment
l. ☐ Option assignment or surrender
m. ☐ Leasehold assignment or surrender
n. ☐ Leasehold grant
o. ☑ Conveyance of an easement
p. ☐ Conveyance for which exemption from transfer tax claimed *(complete Schedule B, Part III)*
q. ☐ Conveyance of property partly within and partly outside the state
r. ☐ Conveyance pursuant to divorce or separation
s. ☐ Other *(describe)* _____

| *For recording officer's use* | Amount received | Date received | Transaction number |
|---|---|---|---|
| | Schedule B., Part I $ _____ Schedule B., Part II $ | | |

201507290030330102

## Schedule B — Real estate transfer tax return (Tax Law, Article 31)

**Part I** – Computation of tax due

| | | | |
|---|---|---|---|
| 1 | Enter amount of consideration for the conveyance *(if you are claiming a total exemption from tax, check the exemption claimed box, enter consideration and proceed to Part III)* ☐ **Exemption claimed** | 1. | 0 00 |
| 2 | Continuing lien deduction *(see instructions if property is taken subject to mortgage or lien)* | 2. | 0 00 |
| 3 | Taxable consideration *(subtract line 2 from line 1)* | 3. | 0 00 |
| 4 | Tax: $2 for each $500, or fractional part thereof, of consideration on line 3 | 4. | 0 00 |
| 5 | Amount of credit claimed for tax previously paid *(see instructions and attach Form TP-584.1,* Schedule G*)* | 5. | 0 00 |
| 6 | Total tax due* *(subtract line 5 from line 4)* | 6. | 0 00 |

**Part II** – Computation of additional tax due on the conveyance of residential real property for $1 million or more

| | | | |
|---|---|---|---|
| 1 | Enter amount of consideration for conveyance *(from* Part I*, line 1)* | 1. | 0 00 |
| 2 | Taxable consideration *(multiply line 1 by the percentage of the premises which is residential real property, as shown in* Schedule A*)* | 2. | 0 00 |
| 3 | Total additional transfer tax due* *(multiply line 2 by 1% (.01))* | 3. | 0 00 |

**Part III** – Explanation of exemption claimed on Part I, line 1 *(check any boxes that apply)*

The conveyance of real property is exempt from the real estate transfer tax for the following reason:

a. Conveyance is to the United Nations, the United States of America, the state of New York, or any of their instrumentalities, agencies, or political subdivisions (or any public corporation, including a public corporation created pursuant to agreement or compact with another state or Canada) ..... a ☐

b. Conveyance is to secure a debt or other obligation ..... b ☐

c. Conveyance is without additional consideration to confirm, correct, modify, or supplement a prior conveyance ..... c ☐

d. Conveyance of real property is without consideration and not in connection with a sale, including conveyances conveying realty as bona fide gifts ..... d ☐

e. Conveyance is given in connection with a tax sale ..... e ☐

f. Conveyance is a mere change of identity or form of ownership or organization where there is no change in beneficial ownership. (This exemption cannot be claimed for a conveyance to a cooperative housing corporation of real property comprising the cooperative dwelling or dwellings.) Attach Form TP-584.1, Schedule F ..... f ☐

g. Conveyance consists of deed of partition ..... g ☐

h. Conveyance is given pursuant to the federal Bankruptcy Act ..... h ☐

i. Conveyance consists of the execution of a contract to sell real property, without the use or occupancy of such property, or the granting of an option to purchase real property, without the use or occupancy of such property ..... i ☐

j. Conveyance of an option or contract to purchase real property with the use or occupancy of such property where the consideration is less than $200,000 and such property was used solely by the grantor as the grantor's personal residence and consists of a one-, two-, or three-family house, an individual residential condominium unit, or the sale of stock in a cooperative housing corporation in connection with the grant or transfer of a proprietary leasehold covering an individual residential cooperative apartment ..... j ☐

k. Conveyance is not a conveyance within the meaning of Tax Law, Article 31, section 1401(e) *(attach documents supporting such claim)* ..... k ☐

*The total tax (from Part I, line 6 and Part II, line 3 above) is due within 15 days from the date conveyance. Please make check(s) payable to the county clerk where the recording is to take place. If the recording is to take place in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, make check(s) payable to the ***NYC Department of Finance***. If a recording is not required, send this return and your check(s) made payable to the ***NYS Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045.

## Schedule C — Credit Line Mortgage Certificate (Tax Law, Article 11)

**Complete the following only if the interest being transferred is a fee simple interest.**

I (we) certify that: *(check the appropriate box)*

1. ☑ The real property being sold or transferred is not subject to an outstanding credit line mortgage.

2. ☐ The real property being sold or transferred is subject to an outstanding credit line mortgage. However, an exemption from the tax is claimed for the following reason:

   ☐ The transfer of real property is a transfer of a fee simple interest to a person or persons who held a fee simple interest in the real property (whether as a joint tenant, a tenant in common or otherwise) immediately before the transfer.

   ☐ The transfer of real property is (A) to a person or persons related by blood, marriage or adoption to the original obligor or to one or more of the original obligors or (B) to a person or entity where 50% or more of the beneficial interest in such real property after the transfer is held by the transferor or such related person or persons (as in the case of a transfer to a trustee for the benefit of a minor or the transfer to a trust for the benefit of the transferor).

   ☐ The transfer of real property is a transfer to a trustee in bankruptcy, a receiver, assignee, or other officer of a court.

   ☐ The maximum principal amount secured by the credit line mortgage is $3,000,000 or more, and the real property being sold or transferred is **not** principally improved nor will it be improved by a one- to six-family owner-occupied residence or dwelling.

   **Please note:** for purposes of determining whether the maximum principal amount secured is $3,000,000 or more as described above, the amounts secured by two or more credit line mortgages may be aggregated under certain circumstances. See TSB-M-96(6)-R for more information regarding these aggregation requirements.

   ☐ Other *(attach detailed explanation)*.

3. ☐ The real property being transferred is presently subject to an outstanding credit line mortgage. However, no tax is due for the following reason:

   ☐ A certificate of discharge of the credit line mortgage is being offered at the time of recording the deed.

   ☐ A check has been drawn payable for transmission to the credit line mortgagee or his agent for the balance due, and a satisfaction of such mortgage will be recorded as soon as it is available.

4. ☐ The real property being transferred is subject to an outstanding credit line mortgage recorded in _____ (insert liber and page or reel or other identification of the mortgage). The maximum principal amount of debt or obligation secured by the mortgage is _____. No exemption from tax is claimed and the tax of _____ is being paid herewith. *(Make check payable to county clerk where deed will be recorded or, if the recording is to take place in New York City but not in Richmond County, make check payable to the **NYC Department of Finance**.)*

## Signature (both the grantor(s) and grantee(s) must sign)

The undersigned certify that the above information contained in schedules A, B, and C, including any return, certification, schedule, or attachment, is to the best of his/her knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to receive a copy for purposes of recording the deed or other instrument effecting the conveyance.

| Grantor signature | Title | Grantee signature | Title |
|---|---|---|---|
| | | Andrew Gugliemi | Attorney |
| | | Andrew Gugliemi | |
| Grantor signature | Title | Grantee signature | Title |
| | | | |

**Reminder:** Did you complete all of the required information in Schedules A, B, and C? Are you required to complete Schedule D? If you checked e, f, or g in Schedule A, did you complete Form TP-584.1? Have you attached your check(s) made payable to the county clerk where recording will take place or, if the recording is in the New York City boroughs of Manhattan, Bronx, Brooklyn, or Queens, to the ***NYC Department of Finance***? If no recording is required, send your check(s), made payable to the ***Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-5045.

## Signature (both the grantor(s) and grantee(s) must sign)

The undersigned certify that the above information contained in schedules A, B, and C, including any return, certification, schedule, or attachment, is to the best of his/her knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to receive a copy for purposes of recording the deed or other instrument effecting the conveyance.

| Grantor signature | Title | Grantee signature | Title |
|---|---|---|---|
| Grantor signature | Title | Grantee signature | Title |

## Schedule D - Certification of exemption from the payment of estimated personal income tax (Tax Law, Article 22, section 663)

**Complete the following only if a fee simple interest or a cooperative unit is being transferred by an individual or estate or trust.**

**If the property is being conveyed by a referee pursuant to a foreclosure proceeding, proceed to Part II, and check the second box under Exemptions for nonresident transferor(s)/seller(s) and sign at bottom.**

**Part I** - New York State residents

If you are a New York State resident transferor(s)/seller(s) listed in Schedule A of Form TP-584 (or an attachment to Form TP-584), you must sign the certification below. If one or more transferors/sellers of the real property or cooperative unit is a resident of New York State, each resident transferor/seller must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all resident transferors/sellers.

### Certification of resident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law, section 663(a) upon the sale or transfer of this real property or cooperative unit.

| | | |
|---|---|---|
| Signature | Print full name DOUG BLINSHTEYN | Date |
| Signature | Print full name | Date |
| Signature | Print full name | Date |
| Signature | Print full name | Date |

**Note:** A resident of New York State may still be required to pay estimated tax under Tax Law, section 685(c), but not as a condition of recording a deed.

**Part II** - Nonresidents of New York State

If you are a nonresident of New York State listed as a transferor/seller in Schedule A of Form TP-584 (or an attachment to Form TP-584) but are not required to pay estimated personal income tax because one of the exemptions below applies under Tax Law, section 663(c), check the box of the appropriate exemption below. If any one of the exemptions below applies to the transferor(s)/seller(s), that transferor(s)/seller(s) is not required to pay estimated personal income tax to New York State under Tax Law, section 663. Each nonresident transferor/seller who qualifies under one of the exemptions below must sign in the space provided. If more space is needed, please photocopy this Schedule D and submit as many schedules as necessary to accommodate all nonresident transferors/sellers.

If none of these exemption statements apply, you must complete Form IT-2663, *Nonresident Real Property Estimated Income Tax Payment Form*, or Form IT-2664, *Nonresident Cooperative Unit Estimated Income Tax Payment Form*. For more information, see *Payment of estimated personal income tax,* on page 1 of Form TP-584-I.

### Exemption for nonresident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) (grantor) of this real property or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law, section 663 due to one of the following exemptions:

☐ The real property or cooperative unit being sold or transferred qualifies in total as the transferor's/seller's principal residence (within the meaning of Internal Revenue Code, section 121) from _____ (Date) to _____ (Date) *(see instructions)*.

☐ The transferor/seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure, or in lieu of foreclosure with no additional consideration.

☐ The transferor or transferee is an agency or authority of the United States of America, an agency or authority of the state of New York, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.

| | | |
|---|---|---|
| Signature | Print full name | Date |
| Signature | Print full name | Date |
| Signature | Print full name | Date |
| Signature | Print full name | Date |

## Certification of resident trans eror(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law, section 663(a) upon the sale or transfer of this real property or cooperative unit.

| Signature | Print full name | Date |
|---|---|---|
| Signature | Print full name | Date |
| Signature | Print full name | Date |
| Signature | Print full name | Date |

## Exemption for nonresident transferor(s)/seller(s)

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor(s)/seller(s) (grantor) of this real property or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law, section 663 due to one of the following exemptions:

☐ The real property or cooperative unit being sold or transferred qualifies in total as the transferor's/seller's principal residence (within the meaning of Internal Revenue Code, section 121) from _____ to _____ *(see instructions)*.
Date Date

☐ The transferor/seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure, or in lieu of foreclosure with no additional consideration.

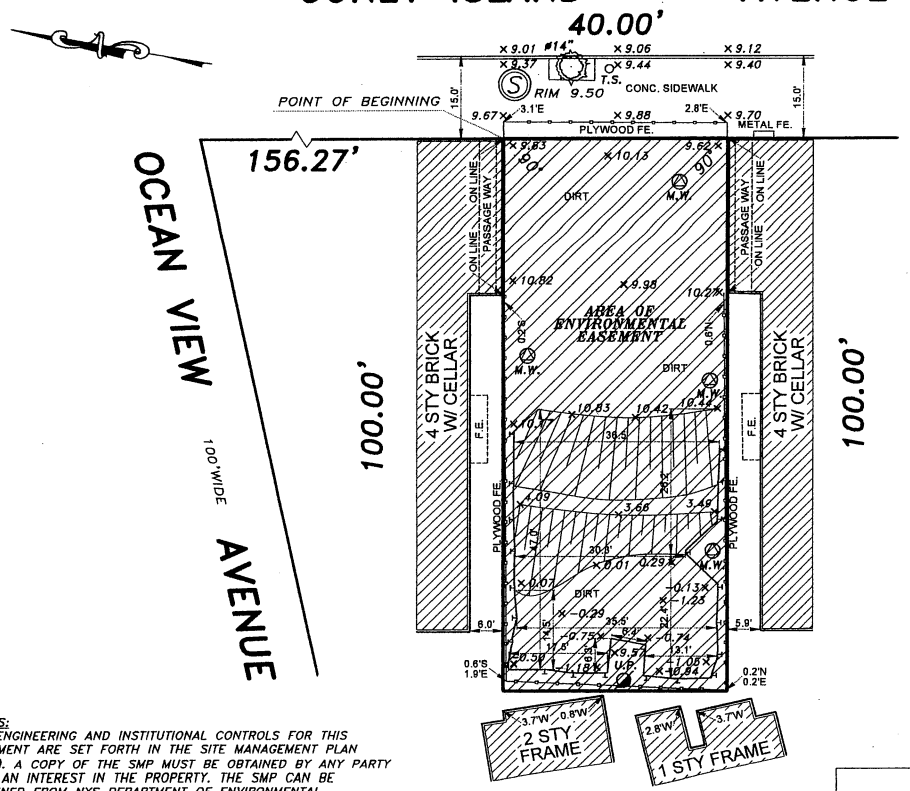
☐ The transferor or transferee is an agency or authority of the United States of America, an agency or authority of the state of New York, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.

| Signature | Print full name | Date |
|---|---|---|
| Signature | Print full name | Date |
| Signature | Print full name | Date |
| Signature | Print full name | Date |

JOB NO.: B 8678-64-ENV

DATE: OCTOBER 6, 2014

ENVIRONMENTAL EASEMENT PLAN




– *ENVIRONMENTAL EASEMENT*

ENVIRONMENTAL EASEMENT
DESCRIPTION/BCP INDEX No. C224157-03-12
"SCHEDULE A"

**All that certain plot, 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 further described as follows:**

**BEGINNING at a point on the westerly side of Coney Island Avenue distant one hundred fifty-six and twenty-seven hundredths feet southerly from the corner formed by the intersection of the westerly side of Coney Island Avenue with the southerly side of Ocean View Avenue;**

**RUNNING THENCE westerly at right angles to Coney Island Avenue, one hundred feet;**

**THENCE southerly parallel with Coney Island Avenue, forty feet;**

**THENCE easterly at right angles to Coney Island Avenue, one hundred feet to the westerly side of Coney Island Avenue;**

**THENCE northerly along the westerly side of Coney Island Avenue, forty feet to the point or place of BEGINNING.**

**Said premises being more commonly known as 3140 Coney Island Avenue, Brooklyn, NY**

SYMBOLS AND ABBREVIATIONS

| | | | |
|---|---|---|---|
| PLATFORM | Pl. or PLTF | MONITORING WELL | M.W. |
| BASEMENT ENTRANCE | B.E. | TRAFFIC LIGHT | T.L. |
| CELLAR ENTRANCE | C.E. | LIGHT | |
| AIR WAY | A.W. | STREET LIGHT | L.P. |
| BAY WINDOW | B.W. | FIRE HYDRANT | HYD. |
| CONCRETE | CONC. | SIAMESE CONNECTION | SPR. |
| OVERHANG | O.H. | CURB AND CURB CUT | CURB CUT |
| AIR CONDITION | AC | OVERHEAD SERVICE | O.H.S.W. |
| METAL | MET. | CABLE TV MANHOLE | CTV |
| NORTH OF PROPERTY LINE | N | MANHOLES | W/P, E, T, W, S; INV. EL. |
| SOUTH OF PROPERTY LINE | S | CATCH BASIN | C.B. |
| EAST OF PROPERTY LINE | E | EXISTING ELEVATIONS | × 45.12 TOP OF CURB; × 42.87 BOTTOM OF CURB; × 45.78 |
| WEST OF PROPERTY LINE | W | CITY ESTABLISHED GRADES | EG. 7.52 |
| ROOF OVER | R.O | SHUT OFF VALVE | G.V.; W.V. |
| FIRE ESCAPE | F.E. | HANDICAPPED PARKING | |
| UTILITY POLE | U.P. | EXISTING TREE | #12" |
| PARKING METER | P.M. | DRAINS | D.R. |
| OIL FILL | O.F. | FENCE | CH.L.-FE.; WOOD FE. |

*NOTES:*
*THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT derweb@gw.dec.state.ny.us.*

*ALL ELEVATIONS SHOWN REFER TO THE BROOKLYN DATUM WHICH IS 2.560 FEET ABOVE MEAN SEA LEVEL AT SANDY HOOK AS ESTABLISHED THE U.S. COAST AND GEODETIC SURVEY.*

GRAPHIC SCALE

ALL WRITTEN MEASUREMENTS AND OFFSETS NOTED ON THIS SURVEY SUPERSEDE MEASUREMENTS SCALED OF THIS PLOT.

SCALE 1:20

0 5 10 15 20 25 30 35 40 45 50 100

## ENVIRONMENTAL EASEMENT PLAN

## 3140 CONEY ISLAND AVENUE, BROOKLYN, KINGS CO., NY,


**PERFECT POINT**
LAND SURVEYING RT
brooklyn - queens - manhattan - bronx
staten island - nassau
phone: (718) 474-7700
fax: (718) 872-9699
info@ppsurveying.com
www.ppsurveying.com


N.Y.S. L.L.S. 049944

SEC. ..... BLOCK 8678 LOT 64

GUARANTEED TO: New York City Department of Environmental Conservation

TITLE NO. .....


UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW. COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYOR'S INKED SEAL OR EMBOSSED SEAL SHALL NOT BE CONSIDERED TO BE A VALID COPY. GUARANTEES OR CERTIFICATIONS INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED AND ON HIS BEHALF TO THE TITLE COMPANY, GOVERNMENTAL AGENCY AND LENDING INSTITUTION LISTED HEREON, AND TO THE ASSIGNEES OF THE LENDING INSTITUTION. GUARANTEES OR CERTIFICATIONS ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.

# AFFIDAVIT OF COMPLIANCE WITH SMOKE DETECTOR REQUIREMENT FOR ONE- AND TWO-FAMILY DWELLINGS

**State of New York** )
) SS.:
**County of** )

The undersigned, being duly sworn, depose and say under penalty of perjury that they are the grantor and grantee of the real property or of the cooperative shares in a cooperative corporation owning real property located at

3140 CONEY ISLAND AVENUE , ,
**Street Address** **Unit/Apt.**

BROOKLYN New York, 8678 64 (the "Premises");
**Borough** **Block** **Lot**

That the Premises is a one or two family dwelling, or a cooperative apartment or condominium unit in a one- or two-family dwelling, and that installed in the Premises is an approved and operational smoke detecting device in compliance with the provisions of Article 6 of Subchapter 17 of Chapter 1 of Title 27 of the Administrative Code of the City of New York concerning smoke detecting devices;

That they make affidavit in compliance with New York City Administrative Code Section 11-2105 (g). (The signatures of at least one grantor and one grantee are required, and must be notarized).

Oleg Blinshteyn
Name of Grantor (Type or Print)

Signature of Grantor

Sworn to before me
this 8 date of August 20 15

GEORGE C.D. DUKE
Notary Public, State of New York
Qual. in New York Co. No. 02DU6104497
Commission Expires May 7, 2016

Andrew Guglielmi, Esq.
Name of Grantee (Type or Print)

Signature of Grantee

Sworn to before me
this 11th date of August 20 15

PATRICK EUGENE FOSTER
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN KINGS COUNTY
NO. 02FO6278032
COMMISSION EXPIRES 03/18/2017

These statements are made with the knowledge that a willfully false representation is unlawful and is punishable as a crime of perjury under Article 210 of the Penal Law.

**NEW YORK CITY REAL PROPERTY TRANSFER TAX RETURNS FILED ON OR AFTER FEBRUARY 6th, 1990, WITH RESPECT TO THE CONVEYANCE OF A ONE- OR TWO-FAMILY DWELLING, OR A COOPERATIVE APARTMENT OR A CONDOMINIUM UNIT IN A ONE- OR TWO-FAMILY DWELLING, WILL NOT BE ACCEPTED FOR FILING UNLESS ACCOMPANIED BY THIS AFFIDAVIT.**

The City of New York
Department of Environmental Protection
Bureau of Customer Services
59-17 Junction Boulevard
Flushing, NY 11373-5108

# Customer Registration Form for Water and Sewer Billing

## Property and Owner Information:

(1) **Property receiving service: BOROUGH: BROOKLYN** **BLOCK: 8678** **LOT: 64**

(2) **Property Address: 3140 CONEY ISLAND AVENUE, BROOKLYN, NY 11235**

(3) **Owner's Name:** **THE PEOPLE OF THE STATE OF NEW YORK**

**Additional Name:**

## Affirmation:

☑ Your water & sewer bills will be sent to the property address shown above.

## Customer Billing Information:

### Please Note:

**A.** Water and sewer charges are the legal responsibility of the owner of a property receiving water and/or sewer service. The owner's responsibility to pay such charges is not affected by any lease, license or other arrangement, or any assignment of responsibility for payment of such charges. Water and sewer charges constitute a lien on the property until paid. In addition to legal action against the owner, a failure to pay such charges when due may result in foreclosure of the lien by the City of New York, the property being placed in a lien sale by the City or Service Termination.

**B.** Original bills for water and/or sewer service will be mailed to the owner, **at the property address or to an alternate mailing address**. DEP will provide a duplicate copy of bills to one other party (such as a managing agent), however, any failure or delay by DEP in providing duplicate copies of bills shall in no way relieve the owner from his/her liability to pay all outstanding water and sewer charges. Contact DEP at (718) 595-7000 during business hours or visit www.nyc.gov/dep to provide us with the other party's information.

## Owner's Approval:

The undersigned certifies that he/she/it is the owner of the property receiving service referenced above; that he/she/it has read and understands Paragraphs A & B under the section captioned "Customer Billing Information"; and that the information supplied by the undersigned on this form is true and complete to the best of his/her/its knowledge.

Print Name of Owner:

Signature: _____ Date (mm/dd/yyyy)

Name and Title of Person Signing for Owner, if applicable:

The City of New York
Department of Environmental Protection
Bureau of Customer Services
59-17 Junction Boulevard
Flushing, NY 11373-5108

# Customer Registration Form for Water and Sewer Billing

## Property and Owner Information:

(1) **Property receiving service: BOROUGH: BROOKLYN** **BLOCK: 8678** **LOT: 64**

(2) **Property Address: 3140 CONEY ISLAND AVENUE, BROOKLYN, NY 11235**

(3) **Owner's Name:** **PEOPLE OF THE STATE OF NEW YORK**

**Additional Name:**

## Affirmation:

☑ Your water & sewer bills will be sent to the property address shown above.

## Customer Billing Information:

### Please Note:

A. Water and sewer charges are the legal responsibility of the owner of a property receiving water and/or sewer service. The owner's responsibility to pay such charges is not affected by any lease, license or other arrangement, or any assignment of responsibility for payment of such charges. Water and sewer charges constitute a lien on the property until paid. In addition to legal action against the owner, a failure to pay such charges when due may result in foreclosure of the lien by the City of New York, the property being placed in a lien sale by the City or Service Termination.

B. Original bills for water and/or sewer service will be mailed to the owner, **at the property address or to an alternate mailing address**. DEP will provide a duplicate copy of bills to one other party (such as a managing agent), however, any failure or delay by DEP in providing duplicate copies of bills shall in no way relieve the owner from his/her liability to pay all outstanding water and sewer charges. Contact DEP at (718) 595-7000 during business hours or visit www.nyc.gov/dep to provide us with the other party's information.

## Owner's Approval:

The undersigned certifies that he/she/it is the owner of the property receiving service referenced above; that he/she/it has read and understands Paragraphs A & B under the section captioned "Customer Billing Information"; and that the information supplied by the undersigned on this form is true and complete to the best of his/her/its knowledge.

Print Name of Owner: OLEG BLINSHTEYN

Signature: _____ Date (mm/dd/yyyy)

Name and Title of Person Signing for Owner, if applicable:

BCS-7CRF-ACRIS REV. 8/08



2015072900303101

Department of Housing Preservation & Development
nyc.gov/hpd

THE CITY OF NEW YORK
DEPARTMENT OF HOUSING PRESERVATION AND DEVELOPMENT

AFFIDAVIT IN LIEU OF REGISTRATION STATEMENT

County of Albany ) SS.:

State of New York )

PEOPLE OF THE STATE OF NEW YORK, being duly sworn, deposes and says:

1) I am personally familiar with the real property known by the street address of (insert street address): 3140 CONEY ISLAND AVENUE Block 8678, Lot 64, and make this Affidavit as (describe capacity in which affidavit is made) GRANTEE in connection with a ~~deed/lease/memorandum of lease~~ (delete inapplicable description) which transfers an interest in the above real property, that is dated 8/5/2015, and is between 3140 CONEY ISLAND REALTY, LLC and PEOPLE OF THE STATE OF NEW YORK.

2) The statements made in the Affidavit are true of my own knowledge, and I submit this Affidavit in order that this Instrument be accepted for recording without being accompanied by a registration statement, as such is defined by Article 2 of Subchapter 4 of Chapter 2 of Title 27 of the Administrative Code of the City of New York.

3) Exemption from registration is claimed because the Instrument affects neither (a) an entire multiple dwelling as such is defined by §27-2004(a)(7) of Article 1 of Subchapter 1, of Chapter 2 of Title 27 of the Administrative Code of the City of New York and New York State Multiple Dwelling Law §4(7) nor (b) a private dwelling as such is defined by §27-2004 (a) (4) of Article 1 of Subchapter 1 of Chapter 2 of Title 27 of the Administrative Code of the City of New York and of the New York State Multiple Dwelling Law §4(6) that is required to register pursuant to, Article 2 of Subchapter 4 of Chapter 2 of Title 27 of the Administrative Code of the City of New York. The Instrument does not affect a multiple dwelling because it affects the following (check applicable item):

- ☑ a commercial building
- ☐ a one-or two family dwelling whose owner or a family member resides in the dwelling
- ☐ a condominium unit in a multiple dwelling
- ☐ cooperative corporation shares relating to a single residential unit in a multiple dwelling
- ☐ mineral, gas, water, air or other similar rights not affecting a multiple dwelling
- ☐ lease of commercial space in a multiple dwelling
- ☐ vacant land

4) I am aware that this Affidavit is required by law to be submitted in order that the Instrument be recorded or accepted for recording without being accompanied by a registration statement. I am aware that any false statements made in this Affidavit may be punishable as a felony or misdemeanor under Penal Law Article 210 or as an offense under Administrative Code of the City of New York §10-154.

Andrew Guglielmi

Sworn To Before Me This

18 Day of August, 2015

Notary Public

Signature

Andrew Guglielmi, Esq.

Address OFFICE OF THE GENERAL COUNSEL NYSDEC 6

Telephone # 999-999-9999

PATRICK EUGENE FOSTER
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN KINGS COUNTY
NO. 02FO6278032
COMMISSION EXPIRES 03/18/2017

Printed on paper containing 30% post-consumer material.

2015072900303101

# SMP – Appendix B

# NARROWS ABSTRACT, INC.

Agent for

*Fidelity National Title Insurance Company*

## SCHEDULE A DESCRIPTION

All that certain plot, 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 further described as follows:

BEGINNING at a point on the westerly side of Coney Island Avenue distant one hundred fifty -six and twenty- seven hundredths feet southerly from the corner formed by the intersection of the westerly side of Coney Island Avenue with the southerly side of Ocean View Avenue;

RUNNING THENCE westerly at right angles to Coney Island Avenue, one hundred feet;

THENCE southerly parallel with Coney Island Avenue, forty feet;

THENCE easterly at right angles to Coney Island Avenue, one hundred feet to the westerly side of Coney Island Avenue; and

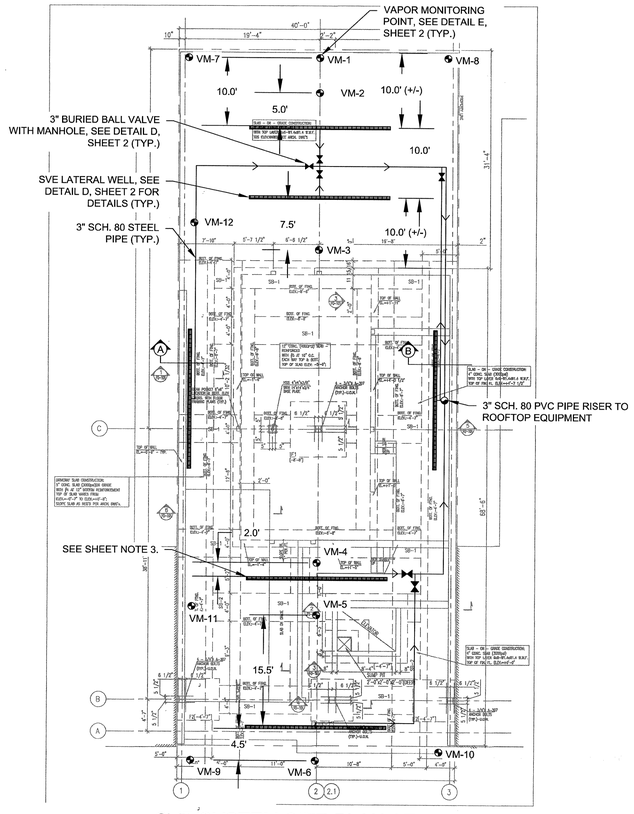
THENCE northerly along the westerly side of Coney Island Avenue, forty feet to the point or place of BEGINNING.

Said premises being more commonly known as 3140 Coney Island Avenue, Brooklyn, NY

*For Conveyancing Only*
*Together with all rights title and interest of, in, and to any streets and roads abutting the above-described premises.*

Title Number: NA 09 3528 K

# SMP – Appendix C




## SVE SYSTEM SITE PLAN AT GROUND LEVEL

0 10 20

SCALE: 1" = 10'

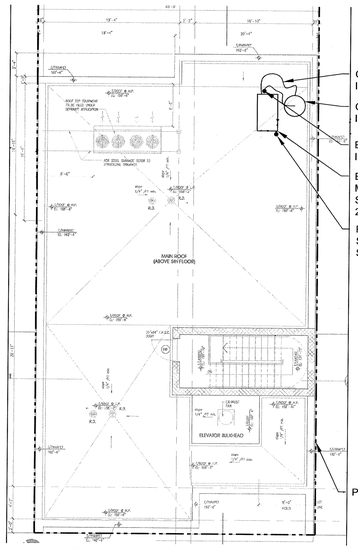
NOTES:

1. ALL LATERAL SVE PIPING 3" SCH. 80 STEEL PIPE AND FITTINGS, UNLESS OTHERWISE NOTED.
2. ALL PIPING AND SVE SCREEN INSTALLATION COORDINATED WITH FOUNDATION INSTALLATION CONTRACTOR.
3. WHERE SVE LATERAL EXTENDS THROUGH FOOTING WALL, 6" SLEEVE THROUGH PENETRATION AS PER STRUCTURAL DESIGN REQUIREMENTS FOR PENETRATIONS.
4. FOUNDATION PLAN REFERENCED. SHEET F0-100, LEONID KRUPNIK, STRUCTURAL ENGINEER, DATED 4/10/10.

LEGEND

- VM-1 — VAPOR MONITORING POINT (SEE DETAIL E ON SHEET 2)
- 3" BURIED BALL VALVE WITH MANHOLE (SEE DETAIL D ON SHEET 2)
- SVE LATERAL WELL (SEE DETAIL D ON SHEET 2)
- > FLOW DIRECTION

NOTE:
ARCHITECTURAL DRAWINGS FROM
EUGENE KHANANOV, AIA, OCTOBER 20, 2011



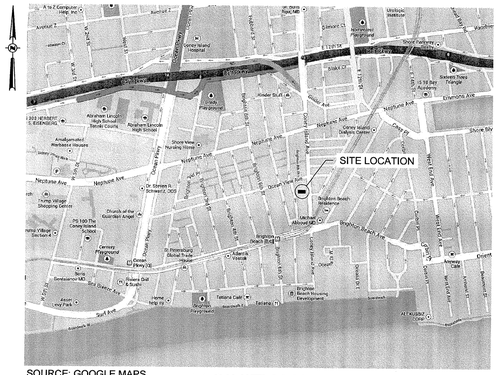

## PARTIAL ROOF PLAN

0 10 20

SCALE: 1" = 10'

NOTES:

1. ROOFTOP EQUIPMENT LOCATED AS CLOSE AS POSSIBLE TO ROOF PENETRATION TO MINIMIZE PIPE RUNS.
2. FINAL EXHAUST STACK LOCATION MIN. 10' AWAY FROM ANY BUILDING OPENING INCLUDING WINDOWS, LOUVERS, DOORS, HVAC AIR INTAKES, ETC. AND 8' ABOVE WALKING SURFACE ON ROOF.

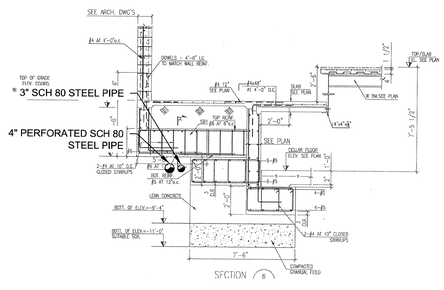



SOURCE: GOOGLE MAPS

## VICINITY MAP

0 1000 2000

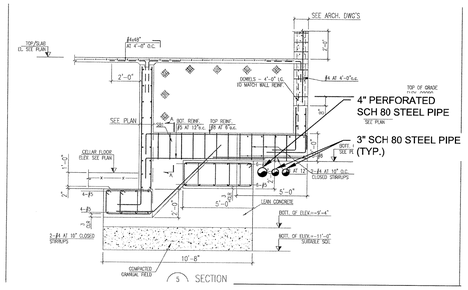
SCALE: 1" = 1000'




## SECTION A

0 5 10

SCALE: 1" = 5'




## SECTION B

0 5 10

SCALE: 1" = 5'

NOTES:

1. 4" SCHEDULE 80 STEEL PIPE PERFORATIONS: HOLE SIZE = 3/8" , 3" CENTER TO CENTER SPACING, TWO ROWS OF HOLES AT 90 DEGREES.
2. 4" MINIMUM CLEARANCE BETWEEN PIPES AND FOOTINGS.


**PWGC**

Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

630 Johnson Avenue, Suite 7
Bohemia, NY 11716-2618
Phone: (631) 589-6353 Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM


CONSULTANTS

AS-BUILTS
11-18-15

| Number | Revision Description | Revision Date |
|---|---|---|
| 7 | | |
| 6 | | |
| 5 | CONSTRUCTION AS-BUILT DOCUMENTS | NOVEMBER 16, 2015 |
| 4 | CONSTRUCTION DOCUMENTS R1 | MARCH 25, 2014 |
| 3 | CONSTRUCTION DOCUMENTS | FEBRUARY 11, 2014 |
| 2 | REGULATORY REVIEW, REVISED | JANUARY 28, 2014 |
| 1 | REGULATORY REVIEW | NOVEMBER 13, 2013 |

| | |
|---|---|
| Designed By: AES/DH | Date Submitted: FEBRUARY 11, 2014 |
| Drawn By: AES | Date Created: OCTOBER 18, 2013 |
| Approved By: PKB | Scale: AS SHOWN |

Client:
**3140 CONEY ISLAND LLC**
**3061 BRIGHTON 6TH STREET**
**BROOKLYN, NEW YORK 11235**

Project:
# REMEDIAL MEASURES

Project Address:
**3140 CONEY ISLAND AVENUE**
**BRIGHTON BEACH**
**BROOKLYN, NY**

County Tax Map Number: | Contract Number:

Regulatory Reference Number:

Title of Drawing:

**SITE PLANS**

Drawing Number:

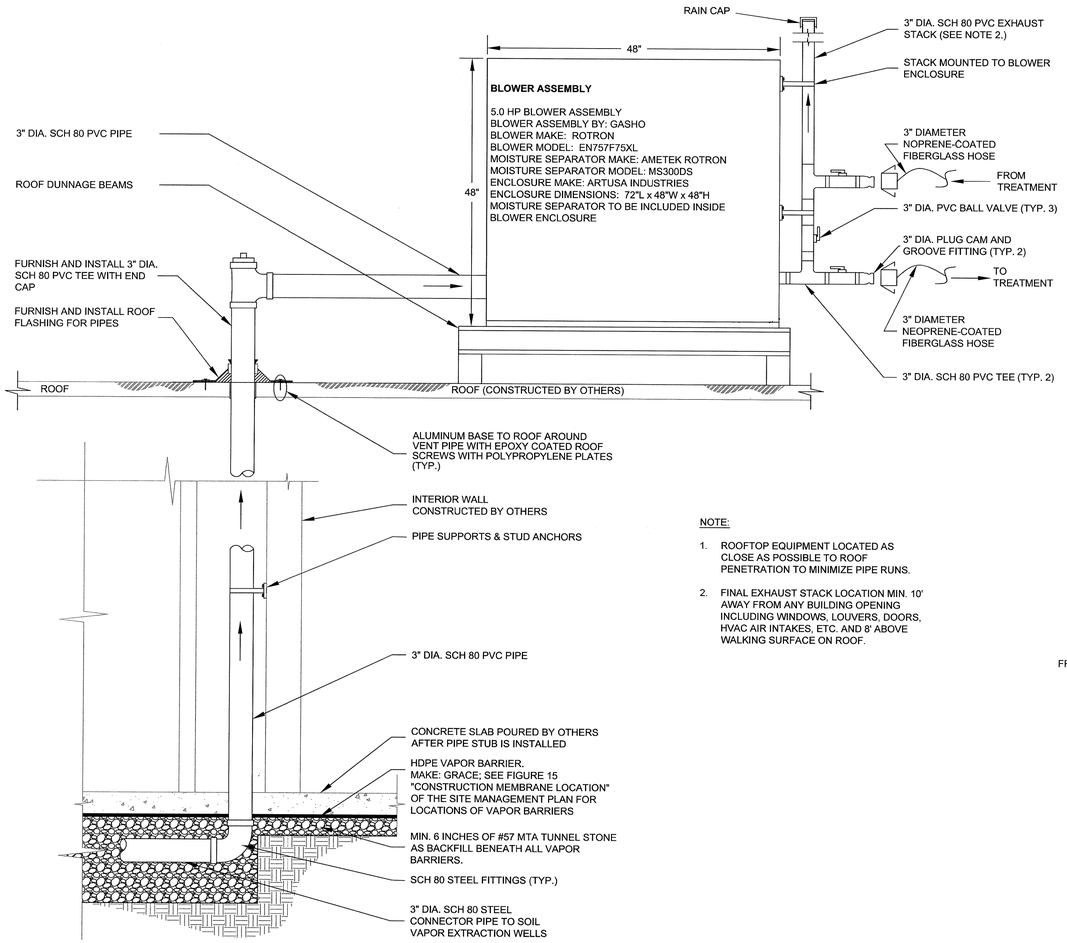
Sheet 1 of 3

PWGC Project Number: CIR1201

STATE OF NEW YORK — KENNETH P. KOCH — 074604 — LICENSED PROFESSIONAL ENGINEER

Unauthorized alteration or addition to this drawing and related documents is a violation of Section 7209 of the New York State Education Law

PWGC FILE NAME: C:\Users\work\Applications\Bluebeam\AutoPublish_BSM\Coney Island Remediation System_full-Build.dwg (Site Plans)
PLOT DATE/TIME: Mon, 16 Nov 2015 10:44:39 -05:00

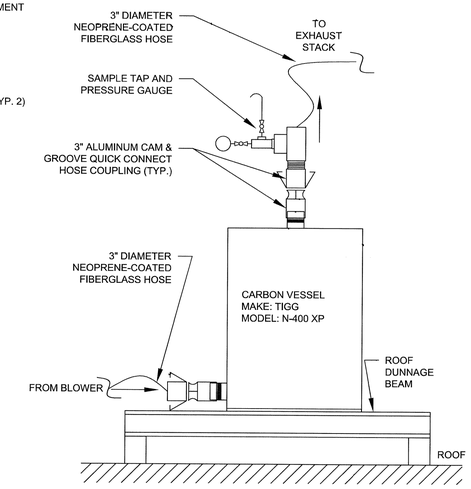



NOTE:

1. ROOFTOP EQUIPMENT LOCATED AS CLOSE AS POSSIBLE TO ROOF PENETRATION TO MINIMIZE PIPE RUNS.
2. FINAL EXHAUST STACK LOCATION MIN. 10' AWAY FROM ANY BUILDING OPENING INCLUDING WINDOWS, LOUVERS, DOORS, HVAC AIR INTAKES, ETC. AND 8' ABOVE WALKING SURFACE ON ROOF.

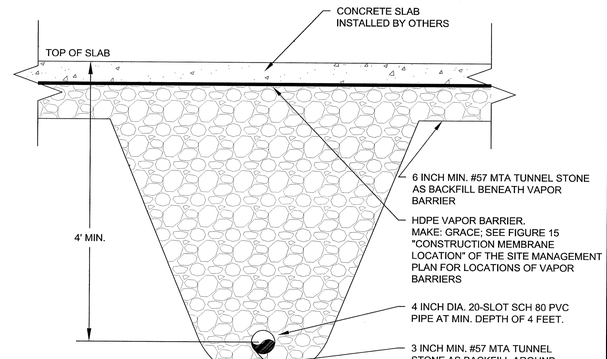
## DETAIL A: CONNECTOR PIPING AND ROOFTOP EQUIPMENT

NOT TO SCALE



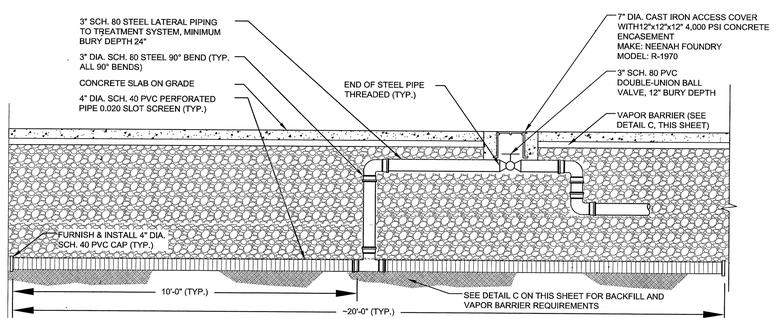

## DETAIL B: CARBON VESSEL

NOT TO SCALE



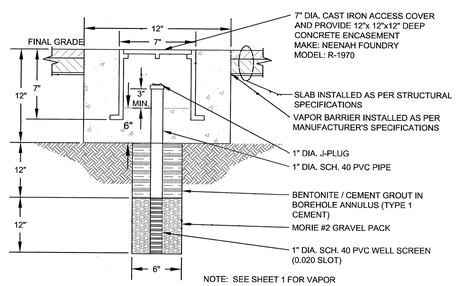

## DETAIL C: SOIL VAPOR EXTRACTION TRENCH AWAY FROM FOUNDATION

NOT TO SCALE




## DETAIL D: SVE LATERAL WELLS AND PIPING

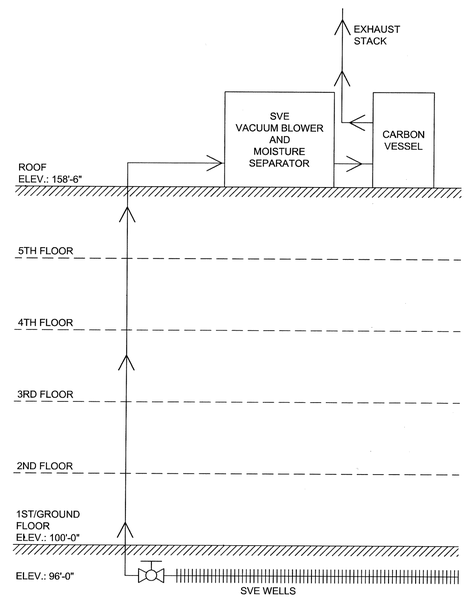
NOT TO SCALE




NOTE: SEE SHEET 1 FOR VAPOR MONITORING POINT LOCATIONS.

## DETAIL E: VACUUM MONITORING POINT

NOT TO SCALE




NOTES:

1. ALL CONNECTOR PIPE IS 3" DIA. SCH 80 STEEL.
2. SVE WELLS ARE 4" DIA. SCH 80 PVC 20-SLOT PIPE, EXCEPT UNDER FOOTINGS (SEE, SECTION A, SHEET 1 OF 3)
3. ARBITRARY ELEVATION DATUM BASED ON FINISHED

## PROCESS FLOW DIAGRAM

NOT TO SCALE

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

CONSULTANTS

AS-BUILTS
11-18-15

| Number | Revision Description | Revision Date |
|---|---|---|
| 7 | | |
| 6 | | |
| 5 | | |
| 4 | CONSTRUCTION AS-BUILT DOCUMENTS | NOVEMBER 16, 2015 |
| 3 | CONSTRUCTION DOCUMENTS | FEBRUARY 11, 2014 |
| 2 | REGULATORY REVIEW, REVISED | JANUARY 28, 2014 |
| 1 | REGULATORY REVIEW | NOVEMBER 13, 2013 |

Designed By: AES/DH
Drawn By: AES
Approved By: PKB
Date Submitted: FEBRUARY 11, 2014
Date Created: OCTOBER 18, 2013
Scale: AS SHOWN

Client:
**3140 CONEY ISLAND LLC**
**3061 BRIGHTON 6TH STREET**
**BROOKLYN, NEW YORK 11235**

Project:
# REMEDIAL MEASURES

Project Address:
**3140 CONEY ISLAND AVENUE**
**BRIGHTON BEACH**
**BROOKLYN, NY**

County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:

**DETAILS**
**AND**
**PROCESS FLOW DIAGRAM**

Drawing Number:

Sheet 2 of 3

PWGC Project Number: **CIR1201**

STATE OF NEW YORK · PAUL KENNETH KOCH · 071460A · LICENSED PROFESSIONAL ENGINEER

Unauthorized alteration or addition to this drawing and related documents is a violation of Section 7209 of the New York State Education Law

PWGC FILE NAME: C:\Users\aes\Desktop\Coney\Coney\Coney_3140\Coney Island Remediation System As-Built\As-Built Drawings\CIR1201 PLOT DATE/TIME: Nov 18, 2015 4:15pm By: aesdesk

## LEGEND

| VALVES AND PIPING | NO | NC |
|---|---|---|
| BALL VALVE | | |
| SAMPLE PORT | | |
| PRESSURE RELIEF VALVE | | |
| VACUUM RELIEF VALVE | | |
| CAMLOCK CONNECTION | C | |
| UNION | | |
| PARTICULATE FILTER | | |
| CARBON VESSEL | | |
| MOISTURE SEPARATOR | | |

**INSTRUMENT IDENTIFICATION**

INDICATING INSTRUMENT (LOCAL)

ALARM

EXAMPLE: SETPOINT OF INSTRUMENT; INSTRUMENT DESIGNATION (PRESSURE SWITCH); INSTRUMENT TYPE; SYSTEM POSITION NUMBER

**EQUIPMENT**

CENTRIFUGAL, REGENERATIVE BLOWER

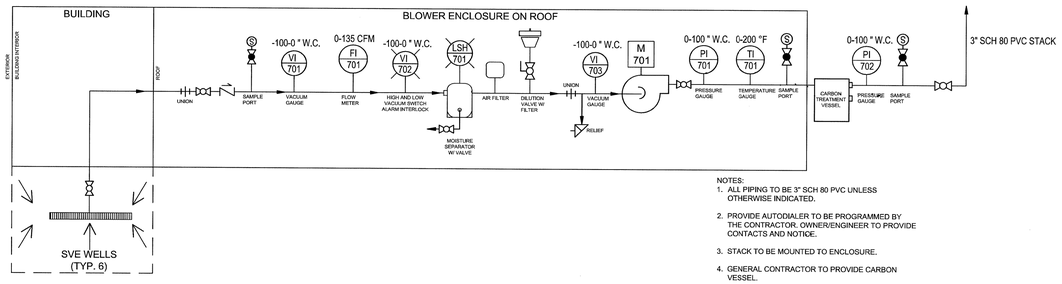
**EQUIPMENT ABBREVIATIONS**

FI - FLOW INDICATOR
M - MOTOR
PI - PRESSURE INDICATOR
TI - TEMPERATURE INDICATOR
VA - VACUUM ALARM

**SYSTEM POSITION DESIGNATION**

700 - SOIL VAPOR EXTRACTION

PROPOSED




NOTES:
1. ALL PIPING TO BE 3" SCH 80 PVC UNLESS OTHERWISE INDICATED.
2. PROVIDE AUTODIALER TO BE PROGRAMMED BY THE CONTRACTOR, OWNER/ENGINEER TO PROVIDE CONTACTS AND NOTICE.
3. STACK TO BE MOUNTED TO ENCLOSURE.
4. GENERAL CONTRACTOR TO PROVIDE CARBON VESSEL.

## ALARM INTERLOCK TABLE

| ALARM INTERLOCK | P & ID DESCRIPTION | ALARM DESCRIPTION | SYSTEM RESPONSE | NOTES |
|---|---|---|---|---|
| 1 | LSH-701 | MOISTURE SEPARATOR HIGH | CRITICAL ALARM SYSTEM SHUT DOWN | |
| 2 | VI-702 | VACUUM LOW | CRITICAL ALARM SYSTEM SHUT DOWN | |
| 3 | VI-702 | VACUUM HIGH | CRITICAL ALARM SYSTEM SHUT DOWN | |

## PROCESS & INSTRUMENTATION DIAGRAM

NOT TO SCALE

### GENERAL NOTES:

1. BEFORE START OF WORK THE CONTRACTOR SHALL FURNISH CERTIFICATES OF INSURANCE TO COMPLY WITH THE OWNER'S REQUIREMENTS. CERTIFICATES WILL INDICATE THE AMOUNTS DESIGNATED ON THE APPLICATION AND WORKERS' COMPENSATION NUMBER.
2. NO WORK TO START UNTIL CLEARANCE IS RECEIVED FROM THE OWNER AND ENGINEER.
3. CONTRACTOR SHALL NOTIFY THE ENGINEER'S OFFICE 48 HOURS PRIOR TO THE START OF WORK.
4. THE CONTRACTOR MUST CHECK JOB SITE AND VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO SUBMITTING HIS PROPOSAL AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES FOUND. THE CONTRACTOR SHALL ESTABLISH THE EXACT LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE ANY EXCAVATION WITH THE LOCATION OF EXISTING UTILITIES.
5. ALL WORK SHALL COMPLY WITH THE 2008 N.Y.C. FIRE CODE, N.Y.C. BUILDING CODE, NYSDEC, E.P.A., N.Y.C. ELECTRIC CODE, N.Y.S. FIRE PREVENTION CODE, NATIONAL ELECTRIC CODE, NATIONAL FIRE PROTECTION ASSOCIATION, U.L., AND ALL GOVERNING AGENCIES HAVING JURISDICTION.
6. THE EXISTENCE AND LOCATION OF AERIAL, SURFACE, OR SUBSURFACE UTILITIES IS NOT SHOWN ON THESE PLANS. PRIOR TO ANY DEMOLITION, EXCAVATION, OR SOIL BORINGS, CONTACT THE NYS ONE CALL NUMBER (800) 272-4480 SO THAT UTILITIES CAN BE MARKED OUT.
7. ALL ELECTRIC WORK IS TO BE PERFORMED BY A LICENSED ELECTRICIAN.
8. THE CONTRACTOR SHALL REPAIR ANY DAMAGED SURFACES OR MATERIALS IN THE PERFORMANCE OF THIS CONTRACT.
9. CONTRACTOR TO FURNISH TO OWNER REPRODUCIBLE AS-BUILT DRAWINGS OF ALL COMPLETED WORK.
10. ALL MATERIALS TO BE REMOVED ARE TO BE LEGALLY DISPOSED OF, OFF SITE, EACH DAY EXCEPT WHERE OTHERWISE NOTED. EXTREME CARE IS TO BE TAKEN TO AVOID SPILLAGE OF DEBRIS.
11. THIS WORK IS TO BE PERFORMED TO PROTECT ADJOINING AREAS, EQUIPMENT, AND OCCUPANTS FROM DAMAGE AND HARM, AND TO PRODUCE MINIMUM DISTURBANCE TO SITE OPERATIONS. PROVIDE ALL PROTECTIVE METHODS AND SCHEDULE WORK WITH OWNER.
12. ANY CONSTRUCTION TO BE LEFT IN PLACE THAT IS WEAKENED OR DAMAGED SHALL BE RESTORED TO THE CONDITION WHICH EXISTED PRIOR TO SUCH DAMAGE.
13. CONSTRUCTION THAT IS TO BE REPLACED AFTER REMOVAL WORK SHALL BE REPLACED WITH CONSTRUCTION OF EQUAL STRENGTH AND DESIGN.
14. CONTRACTOR SHALL EMPLOY A PRIVATE UNDERGROUND UTILITY LOCATING COMPANY TO PERFORM UNDERGROUND UTILITY MARKOUTS. UTILITIES SHALL BE MARKED OUT WITH PAINT ON GROUND SURFACE, THEN SKETCHED AND DIMENSIONED TO SCALE. COPIES OF UTILITY SKETCHES SHALL BE PROVIDED TO THE ENGINEER OF RECORD.
15. SUBGRADE PIPING, CONCRETE, AND MASONRY ARE SUBJECT TO CONTROLLED INSPECTIONS.
16. ALL INSPECTIONS AND COMPACTION AND CONCRETE TESTING SHALL BE MADE BY AN APPROVED LABORATORY UNDER CONTRACT TO THE CONTRACTOR.
17. ONE COPY OF TESTING REPORTS AND CONTROLLED INSPECTION REPORTS SHALL BE SENT TO THE ENGINEER.
18. IT SHALL BE ASSUMED THAT THE EXISTING UTILITIES IN AND ADJACENT TO THE CONSTRUCTION WORK ARE IN WORKING ORDER. IN THE EVENT OF UTILITY BREAKDOWNS IN THE AREA, THE CONTRACTOR SHALL MAKE IMMEDIATE REPAIRS WITHOUT COST TO THE OWNER.
19. ALL FIELD WORK SHOULD PROCEED ONLY AFTER EACH UTILITY THAT IS SHOWN ON THE CONTRACT DRAWINGS IS CLEARLY MARKED IN THE FIELD. THEN WORK IS TO PROCEED WITH CONTROLLED EXCAVATION (WITH HAND DIGGING TO EXPOSE KNOWN UTILITIES) UNTIL THE AREA HAS BEEN OPENED SUFFICIENTLY TO UTILIZE MASS OR MECHANICAL EXCAVATION.
20. SHORING IS REQUIRED IF ANY EXCAVATION IS GREATER THAN 5 FT. DEEP AND SAFE SLOPE OF SIDE WALLS IS NOT POSSIBLE, OR IF REQUIRED BY SOIL CONDITIONS.
21. CONSTRUCTION BARRICADES SHALL BE REQUIRED ALL AROUND OPEN EXCAVATIONS.
22. SITE PLAN IS BASED UPON DRAWINGS PROVIDED BY OWNER. INFORMATION ON THIS PLAN IS APPROXIMATE AND IS TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION, ALONG WITH UTILITY LOCATIONS, AS PER THESE GENERAL NOTES. THE BUILDING IS NOT YET CONSTRUCTED AND SO THE DETAILS OF THE BUILDING ARE SUBJECT TO CHANGE. THE LOCATION OF ALL SVE WELLS, PIPING, AND EQUIPMENT ARE SUBJECT TO CHANGE FROM THESE PLANS.
23. THIS SITE IS A KNOWN SPILL SITE. NO WATER GENERATED AS PART OF, OR RESULTING FROM, THIS PROJECT SHALL BE DISCHARGED TO ANY CATCH BASIN WITHOUT DEMONSTRATED COMPLIANCE. NO DISCHARGE IS AUTHORIZED WITHOUT WRITTEN APPROVAL FROM NYCDEP.
24. FURNISH AND INSTALL PRIVACY SCREEN ON EXISTING CHAIN-LINK FENCE THROUGHOUT THE PERIOD OF CONSTRUCTION.

### EXCAVATION NOTES:

1. AREA OF DISTURBANCE SHALL BE MINIMIZED TO ALLOW FOR CONTRACTOR STAGING. CONTRACTOR TO COORDINATE ACCESS AND STAGING AREA WITH OWNER.
2. EXISTING UTILITIES SHALL NOT BE UNDERMINED. CONTRACTOR SHALL MAINTAIN EXISTING UTILITIES DURING THE WORK.
3. THE CONTRACTOR SHALL PROVIDE STORMWATER CONTROLS TO MINIMIZE STANDING WATER IN WORK AREA. CONTRACTOR SHALL PREVENT SOIL FROM LEAVING THE WORK AREA.
4. OPEN EXCAVATIONS SHOULD BE BACKFILLED, COVERED WITH ROAD GRADE STEEL PLATES, OR SURROUNDED BY TEMPORARY SECURITY FENCES WHEN CONTRACTOR IS NOT ON SITE.
5. CONTRACTOR SHALL LEGALLY DISPOSE OF ALL CONTAMINATED SOILS AS PER APPLICABLE FEDERAL, STATE, AND LOCAL LAWS.

### BACKFILL NOTES:

1. PROVIDE BORROW SOIL MATERIALS TO REPLACE SOIL MATERIALS REMOVED FROM EXCAVATIONS, UNLESS OTHERWISE INDICATED. CONTRACTOR TO PROVIDE CERTIFICATIONS FROM SOURCE OF BORROW FILL.
2. SATISFACTORY SOILS: SOILS FREE FROM ROCK OR GRAVEL LARGER THAN 3 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER.
   2.1. ONLY #57 MTA TUNNEL STONE SHALL BE USED AS BACKFILL BENEATH VAPOR BARRIERS AND AROUND SOIL VAPOR EXTRACTION WELLS.
3. UNSATISFACTORY SOILS INCLUDE SOILS NOT MAINTAINED WITHIN 2 PERCENT OF OPTIMUM MOISTURE CONTENT AT THE TIME OF COMPACTION AND AS NOTED IN 2.
4. CONTRACTOR SHALL PROVIDE ENGINEER AND OWNER ALL WEIGHT TICKETS, BILLS OF LADING AND DISPOSAL MANIFEST FOR ALL MATERIAL TAKEN OFF SITE.
5. THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL DEMOLITION AND CONSTRUCTION MATERIAL OFF-SITE. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR THE DISPOSAL OF THE MATERIAL AND BEAR ALL COSTS OR RETAIN ANY PROFIT INCIDENTAL TO SUCH DISPOSAL.

### COMPACTION OF BACKFILLS AND FILLS:

1. PLACE BACKFILL AND FILL MATERIALS IN LAYERS NOT MORE THAN 8 INCHES IN LOOSE DEPTH. COMPACT ALL MATERIAL BY MECHANICAL COMPACTION EQUIPMENT WHERE PRACTICAL.
2. PLACE BACKFILL AND FILL MATERIALS EVENLY ON ALL SIDES OF THE EXCAVATION TO REQUIRED ELEVATIONS, AND UNIFORMLY ALONG THE FULL LENGTH OF THE EXCAVATION.
3. COMPACT SOIL TO NOT LESS THAN 95% OF MAXIMUM DRY DENSITY ACCORDING TO ASTM D 1557 698.
4. THE CONTRACTOR SHALL EMPLOY AN INDEPENDENT TESTING LABORATORY TO CONFIRM COMPACTION AT APPROXIMATELY EVERY 500 S.F. OF LIFT AND WILL PROVIDE THE ENGINEER WITH TEST RESULTS.

### UNDERGROUND UTILITIES:

1. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES ARE NOT KNOWN BASED UPON AVAILABLE DRAWINGS. THE CONTRACTOR ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR LOCATION AND PROTECTION OF THE UTILITY PIPES, CONDUITS, OR STRUCTURES SHOWN OR NOT SHOWN ON THESE DRAWINGS.

### ELECTRICAL INSTALLATIONS:

1. ELECTRICAL INSTALLATION SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH NFPA 70 - NATIONAL ELECTRIC CODE.
2. CONTRACTOR TO COORDINATE WITH OWNER FOR POWER SOURCE FOR TREATMENT SYSTEM.
3. CONTRACTOR TO COORDINATE WITH OWNER FOR PLACEMENT OF CONDUIT FOR MONITORING EQUIPMENT / POWER.
4. ALL ELECTRICAL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR. CONTRACTOR TO PROVIDE UNDERWRITER'S CERTIFICATE FOR ALL ELECTRIC WORK.

### SYSTEM NOTES:

1. SYSTEM CONTROL PANEL SHALL INCLUDE:
   A. ALL MOTOR STARTERS.
   B. H-O-A SWITCHES FOR ALL BLOWERS.
   C. RUN AND FAULT INDICATORS FOR ALL MOTORS AND INTERLOCKS.
   D. AUTOMATIC TELEPHONE DIALER.
2. SYSTEM CONTROLS SHALL BE EQUIPPED WITH AN EMERGENCY STOP BUTTON LOCATED WITHIN 5 FEET OF THE BLOWER.
3. ALL ELECTRICAL WORK SHALL COMPLY WITH NEC DESIGN STANDARDS AND LOCAL REQUIREMENTS.
4. ALL EQUIPMENT SHALL BE INDIVIDUALLY GROUNDED, AS PER NEC REQUIREMENTS.
5. ALL PRESSURE SENSOR ALARMS SHALL BE FIELD ADJUSTABLE IN PLC.

### TESTING:

1. ALL NEW OR MODIFIED PIPING MUST BE PRESSURE TESTED FOR 1 HOUR @ 30 PSI. TESTING MUST BE WITNESSED BY ENGINEER.
2. ALL NEW EQUIPMENT WILL BE TESTED TO ENSURE PROPER OPERATION.

### PIPING NOTES:

1. RISER PIPE TO BE 3" DIA. SCH 80 PVC. JOINTS SHALL BE THREADED (NPT).
2. TOTAL LENGTH OF PIPE WILL VARY DEPENDING ON FINAL LOCATION OF BLOWER ASSEMBLIES UPON ROOF.
3. INSTALL DI-ELECTRIC COUPLINGS / BUSHINGS / TRANSITION FITTINGS AS REQUIRED.

### SYSTEM DETAILS

SVE BLOWER AND INSTRUMENTATION PACKAGE TO BE PROVIDED BY GASHO CORPORATION OF CHESTER PA. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THE DETAILS AND REQUIREMENTS OF THESE PLANS REFLECT THE EQUIPMENT VENDORS PROPOSAL. CARBON VESSELS ARE TO BE PROVIDED BY THE CONTRACTOR.

1. NEMA 4 CONTROL PANEL, 208 VOLT, 3 PHASE, WITH;
   1.1. ELECTRICAL DISCONNECT SWITCH
   1.2. MOTOR STARTER
   1.3. MOTOR RUN LIGHT
   1.4. HOA SELECTOR SWITCH
   1.5. CONTROL INTERLOCK (SEE P&ID)
   1.6. MANUAL RESET BUTTON
   1.7. AUTOMATIC TELEPHONE DIALER
2. ELECTRICAL DISTRIBUTION PANEL FOR LIGHTING, FANS , HEATER, RECEPTACLE.
3. AMETEK MOISTURE SEPARATOR, MODEL MS300DS W/LIQUID LEVEL SWITCH FOR INTERLOCK.
4. 2" DILUTION VALVE W/INLET FILTER/ SILENCER
5. 2" INLINE FILTER W/ POLYESTER ELEMENT
6. AMETEK ROTRON ENVIRONMENTAL BLOWER MODEL: EN757F72XL, P/N 081174 5 HP, XP, 230/460/3/60
7. 400 LB CARBON VESSEL, MAKE: TIGG CORPORATION, MODEL: N-400 XP, VIRGIN COCONUT. PROVIDED BY GENERAL CONTRACTOR
8. 3" CAM LOCK TYPE SYSTEM EFFLUENT CONNECTION AND 3" DIAMETER SCH. 80 PVC EFFLUENT PIPING TO STACK.
9. TEFC VENTILATION FAN WITH THERMOSTAT


PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.
630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM


CONSULTANTS

AS-BUILTS
11-18-15

| Number | Revision Description | Revision Date |
|---|---|---|
| 7 | | |
| 6 | | |
| 5 | | |
| 4 | CONSTRUCTION AS-BUILT DOCUMENTS | NOVEMBER 16, 2015 |
| 3 | CONSTRUCTION DOCUMENTS | FEBRUARY 11, 2014 |
| 2 | REGULATORY REVIEW, REVISED | JANUARY 28, 2014 |
| 1 | REGULATORY REVIEW | NOVEMBER 13, 2013 |

Designed By: AES/DH
Date Submitted: FEBRUARY 11, 2014
Drawn By: AES
Date Created: OCTOBER 18, 2013
Approved By: PKB
Scale: AS SHOWN

Client:
**3140 CONEY ISLAND LLC**
**3061 BRIGHTON 6TH STREET**
**BROOKLYN, NEW YORK 11235**

Project:
# REMEDIAL MEASURES

Project Address:
**3140 CONEY ISLAND AVENUE**
**BRIGHTON BEACH**
**BROOKLYN, NY**

County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:
**PROCESS & INSTRUMENTATION DIAGRAM AND NOTES**

Drawing Number:

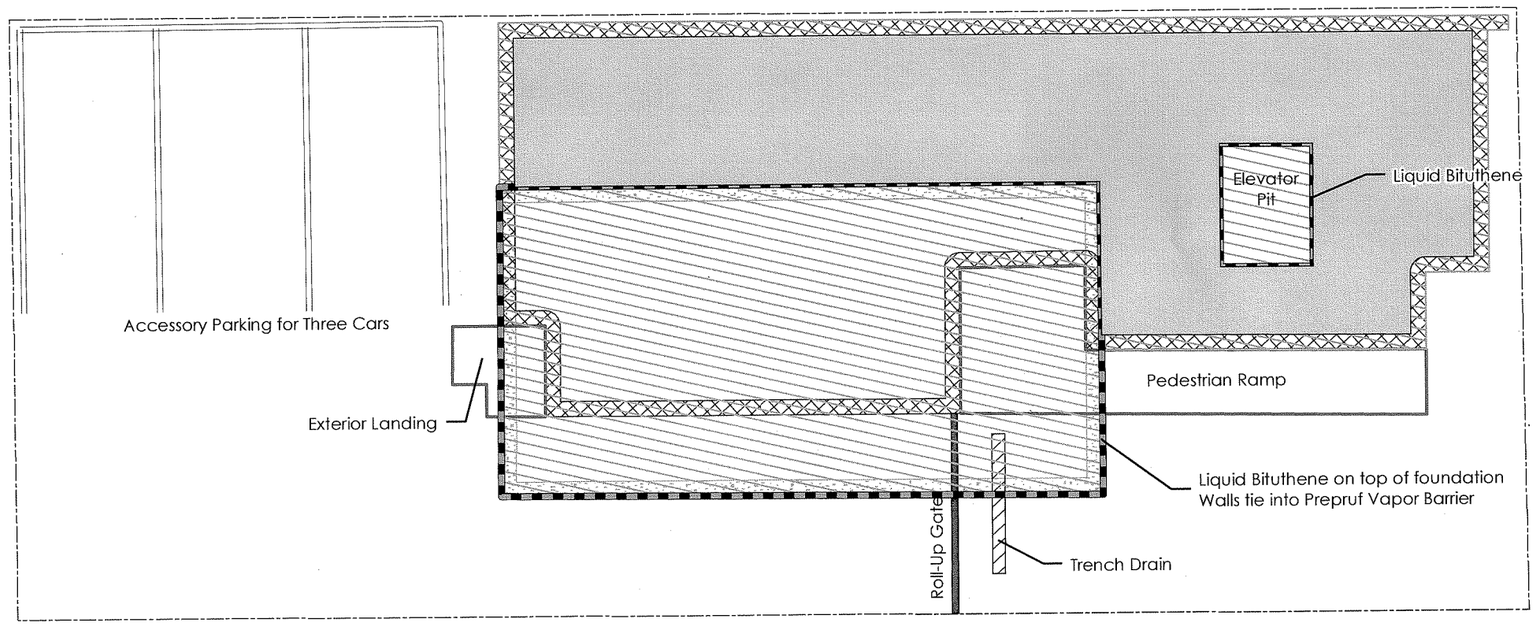
Sheet: 3 of 3

PWGC Project Number: **CIR1201**

STATE OF NEW YORK — PETER K. HOLLENBECK — 074604 — LICENSED PROFESSIONAL ENGINEER

Unauthorized alteration or addition to this drawing and related documents is a violation of Section 7209 of the New York State Education Law

PROCTITLE NAME: C:\Users\aes\Desktop\Submissions\Cyclone_3061Coney Island Remediation System - As-Built Aug 2015.dwg PLOT DATE/TIME: Nov 16, 2015 2:29pm By: aestim




CONEY ISLAND AVENUE

Preprufe 300R
Preprufe 160R
Florprufe 120

First Floor Exterior Wall
Cellar Footprint
Property Boundary
Adjacent Buildings

# CONSTRUCTION MEMBRANE LOCATION

3140 CONEY ISLAND AVENUE
BROOKLYN, NEW YORK

0 10 20 30 40 Feet


PWGC
Strategic Environmental and Engineering Solutions

P.W. GROSSER CONSULTING ENGINEER AND HYDROGEOLOGIST, P.C.

630 Johnson Avenue. • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM


STATE OF NEW YORK
PAUL KENNETH ROYCE
074604
LICENSED PROFESSIONAL ENGINEER


UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW


DRAWING PREPARED FOR:

3140 CONEY ISLAND REALTY, LLC
3061 BRIGHTON 6TH STREET
BROOKLYN, NEW YORK 11235
&
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION
REGION 2
47-40 21ST STREET
LONG ISLAND CITY, NEW YORK 11101-5407

| REVISION | DATE | INITIAL | COMMENTS |
|---|---|---|---|
| | | | |

DRAWING INFORMATION:

| | | | |
|---|---|---|---|
| Project: | CIR1201 | Designed by: | BB |
| Date: | 11/5/2015 | Drawn by: | BB |
| Scale: | AS SHOWN | Approved by: | JLL |

FIGURE NO: 15

SHEET:

Document Path: G:\Projects\A-D\CIR\1201\mapfiles\SMP\FIG15_VaporBarrierLocation.mxd

# SMP – Appendix D

# APPENDIX D – EXCAVATION WORK PLAN

## D-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 Department. Currently, this notification will be made to:

Mr. Yuk Yin Wong
NYSDEC Region 2
47-40 21st Street
Long Island City, NY 11101

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent, plans 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 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, in electronic format, if it differs from the HASP provided in **Appendix F** of this document,
- Identification of disposal facilities for potential waste streams,
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

## D-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based soil screening will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed regardless of when the 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, material that requires testing, material that can be returned to the subsurface, and material that can be used as cover soil.

## D-3 STOCKPILE 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 NYSDEC.

## D-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 its contractors are solely 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. 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.

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.

## D-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.

All trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

The truck transport routes are shown on **Figure 21**. 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.

## D-6 MATERIALS DISPOSAL OFF-SITE

All soil/fill/solid waste 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 soil/fill 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 Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

## D-7 MATERIALS REUSE ON-SITE

Chemical criteria for on-Site reuse of material have been approved by NYSDEC and are listed in **Table 4**, Restricted Residential SCOs. 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 re-use 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.

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.

## D-8 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including excavation dewatering 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, but will be managed off-Site.

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.

## D-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the RAWP. The demarcation layer, consisting of orange snow fencing material or equivalent material will be replaced to provide a visual reference to the top of the 'Remaining Contamination Zone', the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this Site Management Plan. If the type of cover system changes from that

which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the 'Remaining Contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in any updates to the Site Management Plan.

## D-10 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.

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 4**, Restricted Residential SCOs. 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.

## D-11 STORMWATER POLLUTION PREVENTION

As the Site measures less than 1 acre in area, a Stormwater Pollution Prevention Plan will not be required.

## D-12 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 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 reports prepared pursuant to Section 5 of the SMP.

## D-13 COMMUNITY AIR MONITORING PLAN

The Community Air Monitoring Plan (CAMP) provides measures for protection for on-Site workers and the downwind community (i.e., off-Site receptors including residences, businesses, and on-Site workers not directly involved in subsurface activities) from potential airborne contaminant releases resulting from subsurface activities at the Site.

The CAMP was established in accordance with the following requirements:

- 29 CFR 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of protection for workers.
- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan: 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.

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 Photovac MicroTip photoionization detector (PID), or equivalent. **Table A-13** lists the Real-Time Air Monitoring Action Levels to be used in work areas. Air monitoring data shall be documented in a Site log book by the designated Site safety officer. The QEP's Site safety officer or delegate shall calibrate and maintain air monitoring instruments in accordance with manufacturer's specifications. Instruments shall be zeroed daily and checked for accuracy and a daily log shall be kept.

**Table A-13 - Air Monitoring Action Levels**

| AIR MONITORING INSTRUMENT | MONITORING LOCATION | ACTION LEVEL | SITE ACTION | REASON |
|---|---|---|---|---|
| PID | Breathing Zone | 0-25 ppm, non-transient | None | Exposure below established exposure limits |
| PID | Breathing Zone | 25-100 ppm, non-transient | Don APR | Based on potential exposure to VOCs |
| PID | Breathing Zone | >100 ppm, non-transient | Don ASR or SCBA, Institute vapor/odor suppression measures, Notify HSM. | Increased exposure to Site contaminants, potential for vapor release to public areas. |
| PID | Work Area Perimeter | < 5 ppm | None | Exposure below established exposure limits. |
| PID | Work Area Perimeter | > 5 ppm | Stop work and implement vapor release response plan until readings return to acceptable levels, Notify HSM. | Increased exposure to Site contaminants, potential for vapor release to public areas |
| Aerosol Monitor | Work Area Perimeter | >100 but < 150 µg/m$^3$ for 15 minutes | Institute dust suppression measures, Notify HSM. | Work to continue if particulate concentrations remain below 150 µg/m$^3$ |
| Aerosol Monitor | Work Area Perimeter | >150 µg/m$^3$ | Don ASR or SCBA, Institute dust suppression measures, Notify HSM. | Stop work and implement dust suppression techniques until readings return to acceptable levels, Notify HSM. |

A figure showing the location of air sampling stations based on generally prevailing wind conditions is shown in **Figure 22**. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

## D-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis may include limiting open excavations, use of tarping, hydromulch, or encapsulant to cover soils during excavations, direct loading of soils, use of chemical odorants, piping discharge SVE/SSDS air above the roof line, use of vapor phase carbon units to filter air, and monitoring air at and beyond property lines. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the property owner's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

## D-15 DUST CONTROL PLAN

A dust suppression plan that addresses dust management during invasive on-Site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved though the use of a dedicated on-Site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

## D-16 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.

# SMP – Appendix E

GRACE

# PREPRUFE® 300R & 160R

## Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

### Description

Preprufe® 300R & 160R membranes are unique composite sheets comprising a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.

Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe bond to concrete prevents ingress or migration of water around the structure.

The Preprufe R System includes:

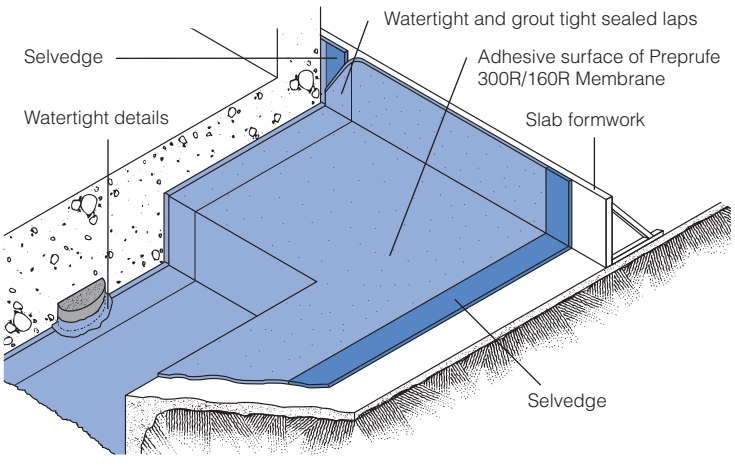
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe Tape LT**—for covering cut edges, roll ends, penetrations and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C)).
- **Preprufe Tape HC**—as above for use in Hot Climates (minimum 50°F (10°C)).
- **Bituthene® Liquid Membrane**—for sealing around penetrations, etc.
- **Adcor™ ES**—waterstop for joints in concrete walls and floors
- **Preprufe Tieback Covers**—preformed cover for soil retention wall tieback heads
- **Preprufe Preformed Corners**—preformed inside and outside corners

Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted earth or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene self-adhesive membrane or Procor® fluid applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

### Advantages

- **Forms a unique continuous adhesive bond to concrete poured against it**—prevents water migration and makes it unaffected by ground settlement beneath slabs
- **Fully-adhered watertight laps** and detailing
- **Provides a barrier to water, moisture and gas**—physically isolates the structure from the surrounding ground
- **BBA Certified** for basement Grades 2, 3, & 4 to BS 8102:1990
- **Zero permeance** to moisture
- **Solar reflective**—reduced temperature gain
- **Simple and quick to install**—requiring no priming or fillets
- **Can be applied to permanent formwork**—allows maximum use of confined sites
- **Self protecting**—can be trafficked immediately after application and ready for immediate placing of reinforcement
- **Unaffected by wet conditions**—cannot activate prematurely
- **Inherently waterproof, non-reactive system:**
  - not reliant on confining pressures or hydration
  - unaffected by freeze/thaw, wet/dry cycling
- **Chemical resistant**—effective in most types of soils and waters, protects structure from salt or sulphate attack




Drawings are for illustration purposes only.
Please refer to graceconstruction.com for specific application details.

BBA BRITISH BOARD OF AGREMENT CERTIFICATE No. 97/3325

## Installation

The most current application instructions, detail drawings and technical letters can be viewed at graceconstruction.com. For other technical information contact your local Grace representative.

Preprufe 300R & 160R membranes are supplied in rolls 4 ft (1.2 m) wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe Membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.

### Substrate Preparation

**All surfaces**—It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability (see Figure 1).

**Horizontal**—The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.

**Vertical**—Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 0.5 in. (12 mm) out of alignment.

### Membrane Installation

Preprufe can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe in cold or marginal weather conditions 55°F (<13°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application. Alternatively, Preprufe Low Temperature (LT) is available for low temperature condition applications. Refer to Preprufe LT data sheet for more information.

**Horizontal substrates**—Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed (see Figure 2).

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

Refer to Grace Tech Letter 15 for information on suitable rebar chairs for Preprufe.

**Vertical substrates**—Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal.

**Roll ends and cut edges**—Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap edges and roll firmly (see Figure 3). Immediately remove printed plastic release liner from the tape.

### Details

Refer to Preprufe Field Application Manual, Section V Application Instructions or visit graceconstruction.com. This manual gives comprehensive guidance and standard details.

### Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by power washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Repair small punctures (0.5 in. (12 mm) or less) and slices by applying Preprufe Tape centered over the damaged area and roll firmly. Remove the release liner from the tape. Repair holes and large punctures by applying a patch of Preprufe membrane, which extends 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with Preprufe Tape, remove the release liner from the tape and roll firmly. Any areas of damaged adhesive should be covered with Preprufe Tape. Remove printed plastic release liner from tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape, rolling firmly. Alternatively, use a hot air gun or similar to activate adhesive and firmly roll lap to achieve continuity.

### Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe membrane and tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Following proper ACI guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

### Removal of Formwork

Preprufe membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems.

A minimum concrete compressive strength of 1500 psi (10 N/mm$^2$) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

Refer to Grace Tech Letter 17 for information on removal of formwork for Preprufe.

Figure 1

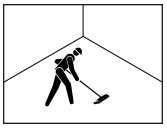


Figure 2

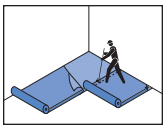
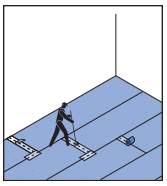
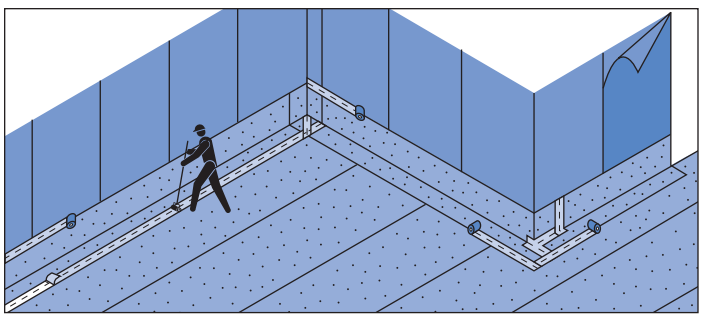


Figure 3

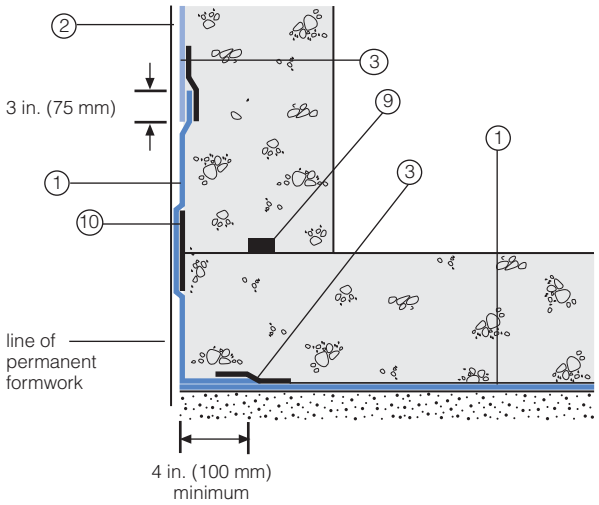




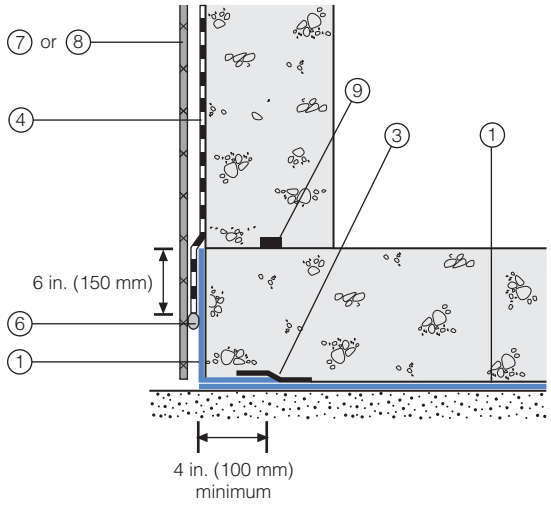
## Detail Drawings

Details shown are typical illustrations and not working details. For a list of the most current details, visit us at graceconstruction.com. For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

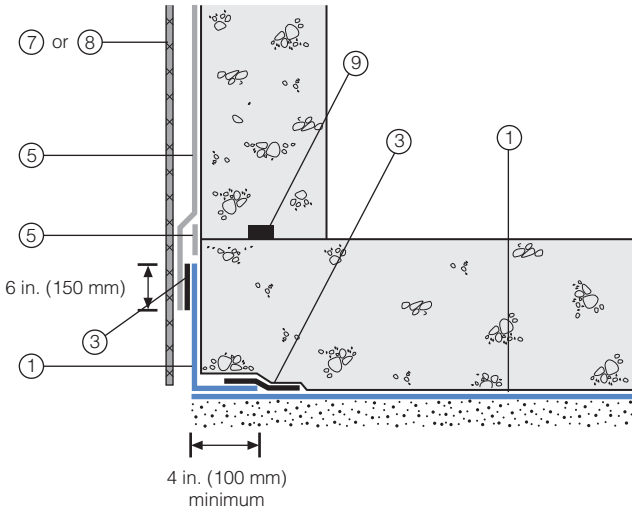
### Wall base detail against permanent shutter



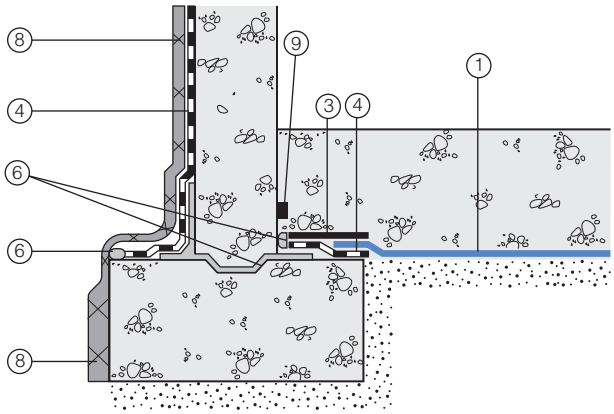

### Bituthene wall base detail (Option 1)



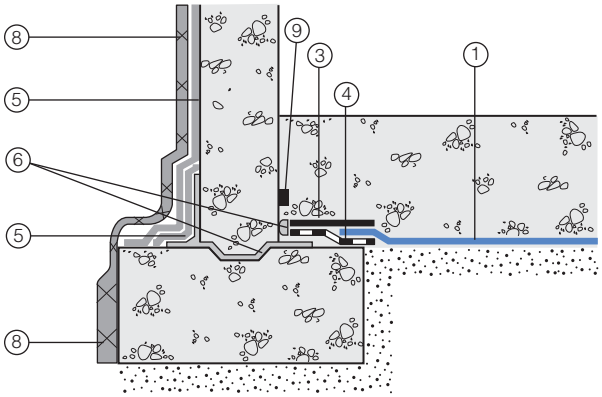

### Procor wall base detail (Option 1)




### Bituthene wall base detail (Option 2)




### Procor wall base detail (Option 2)




**1** Preprufe 300R
**2** Preprufe 160R
**3** Preprufe Tape
**4** Bituthene
**5** Procor
**6** Bituthene Liquid Membrane
**7** Protection
**8** Hydroduct®
**9** Adcor ES
**10** Preprufe CJ Tape

## Supply

| Dimensions (Nominal) | Preprufe 300R Membrane | Preprufe 160R Membrane | Preprufe Tape (LT or HC*) |
|---|---|---|---|
| Thickness | 0.046 in. (1.2 mm) | 0.032 in. (0.8 mm) | |
| Roll size | 4 ft x 98 ft (1.2 m x 30 m) | 4 ft x 115 ft (1.2 m x 35 m) | 4 in. x 49 ft (100 mm x 15 m) |
| Roll area | 392 ft² (36 m²) | 460 ft² (42 m²) | |
| Roll weight | 108 lbs (50 kg) | 92 lbs (42 kg) | 4.3 lbs (2 kg) |
| Minimum side/end laps | 3 in. (75 mm) | 3 in. (75 mm) | 3 in. (75 mm) |
| * LT denotes Low Temperature (between 25°F (-4°C) and 86°F (+30°C))<br>HC denotes Hot Climate (50°F (>+10°C)) | | | |
| **Ancillary Products** | | | |
| Bituthene Liquid Membrane—1.5 US gal (5.7 liter) or 4 US gal (15.1 liter) | | | |

## Physical Properties

| Property | Typical Value 300R | Typical Value 160R | Test Method |
|---|---|---|---|
| Color | white | white | |
| Thickness | 0.046 in. (1.2 mm) | 0.032 in. (0.8 mm) | ASTM D3767 |
| Lateral Water Migration Resistance | Pass at 231 ft (71 m) of hydrostatic head pressure | Pass at 231 ft (71 m) of hydrostatic head pressure | ASTM D5385, modified[1] |
| Low temperature flexibility | Unaffected at -20°F (-29°C) | Unaffected at -20°F (-29°C) | ASTM D1970 |
| Resistance to hydrostatic head | 231 ft (71 m) | 231 ft (71 m) | ASTM D5385, modified[2] |
| Elongation | 500% | 500% | ASTM D412, modified[3] |
| Tensile strength, film | 4000 psi (27.6 MPa) | 4000 psi (27.6 MPa) | ASTM D412 |
| Crack cycling at -9.4°F (-23°C), 100 cycles | Unaffected, Pass | Unaffected, Pass | ASTM C836 |
| Puncture resistance | 221 lbs (990 N) | 100 lbs (445 N) | ASTM E154 |
| Peel adhesion to concrete | 5 lbs/in. (880 N/m) | 5 lbs/in. (880 N/m) | ASTM D903, modified[4] |
| Lap peel adhesion | 5 lbs/in. (880 N/m) | 5 lbs/in. (880 N/m) | ASTM D1876, modified[5] |
| Permeance to water vapor transmission | 0.01 perms (0.6 ng/(Pa x s x m²)) | 0.01 perms (0.6 ng/(Pa x s x m²)) | ASTM E96, method B |
| Water absorption | 0.5% | 0.5% | ASTM D570 |

**Footnotes:**

1. Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
2. Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
3. Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
4. Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
5. The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 2 in. (50 mm) per minute.

### Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe 300R/160R. All Preprufe 300R/160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

NOTE: Use Preprufe Tape to tie-in Procor with Preprufe.

### Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be handled by a minimum of two persons.

## www.graceconstruction.com

**For technical assistance call toll free at 866-333-3SBM (3726)**

Adcor is a trademark and Preprufe, Bituthene and Hydroduct are registered trademarks of W. R. Grace & Co.–Conn.
Procor is a U.S. registered trademark of W. R. Grace & Co.–Conn., and is used in Canada under license from PROCOR LIMITED.

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.–Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending. Copyright 2012. W. R. Grace & Co.–Conn.
PF-111H Printed in U.S.A. 07/12 FA/PDF

GRACE

# PREPRUFE® Detail Tape

Two Sided Self-Adhesive Tape

## Description

Preprufe® Detail Tape is a specially formulated, two-sided, highly aggressive tape. It is a 2 in (50 mm) wide x 50 ft (15 m) long self-adhesive tape with a release liner.

Preprufe Detail Tape is provided in Low Temperature and Hot Climate Grades as follows:

- Preprufe Detail Tape LT Grade—for temperatures between 25°F (-4°C) and 86°F (+30°C)
- Preprufe Detail Tape HC Grade—for use in Hot Climates (minimum 50°F (+10°C))

## Use

Preprufe Detail Tape is ideally suited for the following uses:

- As a detailing accessory to the Preprufe and Preprufe SCS Systems
- Adhering Hydroduct® drainage composites and insulation boards to waterproofing membranes

## Application

### Surface Preparation

All surfaces must be clean, dry and free from dirt, grease oil, dust or other contaminants.

**Preprufe and Preprufe SCS Systems**— Preprufe Detail Tape must be rolled firmly into place prior to removing the release liner. Ensure the release liner is then removed prior to adhering the next piece of membrane to the Preprufe Detail Tape, which then must be rolled into place as well over the Preprufe Detail Tape. Refer to applicable system detail drawings at www.graceconstruction.com

**Hydroduct drainage composites**— Where Hydroduct drainage composites are placed horizontally from rolls onto a wall, a continuous strip of Preprufe Detail Tape near the top and another strip near the bottom is recommended. If the drainage composite is cut and applied vertically in 6 to 8 ft (1.8 to 2.4 m) lengths, a strip is recommended near the top, another near the middle and a third near the bottom.

On decks, a strip of tape is recommended at approximately 10 ft (3 m) intervals, or more frequently in the event of high wind. Unroll the tape and adhere to the waterproofing membrane. Leave the release sheet on the tape until just before applying the drainage composite. The tape and release liner may be cut with a utility knife. Peel the release liner and apply the drainage composite. Press the composite firmly to assure good contact. For deck applications, the tape may be applied to the back of the drainage composite rather than to the waterproofing membrane, if it is more convenient.

**Polystyrene protection board and insulation**— On walls, apply a strip of tape near the top and bottom edge of the board or insulation. If the board is applied vertically in lengths of 8 ft(2.4m) or more, apply a third strip of tape in the middle of the board or insulation. Press panel firmly over the tape to assure a good bond. Preprufe Detail Tape may also be used to adhere polystyrene board or insulation in deck applications in the event of high winds.

## Supply

| Preprufe Detail Tape | |
|---|---|
| Roll size | 2 in. x 50ft. (50 mm x 15m) |
| Packaging | 16 rolls/carton |

## www.graceconstruction.com

**For technical assistance call toll free at 866-333-3SBM (3726)**

Preprufe, and Hydroduct are trademarks of W. R. Grace & Co.–Conn. registered in the United States and other countries.

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.–Conn., 62 Whittemore Avenue, Cambridge, MA 02140.
In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending. Copyright 2013. W. R. Grace & Co.–Conn.
PF-197 Printed in U.S.A. 11/13 GCS/PDF

# FLORPRUFE® 120

## Integrally bonded vapor protection for slabs on grade

## Description

Florprufe® 120 is a high perfor-mance vapor barrier with Grace's Advanced Bond Technology™ that forms a unique seal to the underside of concrete floor slabs.

Comprising a highly durable polyolefin sheet and a specially developed, non-tacky adhesive coating, Florprufe 120 seals to liquid concrete to provide integrally bonded vapor protection.

Florprufe exceeds ASTM E1745 Class A rating.

## Advantages

- Forms a powerful integral seal to the underside of concrete slabs
- Protects valuable floor finishes such as wood, tiles, carpet and resilient flooring from damage by vapor transmission
- Direct contact with the slab complies with the latest industry recommendations
- Remains sealed to the slab even in cases of ground settlement
- Ultra low vapor permeability
- Durable, chemical resistant polyolefin sheet
- Lightweight, easy to apply, kick out rolls
- Simple lap forming with mechanical fixings or tape

## Use

Florprufe 120 is engineered for use below slabs on grade with moisture-impermeable or moisture-sensitive floor finishes that require the highest level of vapor protection.

[1] ACI 302.1R-96

### Product Advantages

- Forms a powerful integral seal
- Protects valuable floor finishes
- Ultra low vapor permeability
- Durable, chemical resistant
- Lightweight and easy to apply

Florprufe complies with the latest recommendations of ACI Committees 302 and 360, i.e. for slabs with vapor sensitive coverings, the location of the vapor barrier should always be in direct contact with the slab1.

The membrane is loose laid onto the prepared sub-base, forming overlaps that can be either mechanically secured or taped. The unique bond of Florprufe to concrete provides continuity of vapor protection at laps. Alternatively, if a taped system is preferred, self-adhered Preprufe® Tape can be used to overband the laps.

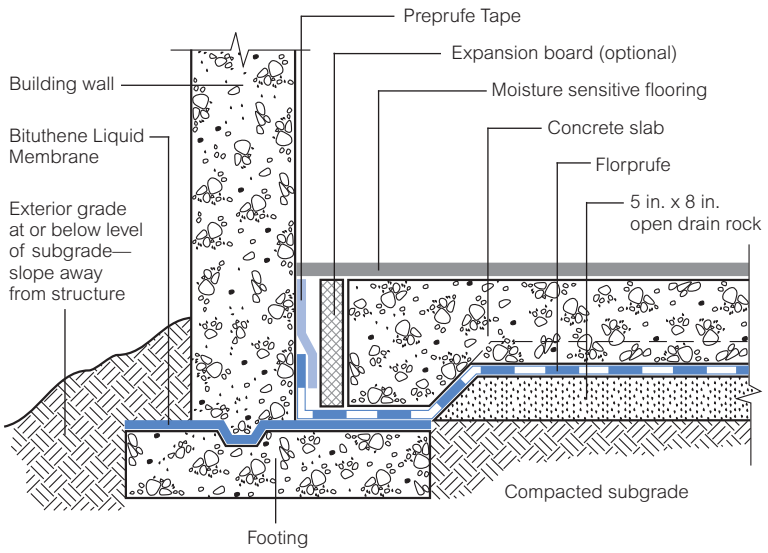
Slab reinforcement and concrete can be placed immediately. Once the concrete is poured, an integral bond develops between the concrete and membrane.

## Installation

### Health & Safety

Refer to relevant Material Safety Data Sheet. Complete rolls should be handled by 2 persons.

Florprufe 120 can be applied at temperatures of 25ºF (-4ºC) or above. Membrane installation is unaffected by wet weather. Installation and detailing of Florprufe 120 are generally in accordance with ASTM E1643-98.




### Typical Assembly

Drawings are for illustration purposes only.
Please refer to www.graceconstruction.com for specific application details.

## Supply

| | |
|---|---|
| **Florprufe 120** | |
| Supplied in rolls | 4 ft x 115 ft (1.2 m x 35 m) |
| Roll area | 460 ft² (42 m²) |
| Roll weight | 70 lbs (32 kg) approx. |
| **Ancillary Products** | |
| Preprufe Tape is packaged in cartons containing 4 rolls that are 4 in. x 49 ft (100 mm x 15 m). | |
| Bituthene Liquid Membrane is supplied in 1.5 gal (5.7 L) pails. | |

## Physical Properties: Exceeds ASTM E1745 Class A rating

| Property | Typical Value | Test Method |
|---|---|---|
| Color | White | |
| Thickness (nominal) | 0.021 in. (0.5 mm) | ASTM D3767—method A |
| Water vapor permeance | 0.03 perms | ASTM E96—method B1 |
| Tensile strength | 65 lbs/in. | ASTM E1541 |
| Elongation | 300% | ASTM D412 |
| Puncture resistance | 3300 gms | ASTM D17091 |
| Peel adhesion to concrete | >4 lbs/in. | ASTM D903 |

1. Test methods that comprise ASTM E1745 standard for vapor retarders

Prepare substrate in accordance with ACI 302.1R Section 4.1. Install Florprufe 120 over the leveled and compacted base. Place the membrane with the smooth side down and the plastic release liner side up facing towards the concrete slab. Remove and discard plastic release liner. End laps should be staggered to avoid a build up of layers. Succeeding sheets should be accurately positioned to overlap the previous sheet 2 in. (50 mm) along the marked lap line.

### Laps

**1. Mechanical fastening method—**
To prevent the membrane from moving and gaps opening, the laps should be fastened together at 39 in. (1.0 m) maximum centers. Fix through the center of the lap area using 0.5 in. (12 mm) long washer-head, self-tapping, galvanized screws (or similar) and allowing the head of the screw to bed into the adhesive compound to self-seal. It is not necessary to fix the membrane to the substrate, only to itself. Ensure the membrane lays flat and no openings occur. (See Figure 1.) Additional fastening may be required at corners, details, etc. Continuity is achieved once the slab is poured and the bond to concrete develops.

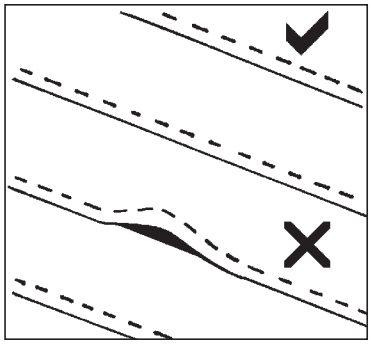


Figure 1

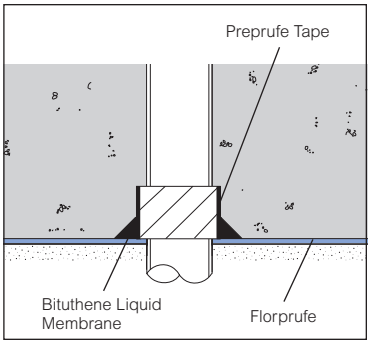



Figure 2

OR

**2. Taped lap method—**
For additional security use Grace Preprufe Tape to secure and seal the overlaps. Overband the lap with the 4 in. (100 mm) wide Preprufe Tape, using the lap line for alignment. Remove plastic release liner to ensure bond to concrete.

### Penetrations

Mix and apply Bituthene Liquid Membrane detailing compound to seal around penetrations such as drainage pipes, etc. (See Figure 2 and refer to the Bituthene Liquid Membrane data sheet, BIT-230.)

### Concrete Placement

Place concrete within 30 days. Inspect membrane and repair any damage with patches of Preprufe Tape. Ensure all liner is removed from membrane and tape before concreting.

## www.graceconstruction.com

**For technical assistance call toll free at 866-333-3SBM (3726)**

Florprufe and Preprufe are registered trademarks of W. R. Grace & Co.–Conn.

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.–Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending. Copyright 2007. W. R. Grace & Co.–Conn.
PF-001G Printed in U.S.A. 3/07 FA/LI/1M

GRACE

# BITUTHENE® LIQUID MEMBRANE

Two component, elastomeric, liquid applied detailing compound for use with Grace waterproofing membranes

## Description

Bituthene® Liquid Membrane is a two component, elastomeric, cold applied, trowel grade material designed for a variety of uses with the Grace waterproofing systems. The VOC (Volatile Organic Compound) content is 10 g/L.

Architectural and Industrial Maintenance Regulations limit the VOC content in products classified as Architectural Coatings. Refer to Technical Letters at www.graceconstruction.com for most current list of allowable limits.

## Advantages

- **Liquid applied**—conforms to irregular profiles
- **Waterproof**—resistant to water vapor and water pressure
- **Tough, rubber-like**—flexible and damage resistant
- **Chemically cured**—unaffected by in-service temperature variations
- **Cold applied**—no flame hazard
- **System compatible**—formulated for use with Grace waterproofing membrane systems

## Use

Bituthene Liquid Membrane is ideally suited for the following uses:

- Fillet material at inside corners
- Reinforcement material at inside corners
- Flashing material around drains, protrusions, curbs and parapets
- Sealing material at terminations
- Repair material for defects on concrete surfaces
- Flashing material at corners

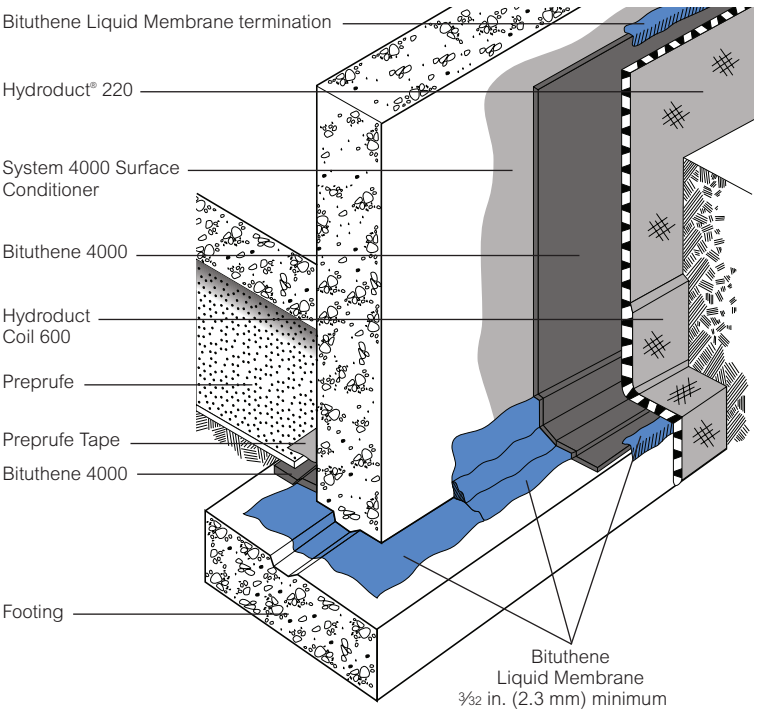
The two parts of Bituthene Liquid Membrane are mixed on site and troweled on to provide a simple and quick waterproofing detailing aid in conjunction with Bituthene, Preprufe® and Procor® systems.

## Compatibility

Bituthene Liquid Membrane is completely compatible with Bituthene, Preprufe and Procor, and with existing asphalt or coal tar-based waterproofing materials. It is also compatible with cured silicone and polyurethane sealants. It is not compatible with creosote, pentachlorophenol, linseed oil or polysulfide-based sealants.

### Product Advantages

- Liquid applied
- Waterproof
- Tough, rubber-like
- Chemically cured
- Cold applied
- System compatible




Drawings are for illustration purposes only.
Please refer to www.graceconstruction.com for specific application details.

### Supply

| Bituthene Liquid Membrane (Parts A & B) | | |
|---|---|---|
| Unit size | 1.5 gal (5.7 L) | 4 gal (15.1 L) |
| Weight per unit | 16 lbs (8 kg) | 44 lbs (20 kg) |
| Units per pallet | 100 | 24 |

### Physical Properties

| Property | Typical Value | Test Method |
|---|---|---|
| Color | | |
| Part A | Black | |
| Part B | Clear | |
| Mixture of Parts A and B | Black | |
| Solids content | 100% | ASTM D1644 |
| Elongation | 250% minimum | ASTM D412 |
| Peel strength | 5 lbs/in. (880 N/m) minimum | ASTM D903 |
| Flexibility, 180° bend over 1 in. (25 mm) mandrel at -25°F (-32°C) | Unaffected | ASTM D1970 |

## Application Procedures

### Safety, Storage and Handling Information

Bituthene products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at www.graceconstruction.com and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

## Surface Preparation

All surfaces must be dry and free from dirt, grease, oil, dust or other contaminants. Bituthene Liquid Membrane may be applied at temperatures of 25°F (-4°C) or above. Below 40°F (5°C), store in a warm place before application.

### Mixing

Add the entire contents of the Part B container to Part A and mix for 3 to 5 minutes until uniform. Part A is black and Part B is clear. Take care to scrape material from the side and bottom of the containers to assure thorough mixing. A low speed (150 rpm) mechanical mixer with flat paddle blades is required. Do not apply any material if streaks can be seen due to insufficient mixing.

Once mixed, Bituthene Liquid Membrane must be applied by trowel within 1.5 hours. More time is available at lower temperatures. At high temperatures, thickening and curing will be faster. Material that has thickened must be discarded. The material will cure to a very flexible rubber-like material.

Bituthene Liquid Membrane must be applied at a minimum thickness of 3⁄32 in. (2.3 mm) unless otherwise noted on details. In fillet applications, the face of the fillet should be a minimum of ¾ in. (20 mm). In corner flashing application details, it should extend 6 in. (150 mm) in each direction from the corner. Bituthene Liquid Membrane will adhere to primed or unprimed concrete.

Bituthene Liquid Membrane should be allowed to cure at least 24 hours before flood testing.

### Coverage

As a fillet material, 1 gal (3.8 L) will cover approximately 100 linear feet (30 m). As a flashing material, 1 gal (3.8 L) will cover approximately 17 $ft^2$ (1.6 $m^2$). As a fillet and reinforcement, 1 gal (3.8 L) will cover approximately 14 linear feet (4.3 m).

### Cleaning

Clean tools and equipment with mineral spirits before Bituthene Liquid Membrane has cured. Mineral spirits is a combustible liquid and should be used only in accordance with the manufacturer's safety recommendations. Do not use solvents to clean hands or skin.

## www.graceconstruction.com

**For technical assistance call toll free at 866-333-3SBM (3726)**

Bituthene, Hydroduct and Preprufe are registered trademarks of W. R. Grace & Co.–Conn.
Procor is a U.S. registered trademark of W. R. Grace & Co.–Conn., and is used in Canada under license from PROCOR LIMITED.

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.–Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending. Copyright 2007. W. R. Grace & Co.–Conn.
BIT-230D Printed in USA 3/07 FA/LI/1M

GRACE

# SMP – Appendix F

# 3140 CONEY ISLAND AVENUE
# BROOKLYN, NEW YORK

# HEALTH AND SAFETY PLAN

**SUBMITTED TO:**

New York State Department of Environmental Conservation
Division of Environmental Remediation
Hunters Point Plaza
47-40 21st Street
Long Island City, New York 11101

**PREPARED FOR:**

3140 Coney Island Realty, LLC
3061 Brighton 6th Street
Brooklyn, New York 11235

**PREPARED BY:**

P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353
Fax: 631-589-8705

Kris Almskog, Vice President krisa@pwgrosser.com
Jennifer Lewis, Senior Hydrogeologist JenniferL@pwgrosser.com

PWGC Project Number: CIR1201

## JUNE 13, 2013

**HEALTH AND SAFETY PLAN**
**3140 CONEY ISLAND AVENUE, BROOKLYN, NEW YORK**

**TABLE OF CONTENTS** **PAGE**

1.0 STATEMENT OF COMMITMENT ..... 1
2.0 INTRODUCTION ..... 2
2.1 Purpose ..... 2
2.2 Scope ..... 2
2.3 Application ..... 3
3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES ..... 4
3.1 Project Manager ..... 4
3.2 Field Team Leader (FTL)/ Site Health and Safety Officer (SHSO) ..... 4
3.3 Health and Safety Manager ..... 4
3.4 Site Personnel ..... 4
4.0 SITE HISTORY AND PROJECT DESCRIPTION ..... 5
4.1 Project Background ..... 5
4.2 Site Description ..... 5
4.3 Site History ..... 5
4.4 Site Features ..... 5
4.5 Current and Future Site Use ..... 5
5.0 POTENTIAL HAZARDS OF THE SITE ..... 6
5.1 Chemical Hazards ..... 6
5.2 Biological Hazards ..... 8
5.2.1 Animals ..... 8
5.2.2 Insects ..... 8
5.2.3 Plants ..... 8
5.3 Physical Hazards ..... 8
5.3.1 Temperature Extremes ..... 9
5.3.2 Steam, Heat and Splashing ..... 9
5.3.3 Noise ..... 9
5.3.4 Fire and Explosion ..... 9
5.3.5 Manual Lifting/Material Handling ..... 9
5.3.6 Slips, Trips and Falls ..... 10
5.3.7 Heavy Equipment Operation ..... 10
5.3.8 Electrocution ..... 10
6.0 ACTIVITY HAZARD ANALYSES ..... 11
7.0 PERSONAL PROTECTIVE EQUIPMENT ..... 12
7.1 PPE Abbreviations ..... 12
7.2 Hazard Assessment for Selection of Personal Protective Equipment ..... 12
7.3 Respirator Cartridge Change-Out Schedule ..... 15
8.0 AIR MONITORING ..... 17
9.0 ZONES, PROTECTION AND COMMUNICATION ..... 18
9.1 Site Control ..... 18
9.2 Contamination Control ..... 18
9.2.1 Personnel Decontamination Station ..... 19
9.3 Communication ..... 19
10.0 MEDICAL SURVEILLANCE PROCEDURES ..... 20
10.1 Medical Surveillance Requirements ..... 20
10.2 Medical Data Sheet ..... 20
11.0 SAFETY CONSIDERATIONS ..... 21
11.1 General Health and Safety Work Practices ..... 21
11.2 The Buddy System ..... 21
11.3 Sample Handling ..... 21
11.4 Drill Rigs ..... 21

## TABLE OF CONTENTS

PAGE

11.4.1 Safety During Drilling Operations ..... 21
11.5 Excavation ..... 22
12.0 DISPOSAL PROCEDURES ..... 23
13.0 EMERGENCY RESPONSE PLAN ..... 24
13.1 Responsibilities ..... 24
13.1.1 Health and Safety Manager (HSM) ..... 24
13.1.2 Field Team Leader/Site Health and Safety Officer (FOL/HSO) ..... 24
13.1.3 Emergency Coordinator ..... 24
13.1.4 Site Personnel ..... 24
13.2 Communication ..... 24
13.2.1 Hand Signals ..... 25
13.2.2 Field Radios and Cell Phones ..... 25
13.3 Local Emergency Support Units ..... 25
13.4 Pre-Emergency Planning ..... 25
13.5 Emergency Medical Treatment ..... 26
13.6 Emergency Site Evacuation Routes and Procedures ..... 27
13.7 Fire Prevention and Protection ..... 27
13.7.1 Fire Prevention ..... 27
13.8 Overt Chemical Exposure ..... 28
13.9 Decontamination during Medical Emergencies ..... 28
13.10 Accident/Incident Reporting ..... 29
13.11 Adverse Weather Conditions ..... 29
13.12 Spill Control and Response ..... 29
13.13 Emergency Equipment ..... 30
14.0 TRAINING ..... 31
14.1 General Health and Safety Training ..... 31
14.1.1 Three Day Supervised On the Job Training ..... 31
14.2 Annual Eight-Hour Refresher Training ..... 31
14.3 Site-Specific Training ..... 31
14.4 On-Site Safety Briefings ..... 31
14.5 First Aid and CPR ..... 31
14.6 Supervisory Training ..... 32
15.0 LOGS, REPORTS AND RECORDKEEPING ..... 33
15.1 Medical and Training Records ..... 33
15.2 Incident Report and Investigation Form ..... 33
15.3 Health and Safety Logbooks ..... 33
16.0 FIELD PERSONNEL REVIEW ..... 34

## TABLES

Table 5-1 Chemical Hazards
Table 7-1 Personal Protective Equipment Selection
Table 13-1 Emergency Telephone Numbers

## APPENDICES

Appendix A Material Safety Data Sheets
Appendix B Activity Hazard Analyses
Appendix C Heat/Cold Stress Protocols
Appendix D Medical Data Sheet
Appendix E General Health and Safety Work Practices
Appendix F Hospital Route Map and Directions
Appendix G Incident Report Form / Investigation Form
Appendix H Daily Briefing Sign-In Sheet

## 1.0 STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to chemical, biological and physical hazards during implementation of the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) at 3140 Coney Island Avenue, Brooklyn, New York. P.W. Grosser Consulting Engineer & Hydrogeologist, PC's (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this HASP. PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP, which applies to persons present at the site actually or potentially exposed to safety or health hazards, describes emergency response procedures for actual and potential physical, biological and 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.

## 2.0 INTRODUCTION

### 2.1 Purpose

This HASP addresses the minimum health and safety practices that will be employed by site workers participating in implementation of NYSDEC BCP activities at the project site located at 3140 Coney Island Avenue, Brooklyn, New York.

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by P.W. Grosser Consulting Engineer & Hydrogeologist, PC (PWGC), its subcontractors, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. PWGC sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in this HASP and must be made available to PWGC.

Activities performed under this HASP will comply with applicable parts of Occupational Safety and Health Administration (OSHA) Regulations, primarily 29 CFR Parts 1910 and 1926 and all other applicable federal, state, and local regulations. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM). A copy of this HASP will be maintained on-site during all work activities.

Refusal to comply with the HASP or violation of any safety procedures by field personnel may result in their immediate removal from the site following consultation with the HSM and the Field Team Leader (FTL).

### 2.2 Scope

This HASP addresses the potential hazards related to implementation of NYSDEC BCP activities. The primary BCP activities may include the following:

- Site Mobilization/Demobilization;
- Soil Excavation;
- Drilling, and;
- Soil, Groundwater, and Soil-Vapor Sampling

The potential hazards associated with this scope are listed below and are discussed in more detail in this HASP after the project organization and responsibilities section.

- Chemical Hazards
- Biological Hazards
- Physical Hazards

### 2.3 Application

The HASP applies to all personnel involved in the above tasks who wish to gain access to active work areas, including but not limited to:

- PWGC employees and subcontractors;
- Client representatives; and
- Federal, state or local representatives.

## 3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section specifies the project organization and responsibilities.

### 3.1 Project Manager

- Participates in major incident investigations;
- Ensures that the HASP has all of the required approvals before site work is conducted; and
- Has the overall project responsibility for project health and safety.

### 3.2 Field Team Leader (FTL)/ Site Health and Safety Officer (SHSO)

- Ensures that the HASP is implemented in conjunction with the Health and Safety Manager (HSM);
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the HSM is informed of project changes that require modifications to the HASP;
- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the site safety briefing;
- Reports to HSM to provide summaries of field operations and progress; and
- Acts as Emergency Coordinator.

### 3.3 Health and Safety Manager

- Provides for the development of the HASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves individuals who are assigned SHSO responsibilities;
- Coordinates revisions of this HASP with field personnel; and
- Assists in the investigation of major accidents.

### 3.4 Site Personnel

- Report any unsafe or potentially hazardous conditions to the FTL/SHSO;
- Maintain knowledge of the information, instructions and emergency response actions contained in this HASP; and
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions.

## 4.0 SITE HISTORY AND PROJECT DESCRIPTION

### 4.1 Project Background

This Health and Safety Plan (HASP) has been prepared by PWGC, on behalf of 3140 Coney Island Realty, LLC. Previous investigations have identified volatile organic compounds (VOCs), specifically tetrachloroethene (PCE) and its degradation products, above guidance levels and/or standards in soil, groundwater, and soil vapor at the site.

### 4.2 Site Description

The subject site is located at 3140 Coney Island Avenue in the City of New York, New York. The site is located within the Borough of Brooklyn (Kings County). The site is situated on the west side of Coney Island Avenue, between Ocean View Avenue and Brighton Beach Avenue. The property is identified as Block: 8678 Lot: 64 by the New York City Department of Assessment. The site is approximately 4,000 square feet (0.1 acre) and is currently vacant and unoccupied.

### 4.3 Site History

The site was formerly improved with a one-story commercial building with a basement, which was demolished in 2009. The building was used as a dry cleaning facility run by Brighton Cleaners. Sanborn maps show operations within the building as cleaning and dyeing from 1950 to 2007. A 1930 Sanborn map shows the building use as a market and 1896 and 1905 Sanborn maps reveal that the site was used as a horse racing track. The site was also heated with a fuel oil underground storage tank (UST) which appears to be the source of petroleum impact to the site.

### 4.4 Site Features

The project site elevation is approximately 10 feet above mean sea level and is generally level. The previously existing structure at the site has been demolished and the site is currently vacant. Ground cover at the site is minimal and consists primarily of grass and weeds. PCE impacted soils in the western section of the site were excavated and replaced with tunnel rock material up to 4 feet below sidewalk grade. The nearest surface water body is the Atlantic Ocean located approximately 0.4-mile south of the site.

### 4.5 Current and Future Site Use

The site is currently vacant and unoccupied. Proposed future plans for the site include construction of a six-story commercial building with a partial basement to be used as medical offices. The partial basement will be constructed approximately 6 feet below sidewalk level. Proposed development plans call for the entirety of the property to be capped by the planned structure and concrete paved parking areas.

## 5.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under Section 1.0. Additional information can be found in **Appendix A** - Material Safety Data Sheets or in **Appendix B** - Activity Hazard Analyses.

### 5.1 Chemical Hazards

Review of historical information from the site indicates that the soil and groundwater at the site is contaminated with PCE and its degradation products, trichloroethene (TCE), cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride. In addition, the following compounds have been identified on the site and contained minor exceedances of standards and are predominantly associated with the petroleum release: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, n-propylbenzene, xylene, 2-butanone, 1,1,1-tricholoroethane, benzene, carbon tetrachloride, chlorobenzene, isopropylbenzene, p-isopropyltoluene, sec-butylbenzene, and toluene. These compounds may present an occupational exposure hazard during site operations.

Specific information on the chemicals identified at the Site can be found in Table 5-1 as well as on the Material Safety Data Sheets found in **Appendix A**.

**Table 5-1**

**Chemical Hazards**

| COMPOUND | CAS# | OSHA PEL | ROUTES OF EXPOSURE | SYMPTOMS OF EXPOSURE | TARGET ORGANS | PHYSICAL DATA |
|---|---|---|---|---|---|---|
| Tetrachloroethene | 127-18-4 | 100 ppm | Inhalation<br>Ingestion<br>Skin Absorption<br>Skin Contact | Irritates eyes, nose, throat; nausea; flushed face & neck; vertigo, dizziness, incoordination, headache, somnolence; skin erythema; potential human carcinogen. | Skin, eyes, respiratory system, kidneys, liver, CNS | Vapor pressure, 14 mm Hg<br>Chloroform like odor,<br>IP= 9.32 eV |
| Trichloroethene | 79-01-6 | 100 ppm | Inhalation<br>Ingestion<br>Skin Contact | Irritates eyes, throat; redness, tearing, blurred vision, vertigo, dizziness, incoordination, irregular heart beat, potential human carcinogen. | Heart, liver, kidneys, CNS | Vapor pressure, 60 mm Hg<br>Irritating odor at high concentrations |
| Vinyl Chloride | 75-01-04 | 1 ppm | Inhalation<br>Ingestion<br>Skin Contact | Mild irritation to eyes, blurred vision, dizziness, confusion, tingling in hands and feet, symptoms of frost bite, confirmed human carcinogen. | Liver, spleen, kidneys, respiratory system, CNS | Vapor pressure, 35.3 psig,<br>sweet etheral odor |
| 1,2-Dichloroethene | 156-60-5 | 200 ppm | Inhalation<br>Ingestion<br>Skin Absorption | Irritates eyes, nose, and throat; nausea; drowsiness. | Skin, eyes, respiratory system | Vapor pressure, 400 mm Hg<br>Pleasant odor |

**Abbreviations**

C = Ceiling limit, not to be exceeded

CNS = Central Nervous System

PEL=Permissible Exposure Limit

TWA = Time-weighted average (8 hours)

OSHA = Occupational Safety and Health Administration

ppm = parts per million

VP = vapor pressure at approximately 68□ F in mm Hg (mercury)

## 5.2 Biological Hazards

Work will be performed in an urban environment, however, during the course of the project, there is potential for workers to come into contact with biological hazards such as animals, insects and plants. The Activity Hazard Analyses found in **Appendix B** includes specific hazards and control measures for each task, if applicable.

### 5.2.1 *Animals*

The Site is located in a predominantly urban area. It is possible that dogs, cats, rats and mice may be present. Workers shall use discretion and avoid all contact with animals.

### 5.2.2 *Insects*

Insects, such as mosquitoes, ticks, bees and wasps may be present during certain times of the year. Workers will be encouraged to wear repellents and PPE, if deemed necessary, when working in areas where insects are expected to be present.

During the months of April through October, particular caution must be exercised to minimize exposure to deer ticks and the potential for contracting Lyme disease. Specific precautionary work practices that are recommended include the following:

- Cover your body as much as possible. Wear long pants and long sleeved shirts. Light color clothing makes spotting of ticks easier.
- Try to eliminate possible paths by which the Deer Tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. (Duct tape may be utilized to help seal cuffs and ankles). If heavy concentrations of ticks or insects are anticipated or encountered, Tyvek coveralls may be utilized for added protection when the potential for heat stress is not a concern.
- Conduct periodic and frequent, (e.g., hourly), surveys of your clothing for the presence of ticks. Remove any tick, save it and report to the clinic with the tick.
- Use insect /tick repellents that contain the chemical DEET (n,n-Diethyltoluamide). Apply repellents in accordance with manufacturers' recommendations. These repellents are readily available and include such brands as Deep Woods OFF and Maximum Strength OFF.

### 5.2.3 *Plants*

The site is currently vacant; poison ivy, sumac and oak may be present on site. The FTL/SHSO should identify the susceptible individuals. Worker shall avoid all contact with these plants.

## 5.3 Physical Hazards

Most safety hazards are discussed in the Activity Hazard Analyses (AHA) in **Appendix B** for the different phases of the project. In addition to the AHAs, general work rules and other safety procedures are described in Section 10 of this HASP.

### 5.3.1 *Temperature Extremes*

Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment.

PWGC's Heat/Cold Stress Protocols are specified in **Appendix C**.

### 5.3.2 *Steam, Heat and Splashing*

Exposure to steam/heat/splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam/heat/splashing can result in scalding/burns, eye injury, and puncture wounds.

### 5.3.3 *Noise*

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

### 5.3.4 *Fire and Explosion*

When conducting excavation or drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, and other potential ignition sources. During dry periods there is an increased chance of forest and brush fires starting at the job site. If these conditions occur no smoking will be permitted at the site and all operations involving potential ignition sources will be monitored continuously (fire watch).

### 5.3.5 *Manual Lifting/Material Handling*

Manual lifting of heavy objects may be required. Failure to follow proper lifting technique can result in back injuries and strains. Back injuries are a serious concern as they are the most common work place injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

### 5.3.6 *Slips, Trips and Falls*

Working in and around the site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from rough terrain, surfaces that are steep inclines, surfaced debris, or surfaces which are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma or back injuries.

### 5.3.7 *Heavy Equipment Operation*

An excavator/backhoe will be used to excavate where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck by or against, or pinched/caught/crushed by, and can result in serious physical harm.

### 5.3.8 *Electrocution*

Encountering underground utilities may pose electrical hazards to workers. Additionally, overhead electrical lines can be a concern during drilling operations. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

## 6.0 ACTIVITY HAZARD ANALYSES

The Activity Hazard Analysis (AHA) is a systematic way of identifying the potential health and safety hazards associated with major phases of work on the project and the methods to avoid, control and mitigate those hazards. The AHAs will be used to train work crews in proper safety procedures during phase preparatory meetings.

AHAs have been developed by PWGC for the following phases of work:

1. Site Mobilization/Demobilization;
2. Excavation
3. Soil, Groundwater and Soil-Vapor sampling; and
4. Decontamination

Copies of these AHAs are included in **Appendix B** of this HASP.

## 7.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment (PPE) specified in **Table 7-1** represents the hazard analysis and PPE selection required by 29 CFR 1910.132. Specific information on known potential hazards can be found under Section 4.0 and **Appendix B** - Activity Hazard Analyses. For the purposes of PPE selection, the HSM and FTL/SHSO are considered competent persons. The signatures on the approval page of the HASP constitute certification of the hazard assessment. For activities not covered by **Table 7-1**, the FTL/SHSO will conduct the hazard assessment, select the PPE, and document changes in the appropriate field logs. PPE selection will be made in consultation with the HSM.

Modifications for initial PPE selection may also be made by the FTL/SHSO in consultation with the HSM and changes documented accordingly. If major modifications occur, the HSM will notify the PM.

### 7.1 PPE Abbreviations

HEAD PROTECTION
HH = Hard Hat

HEARING PROTECTION
EP = ear plugs
EM = ear muffs

HAND PROTECTION
Cot = cotton
But = Butyl
LWG = Leather Work Gloves
Neo = Neoprene
Nit = Nitrile
Sur = Surgical

EYE/FACE PROTECTION
APR = Full Face Air Purifying Respirator
MFS = Mesh Face shield
PFS =Plastic Face shield
SG = ANSI approved safety glasses with side shields

BODY PROTECTION
WC = work clothes
Cot Cov = Cotton Coveralls
Poly = Polyethylene coated Tyvek® coveralls
Saran = Saranex coated coveralls
Tyvek® = Uncoated Tyvek® coveralls

FOOT PROTECTION
Neo = Neoprene
OB = Overboot
Poly = polyethylene coated boot
Rub = rubber slush boots
STB = Leather work boots with steel toe

RESPIRATORY PROTECTION
APR = Full-face air purifying respirator with organic vapor cartridges
ASR = Full face air supplied respirator with escape bottle
SCBA = Self-contained breathing apparatus

### 7.2 Hazard Assessment for Selection of Personal Protective Equipment

The initial selection of personal protective equipment for each task was done by performing a hazard assessment taking into consideration the following:

- Potential chemical and physical present;
- Work operations to be performed;
- Potential routes of exposure;

- Concentrations of contaminants present; and
- Characteristics, capabilities and limitations of PPE and any hazard that the PPE presents or magnifies.

A review of the analytical data from previous sampling events indicates that VOCs identified in **Table 5-1** are the primary contaminants of concern.

The exposure routes for these chemicals are inhalation, skin absorption, skin/eye contact and ingestion. Chemical protective gloves will be required for all activities that involve sample handling and the likelihood for skin contact. The proper use of PPE and strict adherence to decontamination and personal hygiene procedures will effectively minimize skin contact and ingestion as potential routes of exposure.

**Table 7-1**

**Personal Protective Equipment Selection**

| TASK | HEAD | EYE/FACE | FEET | HANDS | BODY | HEARING | RESPIRATOR |
|---|---|---|---|---|---|---|---|
| Mobilization/ Demobilization | HH | SG | STB | WG | WC | None | None |
| Excavation, loading and backfilling | HH | SG | STB | WG | WC | EM or EP | None initially<br>APR if action levels exceeded |
| Drilling Activities | HH | SG | STB | WG | WC | EM or EP | None initially<br>APR if action levels exceeded |
| Soil/GW sampling | HH | SG | STB | WG, Nit & Sur as needed | WC, Tyvek® as needed | None | None initially<br>APR if action levels exceeded |
| Decontamination | HH | SG | STB | Nit + Sur | WC, Tyvek® as needed | None | None initially<br>APR if action levels exceeded |

### 7.3 Respirator Cartridge Change-Out Schedule

A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. If the use of respirators is necessary, the respirator cartridge change-out schedule for this project will be as follows:

1. Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first; and
2. If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short of time period they were used the day before.

The schedule was developed based on the following scientific information and assumptions:

- Analytical data that is available regarding site contaminants;
- Using the Rule of Thumb provided by the AIHA;
- All of the chemicals have boiling points greater than 70□C;
- Total airborne concentration of contaminants is anticipated to be less than 200 ppm;
- The humidity is expected to be less than 85%; and
- Desorption of the contaminants (including those with poor warning properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (eg, overnight) and result in a non-use exposure.

The following is a partial list of factors that may affect the usable cartridge service life and/or the degree of respiratory protection attainable under actual workplace conditions. These factors have been considered when developing the cartridge change-out schedule.

Type of contaminant(s);

- Contaminant concentration;
- Relative humidity;
- Breathing rate; Temperature; Changes in contaminant concentration, humidity, breathing rate and temperature;
- Mixtures of contaminants;
- Accuracy in the determination of the conditions;
- The contaminant concentration in the workplace can vary greatly. Consideration must be given to the quality of the estimate of the workplace concentration;
- Storage conditions between multiple uses of the same respirator cartridges. It is recommended that the chemical cartridges be replaced after each work shift. Contaminants adsorbed on a cartridge can migrate through the carbon bed without airflow;

- Age of the cartridge;
- Condition of the cartridge and respirator;
- Respirator and cartridge selection respirator fit;
- Respirator assembly, operation, and maintenance;
- User training, experience and medical fitness;
- Warning properties of the contaminant; and
- The quality of the warning properties should be considered when establishing the chemical cartridge change schedule. Good warning properties may provide a secondary or back-up indication for cartridge change-out.

## 8.0 AIR MONITORING

Air monitoring will be performed for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at the site in accordance with the project Community Air Monitoring Plan (CAMP). The site specific CAMP provides measures for protection for on-site workers and the downwind community from potential airborne contaminants as a direct result of the Supplemental Investigation. The CAMP will be implemented and executed in accordance with 29 CFR 1910.120(h), the New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan, and the New York State Department of Environmental Conservation (NYSDEC) TAGM #4031.

Real-time monitoring for dust and VOCs will be conducted both within the work area, and along the site perimeter, during intrusive activities such as excavation and drilling activities.

Detailed information on the types, frequency and location of real-time monitoring and community air monitoring requirements are provided in the CAMP prepared for this project.

## 9.0 ZONES, PROTECTION AND COMMUNICATION

### 9.1 Site Control

Site zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It shall include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones shall be established on the work site when operations begin.

This project is a hazardous waste remediation project, and any person working in an area where the potential for exposure to site contaminants exists, will only be allowed access after providing the FTL/SHSO with proper training and medical documentation.

The zones are based upon current knowledge of proposed site activities. It is possible that the zone configurations may be altered due to work plan revisions. Should this occur, the work zone will be adjusted accordingly, and documented through use of a field-change request form.

The following shall be used for guidance in revising these preliminary zone designations, if necessary.

***Support Zone -*** The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

***Contamination Reduction Zone -*** The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides for an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

***Exclusion Zone -*** All activities, which may involve exposure to site contaminants, hazardous materials and/or conditions, should be considered an EZ. The FTL/SHSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the site HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

### 9.2 Contamination Control

Decontamination areas will be established for the following activities.

- Drilling/Sampling Activities
- Excavation

### 9.2.1 *Personnel Decontamination Station*

All personnel and portable equipment used in the EZ shall be subject to a thorough decontamination process, as deemed necessary by the FTL/SHSO. Sampling equipment shall be decontaminated. As necessary, all boots and gloves will be decontaminated using soap and water solution and scrub brushes or simple removal and disposal. All used respiratory protective equipment will be decontaminated daily and sanitized with appropriate sanitizer solution.

All drums generated as a result of sampling and decontamination activities will be marked and stored at a designated area at the site until the materials can be property disposed of off-site.
All non-expendable sampling equipment will be decontaminated. This usually entails the use of Alconox, solvent and distilled/deionized water rinses to eliminate contaminants.

## 9.3 Communication

- Each team member will have a Nextel cell phone/radio for communication with the PM, HSO and other team members during field activities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

| SIGNAL | MEANING |
|---|---|
| Hand gripping throat | Out of air, can't breathe |
| Grip on a partner's wrist or placement of both hands around a partner's waist. | Leave the area immediately, no debate. |
| Hands on top of head | Need assistance |
| Thumbs up | Okay, I'm all right, I understand. |
| Thumbs down | No, negative. |

## 10.0 MEDICAL SURVEILLANCE PROCEDURES

All contractor and subcontractor personnel performing field work where potential exposure to contaminants exists at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f).

### 10.1 Medical Surveillance Requirements

A physician's medical release for work will be confirmed by the HSM before an employee can work in the exclusion zone. The examination will be taken annually at a minimum and upon termination of hazardous waste site work if the last examination was not taken within the previous six months. Additional medical testing may be required by the HSM in consultation with the Corporate Medical Consultant and the FTL/SHSO if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other site conditions warrant further medical surveillance.

### 10.2 Medical Data Sheet

A medical data sheet is provided in **Appendix D**. This medical data sheet is voluntary and should be completed by all on-site personnel and will be maintained at the site. Where possible, this medical data sheet will accompany the personnel needing medical assistance. The medical data sheet will be maintained in a secure location, treated as confidential, and used only on a need-to-know basis.

## 11.0 SAFETY CONSIDERATIONS

### 11.1 General Health and Safety Work Practices

A list of general health and safety work practices is included as an included in **Appendix E**. The work rules will be posted in a conspicuous location at the site.

### 11.2 The Buddy System

At a minimum, employees shall work in groups of two in such a manner that they can observe each other and maintain line-of-sight for each employee within the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

### 11.3 Sample Handling

Personnel responsible for the handling of samples should wear the prescribed level of protection. Samples should be identified as to their hazard and packaged as to prevent spillage or breakage. Sample containers shall be decontaminated in the CRZ or EZ before entering a clean Support Zone area. Any unusual sample conditions, odors, or real-time readings should be noted. Laboratory personnel should be advised of sample hazard level and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling, in order to assure that the practices are appropriate for the suspected contaminants in the sample.

### 11.4 Drill Rigs

When conducting drilling activities, the opportunity of encountering fire and explosion hazards exists from underground utilities and gases. The locations of underground utilities will be verified prior to performing any intrusive activities. Additionally, because of the inherently hazardous nature of drilling operations, safety and accident prevention are crucial when drilling operations are performed. Most drilling accidents occur as a direct result of lack of training and supervision, improper handling of equipment, and unsafe work practices. Hazards include: assembling and disassembling rigs, rotary and auger drilling, and grouting. The drilling contractor shall perform drilling in accordance with its own Health & Safety Program for Drill Rig Safety.

#### 11.4.1 *Safety During Drilling Operations*

- Safety requires the attention and cooperation of every worker and site visitor.
- Do not drive the drill rig from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast (derrick), look up to check for overhead obstructions.
- Maintain a minimum of 15 feet clearance from all overhead electric lines.
- Before raising the mast (derrick), all drill rig personnel (with the exception of the operator) and visitors shall be cleared from the areas immediately to the rear and the sides of the mast. All drill rig personnel and visitors shall be informed that the mast is being raised prior to raising it.
- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. Lower the mast (derrick) only when the leveling jacks are down and do not raise the leveling jack pads until the mast (derrick) is lowered completely.
- The operator of a drill rig shall only operate a drill rig from the position of the controls.

- Throwing or dropping tools shall not be permitted. All tools shall be carefully passed by hand between personnel or a hoist line shall be used.
- Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting work on a drill rig or while on the job.
- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors, or animals form stepping or falling into the hole.
- Terminate drilling operations during an electrical storm and move the entire crew away from the drill rig.

### 11.5 Excavation

Excavations will be conducted in accordance with the requirements contained in 29 CFR 1926, Subpart P-Excavations. It provides for the designation of a "Competent Person" and general requirements for safe excavating practices. The program also incorporates company standards for the monitoring of potentially hazardous atmospheres; protection from water hazards; analyzing and maintaining the stability of adjacent structures; daily competent person inspections; soil classification; sloping and benching; protective systems; and training.

The Competent Person will be the FTL or other designee with appropriate training and experience. The Competent Person will be assisted in his/her duties by other technical personnel such as the HSM, geologists, structural engineers and soils engineers.

No entry into excavations will be allowed for this phase of the project.

## 12.0 DISPOSAL PROCEDURES

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on site.

All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials will be collected and bagged for appropriate disposal as non-hazardous solid waste. Additional waste disposal procedures may be developed as applicable.

## 13.0 EMERGENCY RESPONSE PLAN

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures which are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures.

### 13.1 Responsibilities

#### 13.1.1 *Health and Safety Manager (HSM)*

The HSM oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The HSM acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

#### 13.1.2 *Field Team Leader/Site Health and Safety Officer (FOL/HSO)*

The FTL/SHSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The FTL/SHSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can ensure that OSHA is notified within the required time frame. The HSM will be notified of all OSHA recordable injuries, fires, spills, releases or equipment damage in excess of $500 within 24 hours.

#### 13.1.3 *Emergency Coordinator*

The Emergency Coordinator for the project is the FTL/SHSO.

The Emergency Coordinator shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts the emergency coordinator will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The emergency coordinator will locate emergency phone numbers and identify hospital routes prior to beginning work on site. The emergency coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator will implement the Emergency Response/Contingency Plan whenever conditions at the site warrant such action.

#### 13.1.4 *Site Personnel*

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency.

### 13.2 Communication

A variety of communication systems may be utilized during emergency situations. These are discussed in the

following sections.

### 13.2.1 *Hand Signals*

Downrange field teams will employ hand signals where necessary for communication during emergency situations. Hand signals are found in Section 8.3.

### 13.2.2 *Field Radios and Cell Phones*

PWGC field personnel are provided cellular phones with telephone and two-way radio capabilities for site communication and emergency use.

## 13.3 Local Emergency Support Units

A route map from the site to the nearest hospital can be found in **Appendix F**. This map will be placed with the above emergency telephone numbers in all on-site vehicles.

## 13.4 Pre-Emergency Planning

PWGC will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from exposure to any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

Before the field activities begin, the local emergency response personnel will be notified of the schedule for field activities and about the materials that are thought to exist on the site so that they will be able to respond quickly and effectively in the event of a fire, explosion, or other emergency. Before fieldwork on the site commences, each person who will be working there or observing the operations will complete a medical data sheet (**Appendix D**). These data sheets will be filled out during site-specific training and will be kept on the site.

In the event of an incident where a team member becomes exposed or suffers from an acute symptom of exposure to site materials and has to be taken to a hospital, a copy of his/her medical data sheet will be presented to the attending physician.

**Table 13-1**

**Emergency Telephone Numbers**

| Contact | Firm or Agency | Telephone Number |
|---|---|---|
| Police | | 911 |
| Fire | | 911 |
| Hospital | Beth Israel Medical Center | (718) 951-2807 |
| Ambulance | | 911 |
| Project Manager/Health and Safety Manager | Kris Almskog<br>PWGC | (631) 589-6353 |
| Health & Safety Officer | Jennifer Lewis<br>PWGC | (631) 589-6353 |
| NYSDEC Site Contact | Yuk Yin Wong | (718) 482-4905 |
| Poison Control Center | | (800) 962-1253 |
| Chemtrec | | (800) 424-9300 |

## 13.5 Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the FTL/SHSO immediately. First aid equipment will be available on site at the following locations:

- First Aid Kit: Support Zone (or designated by FTL/SHSO upon arrival)
- Emergency Eye Wash: Support Zone (or designated by FTL/SHSO upon arrival)

During site-specific training, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

There will be at least one person with current First Aid and CPR certification on each active work shift. When personnel are transported to the hospital, the FTL/SHSO will provide a copy of the Medical Data Sheet to the paramedics and treating physician.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an

ambulance. A map and directions to the hospital can be found in **Appendix F.**

### 13.6 Emergency Site Evacuation Routes and Procedures

In order to mobilize the manpower resources and equipment necessary to cope with a fire or other emergency, a clear chain of authority will be established. The EC will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The EC will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the EC also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, an air horn will be sounded on the site. The horn will sound continuously for one blast, signaling that immediate evacuation of all personnel is necessary due to an immediate or impending danger. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the evacuation meeting point, which will be determined upon arrival at the site by the FTL/SHSO, prior to work beginning. This will then be conveyed to all crew members during the site-specific briefing.

The EC will give directions for implementing whatever actions are necessary. Any project team member may be assigned to be in charge of emergency communications during an emergency. He/she will attend the site telephone specified by the EC from the time the alarm sounds until the emergency has ended.

After sounding the alarm and initiating emergency response procedures, the EC will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and fire fighters arrive.

The EC will remain at the site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. A map showing evacuation routes, meeting places and the location of emergency equipment will be posted in all trailers and used during site-specific training.

### 13.7 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site (air horn will sound for a single continuous blast), and notification of local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

#### 13.7.1 *Fire Prevention*

Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or any work area;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;
- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities; and
- Monthly inspections of all fire extinguishers.

### 13.8 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet or recommended by the Corporate Medical Consultant will be followed, when necessary.

SKIN AND EYE CONTACT: Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

INHALATION: Move to fresh air. Decontaminate and transport to hospital or local medical provider.

INGESTION: Decontaminate and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate and transport to emergency medical facility.

### 13.9 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or postponed. The FTL/SHSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on-site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

### 13.10 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

- Health and Safety Manager;
- Project Manager; and
- The employer of any injured worker who is not a PWGC employee.

Written confirmation of verbal reports are to be completed by the FTL/SHSO using the Incident Report Form and submitted within 24 hours. The incident report and investigation form is found in **Appendix G**. If the employee involved is not a PWGC employee, his employer will receive a copy of the report.

### 13.11 Adverse Weather Conditions

In the event of adverse weather conditions, the FTL/SHSO will determine if work can continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries;
- Potential for cold stress and cold-related injuries;
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds);
- Limited visibility (fog);
- Potential for electrical storms;
- Earthquakes; and
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The FTL/SHSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

### 13.12 Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill. The following seven steps should be taken by the Emergency Coordinator:

- Determine the nature, identity and amounts of major spill components;

- Make sure all unnecessary persons are removed from the spill area;
- Notify appropriate response teams and authorities;
- Use proper PPE in consultation with the FTL/SHSO;
- If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.);
- If possible, try to stop the leak with appropriate material; and,
- Remove all surrounding materials that can react or compound with the spill.

### 13.13 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on-site:

- Industrial first aid kit;
- Burn kit and portable eye washes (one per field team);
- Fire extinguishers (one per work area); and
- Absorbent material /spill kit.

## 14.0 TRAINING

### 14.1 General Health and Safety Training

In accordance with PWGC corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

#### 14.1.1 *Three Day Supervised On the Job Training*

In addition to the required initial hazardous waste operations training, each employee shall have received three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

### 14.2 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 1910.120 requirements and related company programs and procedures.

### 14.3 Site-Specific Training

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards and emergency services at the site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

### 14.4 On-Site Safety Briefings

Project personnel and visitors will be given on-site health and safety briefings daily by the FTL/SHSO to assist site personnel in safely conducting their work activities. A copy of the Daily Briefing Sign-In Sheet is contained in **Appendix H**. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity to periodically update the crews on monitoring results. Prior to starting any new activity, a training session using the Activity Hazard Analysis will be held for crew members involved in the activity.

### 14.5 First Aid and CPR

The HSM will identify those individuals requiring first aid and CPR training to ensure that emergency medical treatment is available during field activities. It is anticipated that a minimum of one field person on-site at any one time will have first aid and CPR training. The training will be consistent with the requirements of the American

Red Cross Association or American Heart Association. If none are available on-site, then the HSM shall be notified.

### 14.6 Supervisory Training

Supervisors and health and safety personnel shall have completed an additional eight hours of specialized training in accordance with 29 CFR 1910.120.

## 15.0 LOGS, REPORTS AND RECORDKEEPING

Changes to the HASP will be documented in the Health and Safety log book and as appropriate, the HSM and/or PM will be notified. Daily tailgate meetings will be documented in the H&S log book as well as personnel on-site.

### 15.1 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training and documentation of three day OJT) and medical clearance for hazardous waste site work and respirator use will be maintained on-site. Records for all subcontractor employees will also be kept on-site.

### 15.2 Incident Report and Investigation Form

The incident report and investigation form is to be completed for all accidents and incidents, including near misses. The form can be found in **Appendix G**.

### 15.3 Health and Safety Logbooks

The FTL/SHSO will maintain a logbook during site work. The daily site conditions, personnel, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file.

## 16.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the FTL/SHSO as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I will comply with the provisions contained therein.

| ***Name (Print and Sign)*** | ***Date*** |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

# Appendix A
# Material Safety Data Sheets

Fisher Scientific
Part of Thermo Fisher Scientific

# MATERIAL SAFETY DATA SHEET

## Section 1 - Chemical Product and Company Identification

**MSDS Name:** 1,2,4-Trimethylbenzene

**Catalog Numbers:** AC140090000, AC140090010, AC140090025, AC140095000

**Synonyms:** Pseudocumene.

**Company Identification:**
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

**Company Identification: (USA)**
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

**For information in the US, call:** 800-ACROS-01

**For information in Europe, call:** +32 14 57 52 11

**Emergency Number, Europe:** +32 14 57 52 99

**Emergency Number US:** 201-796-7100

**CHEMTREC Phone Number, US:** 800-424-9300

**CHEMTREC Phone Number, Europe:** 703-527-3887

## Section 2 - Composition, Information on Ingredients

---

CAS#: 95-63-6

Chemical Name: 1,2,4-Trimethylbenzene

%: 98

EINECS#: 202-436-9

---

**Hazard Symbols:** XN N





**Risk Phrases:** 10 20 36/37/38 51/53

## Section 3 - Hazards Identification

**EMERGENCY OVERVIEW**

Warning! Flammable liquid and vapor. Harmful if inhaled. Causes eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Target Organs: Blood, central nervous system, respiratory system, eyes, skin.

**Potential Health Effects**

**Eye:** Causes eye irritation. Causes redness and pain.

**Skin:** Causes skin irritation. Causes redness and pain. May be harmful if absorbed through the skin.

**Ingestion:** May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May be harmful if swallowed. May cause central nervous system depression.

**Inhalation:** Harmful if inhaled. Causes respiratory tract irritation. May cause drowsiness, unconsciousness, and central nervous system depression.

**Chronic:** Prolonged or repeated skin contact may cause dermatitis. May cause anemia and other blood cell abnormalities. Prolonged exposure may produce a narcotic effect. Prolonged or repeated exposure may cause nausea, dizziness, and headache.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** Do not induce vomiting. Possible aspiration hazard. Get medical aid immediately. Call a poison control center.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Possible aspiration hazard. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

**Notes to Physician:**

## 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. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Containers may explode in the heat of a fire. Flammable liquid and vapor.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Autoignition Temperature:** 500 deg C ( 932.00 deg F)

**Flash Point:** 48 deg C ( 118.40 deg F)

**Explosion Limits: Lower:** 0.9 vol %

**Explosion Limits: Upper:** 6.4 vol %

**NFPA Rating:** health: 2; 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. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

## Section 7 - Handling and Storage

**Handling:** Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood. Keep away from heat, sparks and flame.

**Storage:** Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

| Chemical Name | ACGIH | NIOSH | OSHA - Final PELs |
|---|---|---|---|
| 1,2,4-Trimethylbenzene | 25 ppm TWA (listed under Trimethyl benzene). | 25 ppm TWA; 125 mg/m3 TWA | none listed |

OSHA Vacated PELs: 1,2,4-Trimethylbenzene: 25 ppm TWA; 125 mg/m3 TWA (listed under Trimethyl benzene)

**Engineering Controls:**

Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

**Exposure Limits**

**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:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Clear liquid
**Color:** colorless
**Odor:** aromatic odor
**pH:** Not available
**Vapor Pressure:** 7 mm Hg @ 44.4 deg C
**Vapor Density:** 4.15 (air=1)
**Evaporation Rate:** Not available
**Viscosity:** Not available
**Boiling Point:** 168 deg C @ 760 mmHg ( 334.40°F)
**Freezing/Melting Point:** -44 deg C ( -47.20°F)
**Decomposition Temperature:** Not available
**Solubility in water:** Insoluble
**Specific Gravity/Density:** 0.880 g/cm3
**Molecular Formula:** C9H12
**Molecular Weight:** 120.19

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.
**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.
**Incompatibilities with Other Materials** Strong oxidizing agents.
**Hazardous Decomposition Products** Carbon monoxide, carbon dioxide.
**Hazardous Polymerization** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:** CAS# 95-63-6: DC3325000

**LD50/LC50:** RTECS:
**CAS# 95-63-6:** Inhalation, rat: LC50 = 18000 mg/m3/4H;
Oral, mouse: LD50 = 6900 mg/kg;
Oral, rat: LD50 = 5 gm/kg;
.

**Carcinogenicity:** 1,2,4-Trimethylbenzene - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

**Other:** See actual entry in RTECS for complete information.

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Fathead Minnow: LC50 = 77.2 mg/L; 96 Hr; Flow-through at 25 C (pH 7.24)

**Other:** Do not empty into drains.

## Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

## Section 14 - Transport Information

US DOT
Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (1,2,4-Trimethylbenzene)
Hazard Class: 3
UN Number: UN1993
Packing Group: III
Canada TDG

Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

## Section 15 - Regulatory Information

**European/International Regulations**

European Labeling in Accordance with EC Directives

Hazard Symbols: XN N

Risk Phrases:

R 10 Flammable.

R 20 Harmful by inhalation.

R 36/37/38 Irritating to eyes, respiratory system and skin.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 95-63-6: 3

Canada

CAS# 95-63-6 is listed on Canada's DSL List

Canadian WHMIS Classifications: B3, D1B, 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.

CAS# 95-63-6 is listed on Canada's Ingredient Disclosure List

**US Federal**

TSCA

CAS# 95-63-6 is listed on the TSCA Inventory.

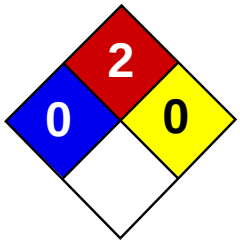
## Section 16 - Other Information

**MSDS Creation Date:** 5/19/1999

**Revision #5 Date** 8/30/2007

**Revisions were made in Sections:** 3, 4, 5, 6, 7, 8, 9, 10, 11, 1

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.







# Material Safety Data Sheet
## Mesitylene MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Mesitylene

**Catalog Codes:** SLM2410

**CAS#:** 108-67-8

**RTECS:** OX6825000

**TSCA:** TSCA 8(b) inventory: Mesitylene

**CI#:** Not available.

**Synonym:** 1,3,5-Trimethylbenzene

**Chemical Formula:** C9H12

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:**
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Mesitylene | 108-67-8 | 100 |

**Toxicological Data on Ingredients:** Mesitylene: VAPOR (LC50): Acute: 4881.9 ppm 4 hour(s) [Rat].

## Section 3: Hazards Identification

**Potential Acute Health Effects:**
Hazardous in case of eye contact (irritant), of ingestion, of inhalation (lung irritant). Slightly hazardous in case of skin contact (irritant, permeator), .

**Potential Chronic Health Effects:**
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

## Section 4: First Aid Measures

**Eye Contact:**
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 559°C (1038.2°F)

**Flash Points:** CLOSED CUP: 43°C (109.4°F).

**Flammable Limits:** Not available.

**Products of Combustion:** These products are carbon oxides (CO, CO2).

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Avoid contact with eyes Wear suitable protective clothing If ingested, seek medical advice immediately and show the container or the label.

**Storage:**
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 25 CEIL: 35 (ppm) TWA: 125 CEIL: 170 (mg/m3) Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:** Aromatic.

**Taste:** Not available.

**Molecular Weight:** 120.2 g/mole

**Color:** Not available.

**pH (1% soln/water):** Not available.

**Boiling Point:** 164.7°C (328.5°F)

**Melting Point:** -44.8°C (-48.6°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 0.8637 (Water = 1)

**Vapor Pressure:** 1.86 mm of Hg (@ 20°C)

**Vapor Density:** 4.14 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 0.23 ppm

**Water/Oil Dist. Coeff.:** The product is equally soluble in oil and water; log(oil/water) = 0

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Very slightly soluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

## Section 11: Toxicological Information

**Routes of Entry:** Eye contact. Ingestion.

**Toxicity to Animals:**
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute toxicity of the vapor (LC50): 4881.9 ppm 4 hour(s) [Rat].

**Chronic Effects on Humans:** Not available.

**Other Toxic Effects on Humans:**
Hazardous in case of ingestion, of inhalation (lung irritant). Slightly hazardous in case of skin contact (irritant, permeator), .

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** Class 3: Flammable liquid.

**Identification:** : 1,3,5-Trimethylbenzene : UN2325 PG: III

**Special Provisions for Transport:** Marine Pollutant

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
Florida: Mesitylene New Jersey: Mesitylene TSCA 8(b) inventory: Mesitylene

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**
CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).

**DSCL (EEC):**
R10- Flammable. R36/37- Irritating to eyes and respiratory system.

**HMIS (U.S.A.):**

**Health Hazard:** 0

**Fire Hazard:** 2

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 0

**Flammability:** 2

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 06:06 PM

**Last Updated:** 11/01/2010 12:00 PM

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.*

HOVENSA

MATERIAL SAFETY DATA SHEET

# Benzene

**MSDS No. 1785**

**EMERGENCY OVERVIEW**
**DANGER!**
**FLAMMABLE - BLOOD TOXIN AND CARCINOGEN - ABSORBED THROUGH THE SKIN - CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD**




NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause blood disease, including anemia and leukemia.

## 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

**HOVENSA L.L.C.**
**1 Estate Hope**
**Christiansted, VI 00820-5652**

**EMERGENCY TELEPHONE NUMBER (24 hrs):** **CHEMTREC (800) 424-9300**

**COMPANY CONTACT (business hours):** **Safety Department (340) 692-3000**

**SYNONYMS:** Benzol; Coal Naphtha; coal tar naphtha; Cyclohexatriene; Phenyl hydride
See Section 16 for abbreviations and acronyms.

## 2. COMPOSITION and CHEMICAL INFORMATION ON INGREDIENTS

| INGREDIENT NAME (CAS No.) | CONCENTRATION PERCENT BY WEIGHT |
|---|---|
| Benzene (71-43-2) | 100 |

## 3. HAZARDS IDENTIFICATION

**EYES**
Moderate to severe irritant. Contact with liquid or vapor may cause irritation.

**SKIN**
Moderate to severe irritant. May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

**INGESTION**
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

**INHALATION**
Excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

Effects to the blood (including decreased platelet and white blood cell counts), cardiovascular system, nervous system, retina, lungs, gastrointestinal system, spleen, and kidneys have been reported from large, acute (short) and repeated or prolonged exposures.

**CHRONIC EFFECTS and CARCINOGENICITY**
Benzene is a regulated human carcinogen. Benzene has the potential to cause bone marrow depression, aplastic anemia (low red blood cell count) and other blood diseases, including leukemia, after repeated and prolonged exposure. Benzene can cause liver and kidney toxicity.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE**
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Pre-existing chronic respiratory disease, liver or kidney dysfunction, or blood, cardiovascular and central nervous system disorders may be aggravated by exposure.

## 4. FIRST AID MEASURES

**EYES**
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

**SKIN**
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

**INGESTION**
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

**INHALATION**
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

**NOTE TO PHYSICIAN**
OSHA and US Coast Guard require that a person exposed to benzene in an emergency have a urine sample taken at the end of the shift and have a urine phenol test performed within 72 hours. For results equal to or greater than 75 ml/L of urine, employees must have a complete blood count every month for three months after the emergency exposure. See OSHA 29 CFR 1910.1028 or USCG 49 CFR 193.

## 5. FIRE FIGHTING MEASURES

**FLAMMABLE PROPERTIES:**

| | |
|---|---|
| FLASH POINT: | 12 °F (-11°C) |
| AUTOIGNITION TEMPERATURE: | 928 °F (498 °C) |
| OSHA/NFPA FLAMMABILITY CLASS: | 1B (flammable liquid) |
| LOWER EXPLOSIVE LIMIT (%): | 1.3% |
| UPPER EXPLOSIVE LIMIT (%): | 7.9% |

**FIRE AND EXPLOSION HAZARDS**

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

**EXTINGUISHING MEDIA**

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

**FIRE FIGHTING INSTRUCTIONS**

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

## 6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Product may release substantial amounts of flammable vapors and gases (e.g., methane, ethane, and propane), at or below ambient temperature depending on source and process conditions and pressure.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection - do not discharge solid water stream patterns into the liquid resulting in splashing.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

## 7. HANDLING and STORAGE

### HANDLING and STORAGE PRECAUTIONS

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

### STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

### WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

## 8. EXPOSURE CONTROLS and PERSONAL PROTECTION

### EXPOSURE LIMITS

| Components (CAS No.) | Source | Exposure Limits TWA/STEL | Note |
|---|---|---|---|
| Benzene (71-43-2) | OSHA<br>ACGIH | PEL = 1ppm; STEL = 5 ppm<br>TLV = 0.5 ppm; STEL = 2.5 ppm | A1; skin; BEI |

### ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

### EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

### SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as of E.I. DuPont Tyvek-Saranex 23 ®, Tychem®, Barricade® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

**RESPIRATORY PROTECTION**
A NIOSH -approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

## 9. PHYSICAL and CHEMICAL PROPERTIES

**APPEARANCE**
A clear, water-like liquid

**ODOR**
A sweet, aromatic odor.

**ODOR THRESHOLD**
4.7 ppm

**BASIC PHYSICAL PROPERTIES**

| | |
|---|---|
| BOILING RANGE: | 176 $^{o}$F (80 $^{o}$C) |
| VAPOR PRESSURE: | 74.6 mm Hg @ 68 $^{o}$F (20 $^{o}$C) |
| VAPOR DENSITY (air = 1): | 2.8 |
| SPECIFIC GRAVITY ($H_2O$ = 1): | 0.87 |
| EVAPORATION RATE: | High |
| PERCENT VOLATILES: | 100 % |
| SOLUBILITY ($H_2O$): | Insoluble to slightly soluble |

## 10. STABILITY and REACTIVITY

**STABILITY:** Stable. Hazardous polymerization will not occur.

**CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS**
Material is stable under normal conditions. Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

**HAZARDOUS DECOMPOSITION PRODUCTS**
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

## 11. TOXICOLOGICAL PROPERTIES

**ACUTE TOXICITY**
Acute Dermal LD50 (rabbits): > 9.4 ml/kg
Acute Oral LD50 (mouse): 4.7 g/kg
Acute inhalation LC50: 10,000 ppm (rat; 7 hours)
Eye irritation (rabbit): mild to moderate
Primary dermal irritation (rabbits): mild to moderate

**CHRONIC EFFECTS AND CARCINOGENICITY**
Carcinogenicity: OSHA: YES IARC: (1) NTP: YES ACGIH: (A1)

Numerous epidemiological (human) and animal studies have reported an increased incidence or a causal relationship between leukemia and benzene exposure.

Mutagenicity: positive

## 12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

## 13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

## 14. TRANSPORTATION INFORMATION

| | |
|---|---|
| DOT PROPER SHIPPING NAME: | Benzene |
| DOT HAZARD CLASS and PACKING GROUP: | 3, PG II |
| DOT IDENTIFICATION NUMBER: | UN 1114 |
| DOT SHIPPING LABEL: | FLAMMABLE LIQUID |

PLACARD:




## 15. REGULATORY INFORMATION

**U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION**

Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

**CLEAN WATER ACT (OIL SPILLS)**

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

**CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)**

Benzene is a CERCLA Section 103 "hazardous substance" subject to CERCLA and SARA Section 304 reporting requirements.

Reportable Quantity: 10 pounds

**SARA SECTION 311/312 - HAZARD CLASSES**

| ACUTE HEALTH | CHRONIC HEALTH | FIRE | SUDDEN RELEASE OF PRESSURE | REACTIVE |
|---|---|---|---|---|
| X | X | X | -- | -- |

**SARA SECTION 313 - SUPPLIER NOTIFICATION**

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

| INGREDIENT NAME | | CONCENTRATION PERCENT BY WEIGHT |
|---|---|---|
| Benzene | CAS NUMBER: 71-43-2 | < 0.1 to 2 |

**CANADIAN REGULATORY INFORMATION (WHMIS)**

Class B Division 2 (Flammable Liquid)
Class D Division 2 Subdivision A (Very toxic by other means)
Class D Division 1 Subdivision A (Very toxic acute)
Class D Division 2 Subdivision B (Toxic by other means)

**CALIFORNIA PROPOSITON 65 LIST OF CHEMICALS**

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

| **INGREDIENT NAME (**CAS NUMBER) | **Date Listed** |
|---|---|
| Benzene | 2/27/1987 |

**NFPA® HAZARD RATING**

| | |
|---|---|
| HEALTH: | 2 |
| FIRE: | 3 |
| REACTIVITY: | 0 |

Refer to NJPA 704 "Identification of the Fire Hazards of Materials" for further information

**HMIS® HAZARD RATING**

| | | |
|---|---|---|
| HEALTH: | 3 * | Slight |
| FIRE: | 3 | Moderate |
| PHYSICAL: | 0 | Negligible |
| | | * Chronic |

**SUPERSEDES MSDS DATED:** 01/14/1999

**ABBREVIATIONS:**

| | | |
|---|---|---|
| AP = Approximately | < = Less than | > = Greater than |
| N/A = Not Applicable | N/D = Not Determined | ppm = parts per million |

**ACRONYMS:**

| | |
|---|---|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| AIHA | American Industrial Hygiene Association |
| ANSI | American National Standards Institute (212) 642-4900 |
| API | American Petroleum Institute (202) 682-8000 |
| CERCLA | Comprehensive Emergency Response, Compensation, and Liability Act |
| DOT | U.S. Department of Transportation [General info: (800) 467-4922] |
| EPA | U.S. Environmental Protection Agency |
| HMIS | Hazardous Materials Information System |
| IARC | International Agency For Research On Cancer |
| MSHA | Mine Safety and Health Administration |
| NFPA | National Fire Protection Association (617)770-3000 |
| NIOSH | National Institute of Occupational Safety and Health |
| NOIC | Notice of Intended Change (proposed change to ACGIH TLV) |
| NTP | National Toxicology Program |
| OPA | Oil Pollution Act of 1990 |
| OSHA | U.S. Occupational Safety & Health Administration |
| PEL | Permissible Exposure Limit (OSHA) |
| RCRA | Resource Conservation and Recovery Act |
| REL | Recommended Exposure Limit (NIOSH) |
| SARA | Superfund Amendments and Reauthorization Act of 1986 Title III |
| SCBA | Self-Contained Breathing Apparatus |
| SPCC | Spill Prevention, Control, and Countermeasures |
| STEL | Short-Term Exposure Limit (generally 15 minutes) |
| TLV | Threshold Limit Value (ACGIH) |
| TSCA | Toxic Substances Control Act |
| TWA | Time Weighted Average (8 hr.) |
| WEEL | Workplace Environmental Exposure Level (AIHA) |
| WHMIS | Canadian Workplace Hazardous Materials Information System |

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

# TETRACHLOROETHYLENE

**0076**
April 2000

**CAS No: 127-18-4**
RTECS No: KX3850000
UN No: 1897
EC No: 602-028-00-4

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

| 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** | **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. | Xn Symbol<br>N Symbol<br>R: 40-51/53<br>S: (2-)23-36/37-61<br>UN Hazard Class: 6.1<br>UN Pack Group: III | Do not transport with food and feedstuffs. Marine pollutant. |

| **EMERGENCY RESPONSE** | **SAFE STORAGE** |
|---|---|
| Transport Emergency Card: TEC (R)-61S1897<br>NFPA Code: H2; F0; R0 | Separated from metals, (see Chemical Dangers), food and feedstuffs. Keep in the dark. Ventilation along the floor. |

**IPCS**
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2005

**SEE IMPORTANT INFORMATION ON THE BACK.**

## IMPORTANT DATA

**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).

**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.

## NOTES

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.

## ADDITIONAL INFORMATION

**LEGAL NOTICE** Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2005

# Material Safety Data Sheet

## 1,2,4,5-Tetramethylbenzene, 99% (UV-VIS)

ACC# 75500

### Section 1 - Chemical Product and Company Identification

MSDS Name: 1,2,4,5-Tetramethylbenzene, 99% (UV-VIS)
Catalog Numbers: AC409390000, AC409390050, AC409391000, AC409395000, EK 114 4260, EK 114 4278, EK114 4260, EK114 4278, EK1144260, EK1144278
Synonyms: Durene; Durol; P-Xylene, 2,5-Dimethyl-.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

### Section 2 - Composition, Information on Ingredients

| CAS# | Chemical Name | Percent | EINECS/ELINCS |
|---|---|---|---|
| 95-93-2 | 1,2,4,5-Tetramethylbenzene | 98% | 202-465-7 |

Hazard Symbols: None listed.
Risk Phrases: None listed.

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: white powder. Flash Point: 73 deg C. The toxicological properties of this material have not been fully investigated. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. Warning! Flammable solid.
Target Organs: None.

#### Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause irritation of the digestive tract. 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.
Skin: Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure 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. Dusts at sufficient concentrations can form explosive mixtures 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 solid. May burn rapidly with flare burning effect. May re-ignite after fire is extinguished.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use agent most appropriate to extinguish fire. For large fires, use water spray, fog or regular foam. For small fires, use dry chemical, carbon dioxide, sand, earth, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out.

## Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

## Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Minimize dust generation and accumulation. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid contact with 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. Keep from contact with moist air and steam.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Keep container closed when not in use. 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: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels. Wet processing methods may be used to reduce dust generation.
Exposure Limits

| Chemical Name | ACGIH | NIOSH | OSHA - Final PELs |
|---|---|---|---|
| 1,2,4,5-Tetramethylbenzene | none listed | none listed | none listed |

OSHA Vacated PELs: 1,2,4,5-Tetramethylbenzene: 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: A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

## Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder
Appearance: white powder
Odor: None reported.
pH: Not available.
Vapor Pressure: 160 mmHg @ 140
Vapor Density: 4.6
Evaporation Rate:Not available.
Viscosity: Not available.
Boiling Point: 196.0 - 197.0 deg C @ 760.00m
Freezing/Melting Point:80.00 - 82.00 deg C
Autoignition Temperature: Not applicable.
Flash Point: 73 deg C ( 163.40 deg F)
Decomposition Temperature:Not available.
NFPA Rating: (estimated) Health: 0; Flammability: 2; Reactivity: 0
Explosion Limits, Lower:Not available.
Upper: Not available.
Solubility: Insoluble.
Specific Gravity/Density:.8380g/cm3
Molecular Formula:C10H14
Molecular Weight:134.22

## Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Volatile in steam.
Conditions to Avoid: Incompatible materials, ignition sources, dust generation, excess heat, strong oxidants, steam.
Incompatibilities with Other Materials: Strong 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# 95-93-2: DC0500000
LD50/LC50:
CAS# 95-93-2:
Oral, rat: LD50 = 6989 mg/kg;

Carcinogenicity:
CAS# 95-93-2: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: No information available.
Other Studies: No data available.

## Section 12 - Ecological Information

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 | IATA | RID/ADR | IMO | Canada TDG |
|---|---|---|---|---|---|

| | | |
|---|---|---|
| **Shipping Name:** | No information available. | No information available. |
| **Hazard Class:** | | |
| **UN Number:** | | |
| **Packing Group:** | | |

## Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 95-93-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
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.
SARA

Section 302 (RQ)
None of the chemicals in this material have an RQ.
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 95-93-2: flammable.
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# 95-93-2 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
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:

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# 95-93-2: 1
Canada
CAS# 95-93-2 is listed on Canada's DSL List. CAS# 95-93-2 is listed on Canada's DSL List.
This product has a WHMIS classification of B4, D2B.
CAS# 95-93-2 is not listed on Canada's Ingredient Disclosure List.
Exposure Limits

## Section 16 - Additional Information

MSDS Creation Date: 8/24/1997
Revision #2 Date: 8/02/2000

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# TRICHLOROETHYLENE

**0081**
October 2000

**CAS No: 79-01-6**
RTECS No: KX4550000
UN No: 1710
EC No: 602-027-00-9

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

| 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 plenty of water to drink. Rest. |

| SPILLAGE DISPOSAL | 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. Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. | T Symbol<br>R: 45-36/38-52/53-67<br>S: 53-45-61<br>UN Hazard Class: 6.1<br>UN Pack Group: III | Do not transport with food and feedstuffs. Marine pollutant. |

| EMERGENCY RESPONSE | SAFE STORAGE |
|---|---|
| Transport Emergency Card: TEC (R)-61S1710<br>NFPA Code: H2; F1; R0 | Separated from metals (see Chemical Dangers), strong bases, food and feedstuffs. Dry. Keep in the dark. Ventilation along the floor. |

**IPCS**
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2004

**SEE IMPORTANT INFORMATION ON THE BACK.**

## 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 2004).

**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

## 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.
Card has been partly updated in October 2004. See sections Occupational Exposure Limits, EU classification, Emergency Response.

## ADDITIONAL INFORMATION

**LEGAL NOTICE** Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2004

# VINYL CHLORIDE

**0082**
April 2000

**CAS No: 75-01-4**
RTECS No: KU9625000
UN No: 1086 (stabilized)
EC No: 602-023-00-7

Chloroethene
Chloroethylene
VCM
(cylinder)
$C_2H_3Cl$ / $H_2C=CHCl$
Molecular mass: 62.5

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/SYMPTOMS | PREVENTION | FIRST AID/FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Extremely flammable. Gives off irritating or toxic fumes (or gases) in a fire. | NO open flames, NO sparks, and NO smoking. | Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with powder, carbon dioxide. |
| **EXPLOSION** | Gas/air mixtures are explosive. | Closed system, ventilation, explosion-proof electrical equipment and lighting. Use non-sparking handtools. | In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position. |

| EXPOSURE | | AVOID ALL CONTACT! | IN ALL CASES CONSULT A DOCTOR! |
|---|---|---|---|
| **Inhalation** | Dizziness. Drowsiness. Headache. Unconsciousness. | Ventilation, local exhaust, or breathing protection. | Fresh air, rest. Refer for medical attention. |
| **Skin** | ON CONTACT WITH LIQUID: FROSTBITE. | Protective gloves. Cold-insulating gloves. Protective clothing. | ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. |
| **Eyes** | Redness. Pain. | Safety goggles 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. | |

| SPILLAGE DISPOSAL | PACKAGING & LABELLING |
|---|---|
| Evacuate danger area! Consult an expert! Ventilation. Remove all ignition sources. Personal protection: complete protective clothing including self-contained breathing apparatus. | F+ Symbol<br>T Symbol<br>R: 45-12<br>S: 53-45<br>Note: D<br>UN Hazard Class: 2.1 |

| EMERGENCY RESPONSE | SAFE STORAGE |
|---|---|
| Transport Emergency Card: TEC (R)-20S1086<br>NFPA Code: H 2; F 4; R 2 | Fireproof. Separated from incompatible materials. (See Chemical Dangers.) Cool. Store only if stabilized. |

**IPCS**
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2005

**SEE IMPORTANT INFORMATION ON THE BACK.**

## IMPORTANT DATA

**Physical State; Appearance**
COLOURLESS COMPRESSED LIQUEFIED GAS, WITH CHARACTERISTIC ODOUR.

**Physical dangers**
The gas is heavier than air, and may travel along the ground; distant ignition possible. Vinyl chloride monomer vapours are uninhibited and may form polymers in vents or flame arresters of storage tanks, resulting in blockage of vents.

**Chemical dangers**
The substance can under specific circumstances form peroxides, initiating explosive polymerization. The substance will polymerize readily due to heating and under the influence of air, light and on contact with a catalyst, strong oxidizing agents and metals such as copper and aluminium, with fire or explosion hazard. The substance decomposes on burning producing toxic and corrosive fumes (hydrogen chloride, phosgene). Attacks iron and steel in the presence of moisture.

**Occupational exposure limits**
TLV: 1 ppm as TWA; A1 (confirmed human carcinogen); (ACGIH 2004).
MAK: Carcinogen category: 1; (DFG 2004).

**Routes of exposure**
The substance can be absorbed into the body by inhalation.

**Inhalation risk**
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

**Effects of short-term exposure**
The substance is irritating to the eyes. The liquid may cause frostbite. The substance may cause effects on the central nervous system. Exposure could cause lowering of consciousness. Medical observation is indicated.

**Effects of long-term or repeated exposure**
The substance may have effects on the liver, spleen, blood and peripheral blood vessels, and tissue and bones of the fingers. This substance is carcinogenic to humans.

## PHYSICAL PROPERTIES

Boiling point: -13/C
Melting point: -154/C
Relative density (water = 1): 0.9 (liquid)
Density: 8 (vapour) at 15/C g/l
Solubility in water: none
Relative vapour density (air = 1): 2.2
Flash point: -78/C c.c.
Auto-ignition temperature: 472/C
Explosive limits, vol% in air: 3.6-33
Octanol/water partition coefficient as log Pow: 0.6

## ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to ground water contamination.

## NOTES

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.

## ADDITIONAL INFORMATION

**LEGAL NOTICE** Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2005

# MATERIAL SAFETY DATA SHEET

Xylenes (Xylol)

**SECTION 1 . Product and Company Idenfication**

Product Name and Synonym: Xylenes (Xylol)

Product Code: 280-20

| | |
|---|---|
| Health: | 2 |
| Flammability: | 3 |
| Reactivity: | 0 |

**Hazard Rating:**
Least 0 | Slight 1 | Moderate 2 | High 3 | Extreme 4

NA = Not Applicable NE = Not Established

Material Uses:

Manufacturer: OFI Testing Equipment, Inc.
11302 Steeplecrest Drive
Houston, TX 77065 USA
Phone: (713) 880-9885
Fax: (713) 880-9886

Entry Date : 5/12/2010

Print Date: 9/13/2010

24 Hour Emergency Assistance : Chemtrec 800-424-9300
Canutec 613-996-6666

**SECTION 2 HAZARD IDENTIFICATION**

Keep away from heat and ignition sources. May be harmful if swallowed. Avoid breathing vapor or dust. Use with adequate ventilation. Avoid contact with eyes, skin, and clothes. Wash thoroughly after handling. Keep container closed.

Emergency Overview: Danger! Harmful Or Fatal If Swallowed. Vapor Harmful. Affects Central Nervous System. Causes
Severe Eye Irritation. Causes Irritation To Skin And Respiratory Tract. Chronic Exposure Can Cause Adverse Liver, Kidney, And Blood Effects. Flammable Liquid And Vapor.

Inhalation: Inhalation of Vapors May be Irritating To The Nose And Throat. Inhalation Of High Concentrations May Result In Nausea, Vomiting, Headache, Ringing In The Ears, And Severe Breathing Difficulties Which May Be Delayed In Onset. Substernal Pain, Cough, And Hoarseness Are Also Reported. High Vapor Concentrations Are Anesthetic And Central Nervous System Depressants.

Ingestion: Ingestion Causes Burning Sensation in Mouth and Stomach, Nausea, Vomiting and Salvation.
Minute Amounts Aspirated into the Lungs can Produce a Severe Hemorrhagic Pneumonitis with Severe Pulmonary Injury or Death.

Skin: Skin Contact Results in Loss of Natural Oils and Often Results in Characteristic Dermatitis. May be Absorbed Through the Skin.

Eye Contact: Vapors Cause Eye Irritation. Splashes Cause Severe Irritation, Possible Corneal Burns and Eye
Damage.

Chronic Exposure: Chronic Inhalation Can Cause Headache, Loss of Appetite, Nervousness and Pale Skin.
Repeated or Prolonged Skin Contact may Cause a Skin Rash. Repeated Exposure of the Eyes to High Concentrations of Vapor may Cause Reversible Eye Damage. Repeated Exposure can Damage Bone Marrow, Causing Low Blood Cell Count. May Damage Liver and Kidneys.

Aggravated by Exposure: Persons with Pre-Existing Skin Disorders or Eye Problems or Impaired Respiratory Function, or
Impaired Liver or Kidney Function may be more Susceptible to the Effects of the Substance.

**SECTION 3 MIXTURE COMPONENTS**

Xylenes (Xylol)

| SARA 313 | Component | CAS Number | Percent Comp. | Dimension | Exposure Limits |
|---|---|---|---|---|---|
| ☑ | Xylenes (Xylol) | CAS# 1330-20-7 | 100 | V/V | OSHA TWA 100 ppm (435 mg/$m^3$) |

**SECTION 4 FIRST AID MEASURES**

Keep away from heat and ignition sources. May be harmful if swallowed. Avoid breathing vapor or dust. Use with adequate ventilation. Avoid contact with eyes, skin, and clothes. Wash thoroughly after handling. Keep container closed.

FIRST AID: SKIN: Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention

EYES: Wash eyes with plenty of water for at least 15 minutes, lifting lids occasionally. Seek Medical Aid. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen

INGESTION: Give several glasses of milk or water. Vomiting may ocur spontaneously, but DO NOT INDUCE! Never give anything by mouth to an unconcious person.

**SECTION 5 FIRE FIGHTING MEASURES**

| | |
|---|---|
| Fire Extinguisher Type: | Water spray, dry chemical, carbon dioxide, alcohol foam |
| Fire / Explosion Hazards: | Vapor may travel considerable distance to source of ignition and flash back. |
| Fire Fighting Procedure: | Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and clothing. |

**SECTION 6 ACCIDENTAL RELEASE MEASURES**

Remove all sources of ignition. Ventilate area of leak or spill. Wear protective equipment. Clean up in a manner that doen't disperse dust.

Ventilate area or Leak or Spill. Remove all Sources of Ignition. Wear Appropriate Personal
Protective Equipment as Specified in Section 8. Isolate Hazard Area. Keep Unnecessary and
Unprotected Personnel from Entering. Contain and Recover Liquid when Possible. Use Non-
Sparking Tools and Equipment. Collect Liquid in an Appropriate Container or Absorb with an
Inert Material (e.g., Vermiculite, Dry Sand, Earth), and Place in a Chemical Waste Container. Do Not Use Combustible Materials, such as Saw Dust. Do Not Flush to Sewer! US Regulations
(CERCLA) Require Reporting Spills and Releases to Soil, Water and Air in Excess of Reportable
Quantities.

**SECTION 7 HANDLING AND STORAGE**

Keep away from heat and flame. Do not get in eyes, on skin, on clothing. Use with adequate ventilation.

**SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION**

| | |
|---|---|
| Respiratory Protection: | NIOSH/MSHA-approved respirator |
| Ventilation | |
| | Local Exhaust ☑ |

| | |
|---|---|
| | Mechanical ☐ |
| Protective Gloves: | Gloves to prevent skin exposure as rubber or vinyl |
| Eye Protection: | Goggles and Face Shield |
| Other Protective Equipment: | Wear appropriate clothing to prevent skin exposure |

**SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES**

| | | | |
|---|---|---|---|
| Melting Point: | 12.2° C | Percent Volatile by Volume: | >99% |
| Boiling Point: | 138° C | Evaporation Rate | Information not available |
| Vapor Pressure: | 6.72 | Evaporation Standard | |
| Vapor Density: | 3.66 | Auto Ignition Temp | Information not availlabl |
| Solubility in Water: | Negligible | Lower Flamm. Limit in Air | 1.0 |
| Appearance /Odors: | Red liquid, solvent odor | Upper Flamm. Limit in Air | 6.0 |
| Flash Point: | 17.0° C | | |
| Specific Gravity: | 0.864 | | |

**SECTION 10 STABILITY AND REACTIVITY INFORMATION**

| | |
|---|---|
| Stability: | Stable |
| Conditions to Avoid: | Avoid contact with heat, sparks, flames, or other sources of ignition. |
| Materials to Avoid: | Oxidizing materials |
| Hazardous Decomposition Products: | Oxides of carbon, acrid fumes |
| Hazardous polymerization: | Will Not Occur |
| Conditions to Avoid: | None known |

**SECTION 11 Toxicological Information**

Carcinogenic References: NTP Carcinogen - Known: No, IARC Category- 3

**SECTION 12 Ecological Information**

Environmental Toxicity: When Released to the Soil and Water, this Material may Evaporate to Moderate Extent.

Environmental Toxicity: This material may be toxic to aquatic life. The LC50/96-hour values for fish are between 1 and 10 mg/l. The LC50/96-hour values for fish are between 10 and 100 mg/l.

**SECTION 13 Disposal Considerations**

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

**SECTION 14 Transport Information**

Xylenes (Xylol)

DOT Classification: Xylenes, 3, UN1307, PG III

DOT Regulations may change from time to time. Please consult the most recent D.O.T. regulations.

**SECTION 15 Regulatory Information**

Chemical Inventory Status –
Part 1:Ingrdient
p-Xylene (106-42-3)
TSCA Yes
EC Yes
Japan YES
Australia Yes

Chemical Inventory Status –
Part 2:Ingredient
p-Xylene (106-42-3)
Korea Yes
DSL Yes
NDSL No
Phil. Yes

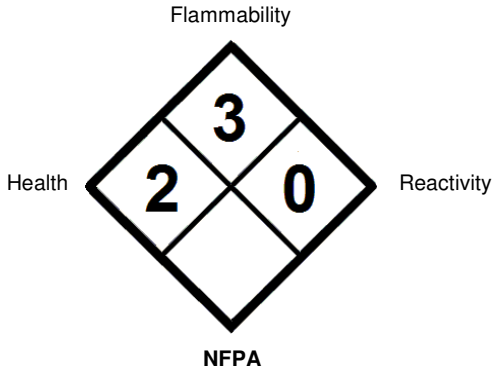
Federal, State & International Regulations –
Part 1: Ingredient.
p-Xylene (106-42-3)
RQ No
TPQ No
List YES
Chemical Catg No

Federal, State &
International Regulations –
Part 2:Ingredient
p-Xylene (106-42-3)
CERCLA 100
261.33 No
8(d) YES

Chemical Weapons Convention: No
TSCA 12 (b):YES
CDTA:NO PURE/LIQUID
SARA 311/312: Acute:YES
Chronic: YES
Fire: YES
Pressure: No
Reactivity: No
Australian Hazchem Code: 3Y
Poison Schedule:S6

**SECTION 16 Additional Information**

Effects of overexposure, Acute abd Chronic: Irritation of eyes, nose and throat. Reversible eye damage, dermatitis, chemical pneumonia, central nrevous system depression. Conditions aggravated: Persons with pre-existing eye, skin or respiratory conditions may be more susceptible. Target organs: Liver and kidneys.




**NFPA**

**Revisions**

| | | |
|---|---|---|
| 6/22/2010 | 0.1 | updated msds to 16 section from 10 section msds. STN |

The information herein is believed to be accurate and is offered in good faith for the user's consideration and investigation. No warranty either expressed or implied is made for the completeness or accuracy of the information whether originating from the above mentioned company or not. Users of this material should satisfy themselves by independent investigation of current scientific and medical knowledge that the material can be used safely.

# 1,1,1-TRICHLOROETHANE

**0079**
October 1994

**CAS No: 71-55-6**
RTECS No: KJ2975000
UN No: 2831
EC No: 602-013-00-2

Methyl chloroform
Methyltrichloromethane
alpha-Trichloroethane
$C_2H_3Cl_3$ / $CCl_3CH_3$
Molecular mass: 133.4

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/SYMPTOMS | PREVENTION | FIRST AID/FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Combustible under specific conditions. Heating will cause rise in pressure with risk of bursting. See Notes. Gives off irritating or toxic fumes (or gases) in a fire. | | In case of fire in the surroundings: use appropriate extinguishing media. |
| **EXPLOSION** | | | In case of fire: keep drums, etc., cool by spraying with water. |

| **EXPOSURE** | | **PREVENT GENERATION OF MISTS!** | |
|---|---|---|---|
| **Inhalation** | Headache. Dizziness. Drowsiness. Nausea. Ataxia. 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. | Safety goggles 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** | Diarrhoea. Nausea. Vomiting. (Further see Inhalation). | Do not eat, drink, or smoke during work. | Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Refer for medical attention. |

| **SPILLAGE DISPOSAL** | **PACKAGING & LABELLING** | |
|---|---|---|
| Ventilation. Collect leaking and spilled liquid in sealable, suitable 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: self-contained breathing apparatus. | Xn Symbol<br>N Symbol<br>R: 20-59<br>S: (2-)24/25-59-61<br>Note: F<br>UN Hazard Class: 6.1<br>UN Pack Group: III | Do not transport with food and feedstuffs. Marine pollutant. |

| **EMERGENCY RESPONSE** | **SAFE STORAGE** |
|---|---|
| Transport Emergency Card: TEC (R)-61S2831<br>NFPA Code: H2; F1; R0 | Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Cool. Dry. Ventilation along the floor. |

**IPCS**
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2005

**SEE IMPORTANT INFORMATION ON THE BACK.**

## IMPORTANT DATA

**Physical State; Appearance**
COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.

**Physical dangers**
The vapour is heavier than air.

**Chemical dangers**
The substance decomposes on heating or on burning producing toxic and corrosive fumes including phosgene and hydrogen chloride. Reacts violently with aluminium, manganese and their alloys, alkalis, strong oxidants, acetone and zinc. Attacks natural rubber. Mixtures of 1,1,1-trichloroethane with potassium or its alloys are shock sensitive. Reacts slowly with water releasing corrosive hydrochloric acid.

**Occupational exposure limits**
TLV: 350 ppm as TWA, 450 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued (ACGIH 2004).
MAK: 200 ppm, 1100 mg/m$^3$; Peak limitation category: II(1); skin absorption (H); Pregnancy risk group: C; (DFG 2004).

**Routes of exposure**
The substance can be absorbed into the body by inhalation of its vapour 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, the skin and the respiratory tract. The substance may cause effects on the heart, central nervous system and liver, resulting in cardiac disorders and respiratory failure. Exposure at high levels may result in death. Medical observation is indicated.

**Effects of long-term or repeated exposure**
The liquid defats the skin. The substance may have effects on the liver.

## PHYSICAL PROPERTIES

Boiling point: 74/C
Melting point: -30/C
Relative density (water = 1): 1.34
Solubility in water: none
Vapour pressure, kPa at 20/C: 13.3
Relative vapour density (air = 1): 4.6
Flash point: see Notes
Auto-ignition temperature: 537/C
Explosive limits, vol% in air: 8-16
Octanol/water partition coefficient as log Pow: 2.49

## ENVIRONMENTAL DATA

The substance is harmful to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to air quality and ground water contamination.

## NOTES

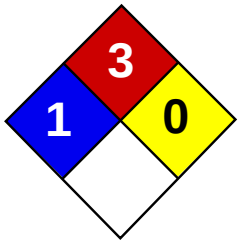
Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions.
The substance burns only in excess oxygen or if a strong source of ignition is present.
Use of alcoholic beverages enhances the harmful effect.
Depending on the degree of exposure, periodic medical examination is suggested.
An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.
Do NOT use in the vicinity of a fire or a hot surface, or during welding.
Aerothene, Algylen, Trichloran, Chlorylen, Genklene, Chlorothene NU, Chlorothene VG, and Solvent 111 are trade names.
Card has been partly updated in April 2005. See section Occupational Exposure Limits.

## ADDITIONAL INFORMATION

**LEGAL NOTICE** Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2005







# Material Safety Data Sheet
## Methyl ethyl ketone MSDS

## Section 1: Chemical Product and Company Identification

**Product Name:** Methyl ethyl ketone

**Catalog Codes:** SLM2626, SLM3232

**CAS#:** 78-93-3

**RTECS:** EL6475000

**TSCA:** TSCA 8(b) inventory: Methyl ethyl ketone

**CI#:** Not applicable.

**Synonym:** 2-Butanone

**Chemical Name:** Methyl Ethyl Ketone

**Chemical Formula:** C4H8O

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:**
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

## Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Methyl ethyl ketone | 78-93-3 | 100 |

**Toxicological Data on Ingredients:** Methyl ethyl ketone: ORAL (LD50): Acute: 2737 mg/kg [Rat]. 4050 mg/kg [Mouse]. DERMAL (LD50): Acute: 6480 mg/kg [Rabbit]. VAPOR (LC50): Acute: 23500 mg/m 8 hours [Rat].

## Section 3: Hazards Identification

**Potential Acute Health Effects:**
Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation (lung irritant).

**Potential Chronic Health Effects:**
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified POSSIBLE for human. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to gastrointestinal tract, upper respiratory tract, skin, eyes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

## Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 404°C (759.2°F)

**Flash Points:** CLOSED CUP: -9°C (15.8°F). OPEN CUP: -5.5556°C (22°F) (Tag).

**Flammable Limits:** LOWER: 1.8% UPPER: 10%

**Products of Combustion:** These products are carbon oxides (CO, CO2).

**Fire Hazards in Presence of Various Substances:** Highly flammable in presence of open flames and sparks, of heat.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

**Fire Fighting Media and Instructions:**
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

**Special Remarks on Fire Hazards:**
Ignition on contact with potassium t-butoxide. Vapor may cause a flash fire

**Special Remarks on Explosion Hazards:**
Reaction with Hydrogen Peroxide + nitric acid forms heat and shock-sensitive explosive product. Mixture with 2-propanol will produce explosive peroxides during storage.

## Section 6: Accidental Release Measures

**Small Spill:**
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

**Large Spill:**
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

**Storage:**
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 200 STEL: 300 (ppm) from ACGIH (TLV) [United States] [1999] TWA: 150 STEL: 300 (ppm) [Australia] TWA: 590 STEL: 885 (mg/m3) from NIOSH TWA: 200 STEL: 300 (ppm) from NIOSH TWA: 590 STEL: 885 (mg/m3) [Canada] TWA: 200 STEL: 300 (ppm) from OSHA (PEL) [United States] TWA: 590 STEL: 885 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:**
Acetone-like Pleasant. Pungent. Sweetish. (Strong.)

**Taste:** Not available.

**Molecular Weight:** 72.12g/mole

**Color:** Clear Colorless.

**pH (1% soln/water):** Not available.

**Boiling Point:** 79.6 (175.3°F)

**Melting Point:** -86°C (-122.8°F)

**Critical Temperature:** 262.5°C (504.5°F)

**Specific Gravity:** 0.805(Water = 1)

**Vapor Pressure:** 10.3 kPa (@ 20°C)

**Vapor Density:** 2.41 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 0.25 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in oil; log(oil/water) = 0.3

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, diethyl ether, acetone.

**Solubility:** Soluble in cold water, diethyl ether, acetone.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Heat, ignition sources, mechanical shock, incompatible materials.

**Incompatibility with various substances:** Reactive with oxidizing agents, metals, acids, alkalis.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**
Incompatible with chloroform, copper, hydrogen peroxide, nitric acid, potassium t-butoxide, 2-propanol, chlorosulfonic acid, strong oxidizers, amines, ammonia, inorganic acids, isocyanates, caustics, pyrindines. Vigorous reaction with chloroform +alkali.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation.

**Toxicity to Animals:**
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2737 mg/kg [Rat]. Acute dermal toxicity (LD50): 6480 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 32000 mg/m3 4 hours [Mouse].

**Chronic Effects on Humans:**
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified POSSIBLE for human. May cause damage to the following organs: gastrointestinal tract, upper respiratory tract, skin, eyes, central nervous system (CNS).

**Other Toxic Effects on Humans:** Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation (lung irritant).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** May cause birth defects based on animal dats. Embryotoxic and/or foetotoxic in animal.

**Special Remarks on other Toxic Effects on Humans:**
Acute Potential Health Effects: Skin: Causes skin irritation. May be absorbed through the skin. Eyes: Causes eye irritation. Inhalation: Inhalation of high concentrations may cause central nervous effects characterized by headache, dizziness, unconsciousness, and coma. Causes respiratory tract irritation and affects the sense organs. May affect the liver and urinary system. Ingestion: Causes gastrointestinal tract irritation with nausea, vomiting and diarrhea. May affect the liver. Chronic Potential Health Effects: Chronic inhalation may cause effects similar to those of acute inhalation. Prolonged or repeated skin contact may cause defatting and dermatitis.

## Section 12: Ecological Information

**Ecotoxicity:** Ecotoxicity in water (LC50): 3220 mg/l 96 hours [Fathead Minnow]. 1690 mg/l 96 hours [Bluegill].

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** CLASS 3: Flammable liquid.

**Identification:** : Ethyl methyl ketone UNNA: 1193 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
New York release reporting list: Methyl ethyl ketone Rhode Island RTK hazardous substances: Methyl ethyl ketone Pennsylvania RTK: Methyl ethyl ketone Minnesota: Methyl ethyl ketone Massachusetts RTK: Methyl ethyl ketone New Jersey: Methyl ethyl ketone California Director's list of Hazardous Substances: Methyl ethyl ketone TSCA 8(b) inventory: Methyl ethyl ketone TSCA 8(d) H and S data reporting: Methyl ethyl ketone: Effective: 10/4/82; Sunset: 10/4/92 SARA 313 toxic chemical notification and release reporting: Methyl ethyl ketone CERCLA: Hazardous substances.: Methyl ethyl ketone: 5000 lbs. (2268 kg)

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**
R11- Highly flammable. R36/37- Irritating to eyes and respiratory system. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S33- Take precautionary measures against static discharges.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:39 PM

**Last Updated:** 06/09/2012 12:00 PM

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.*

# ETHYLBENZENE

**0268**
March 1995

**CAS No: 100-41-4**
RTECS No: DA0700000
UN No: 1175
EC No: 601-023-00-4

Ethylbenzol
Phenylethane
EB
$C_8H_{10}$ / $C_6H_5$-$C_2H_5$
Molecular mass: 106.2

| 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 | 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. | **EU classification**<br>F Symbol<br>Xn Symbol<br>R: 11-20<br>S: (2-)16-24/25-29<br>**UN classification**<br>UN Hazard Class: 3<br>UN Pack Group: II |

| EMERGENCY RESPONSE | SAFE STORAGE |
|---|---|
| Transport Emergency Card: TEC (R)-30S1175 or 30GF1-I+II<br>NFPA Code: H2; F3; R0 | Fireproof. Separated from strong oxidants. |

**IPCS**
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission
© IPCS 2006

**SEE IMPORTANT INFORMATION ON THE BACK.**

## IMPORTANT DATA

**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).

**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.

## NOTES

The odour warning when the exposure limit value is exceeded is insufficient.
Card has been partly updated in October 2005. See sections Occupational Exposure Limits, Emergency Response.

## ADDITIONAL INFORMATION

**LEGAL NOTICE** Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible for the use which might be made of this information

©IPCS 2006

Georgia Gulf

*Chemicals and Vinyls, LLC*

# Material Safety Data Sheet: Isopropylbenzene [Cumene]

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

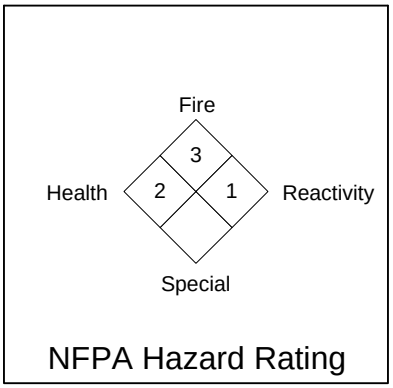
**Product name** **Isopropylbenzene [Cumene]**

**Effective date** August 2007

**Synonyms** Isopropylbenzene, cumol, 2-phenylepropane, (1-methylethyl) benzene, cumene

**Chemical formula** $(CH_3)_2 CHC_6 H_5$

**CAS name & no.** Benzene, (1-methylethyl), 98-82-8



NFPA Hazard Rating

**Manufacturer's name and address**

Georgia Gulf Chemicals and Vinyls, LLC
P.O. Box 1959
Pasadena, TX 77501

**Emergency telephone number**

For transportation emergencies:
CHEMTREC (800) 424-9300
For all other emergencies: (225) 685-2500

**MSDS contact**

Corporate Health & Safety Department
P.O. Box 629
Plaquemine, LA 70765
Phone Number (225) 685-2500

# 2. COMPOSITION/INFORMATION ON INGREDIENTS

| Component | CAS No. | Wt.%. |
|---|---|---|
| Isopropylbenzene [Cumene] | 98-82-8 | 99.97 |

# 3. HAZARDS IDENTIFICATION

**PRECAUTIONARY INFORMATION**

**Flammable liquid. Eye, skin and respiratory tract irritant. May cause narcosis. Causes dizziness, drowsiness and unconsciousness.**

## POTENTIAL HEALTH EFFECTS

### Primary Routes of Entry

Inhalation, ingestion, skin, and eye contact.

### Acute Effects

Isopropylbenzene may act as a central nervous system depressant and a narcotic. Inhalation of high vapor concentrations may cause dizziness, slight incoordination, and unconsciousness. This chemical may also be toxic to the liver, spleen, and gall bladder, but there is little human evidence of these effects. This chemical is also a skin and eye irritant.

### Chronic Effects

Prolonged skin contact may result in skin rashes. Chronic experiments in animals found isopropylbenzene to cause damage to the spleen and fatty changes in the liver, but no renal or pulmonary irritancy. Subacute inhalation experiments showed no significant changes in peripheral blood, but exhibited some liver, kidney, and lung effects.

### Potential Adverse Chemical Interactions

Persons with kidney diseases, liver diseases, skin diseases or respiratory diseases, especially obstructive airway disease, may be at increased risks due to the toxic effects of isopropylbenzene on these organs.

### Carcinogen Status

Isopropylbenzene is not considered to be carcinogenic by OSHA, NIOSH, NTP, IARC, or EPA.

# 4. FIRST AID MEASURES

### Inhalation
If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, begin artificial respiration and if heart action has stopped, CPR. Get medical attention as soon as possible.

### Skin Contact
If this chemical contacts the skin, flush the contaminated skin with copious quantities of water for at least 15 minutes. If this chemical penetrates the clothing, immediately remove clothing and flush the skin with water promptly. If irritation persists after washing, get medical attention.

### Eye Contact
If the chemical contacts the eyes, immediately wash the eyes with large amounts of room temperature water for at least 15 minutes, occasionally lifting the lower and upper lids. Get medical attention immediately.

### Ingestion
If the chemical is ingested do not induce vomiting. Get medical attention immediately.

# 5. FIRE FIGHTING MEASURES

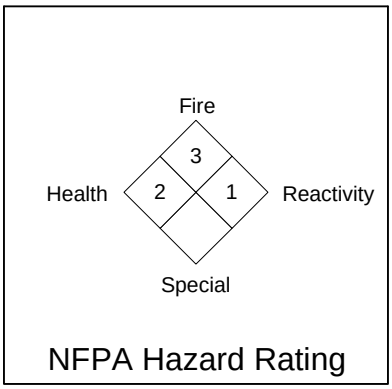
| | |
|---|---|
| **Flash Point** | 33°C (closed cup) |
| **Flammable Limits (% By Vol.)** | |
| Lower Explosive Limit (LEL) | 0.9 |
| Upper Explosive Limit (UEL) | 6.5 |
| **Autoignition Temperature** | 425° C |

### Fire Fighting Procedures/Fire Extinguishing Media
Keep unnecessary people away; isolate hazard area and deny entry. Avoid breathing vapors, stay upwind. Use NIOSH approved self-contained respirator in the positive pressure mode as combustion of isopropylbenzene produces toxic vapors. Structural firefighter's protective clothing is NOT effective for this material. Use an acceptable halon replacement such as carbon dioxide extinguishers, alcohol foam or dry chemical for small fires. Large fires should be extinguished with alcohol foam. Water sprays may be used to keep the containers cool but may be insufficient to extinguish the fire. Direct water streams may promote the spread of isopropylbenzene flames, as isopropylbenzene is lighter than water. Stay away from ends of tanks. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Isolate for 1/2 mile in all directions if tank car or truck is involved in fire.

### Unusual Fire and Explosion Hazards
Dangerous fire and explosion hazard when exposed to heat or flame. Isopropylbenzene vapor forms explosive mixtures in air. Flowing isopropylbenzene may ignite by self-generated static electricity. Do not weld, cut, drill, grind, or perform similar operations on or near containers (even empty containers, as even residues of isopropylbenzene can ignite explosively).

## 5. FIRE FIGHTING MEASURES (continued)

Isopropylbenzene vapors are heavier than air and may travel back a considerable distance to a source of ignition and flash back. Containers exposed to heat from fires should be cooled with water to prevent vapor pressure buildup, which could result in container rupture. Combustion of isopropylbenzene produces irritants and toxic gases.




**National Fire Protection Association Hazard Rating**
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

## 6. ACCIDENTAL RELEASE MEASURES

Shut off all sources of ignition. No smoking or flares allowed in the spill area. Restrict access to spill area, and move unprotected personnel upwind of the area. Keep out of low areas. Allow only trained personnel wearing appropriate protective clothing and self-contained respirator in the vicinity of the spill. Do not touch spilled material; stop leak if you can without risk. If fire potential exists, cover spill with foam. Prevent isopropylbenzene from entering water bodies, drains and any sewage collection systems. Isopropylbenzene will float on water and the runoff will present an explosion or fire hazard. For small spills take up with sand or other non-combustible absorbent material, and place into containers for later disposal. Control large spills by diking. Dispose all spill material in accordance with federal, state and local regulations. Isopropylbenzene spills over the reportable quantity (5,000 lbs) should be reported to the National Response Center (800-424-8802).

## 7. HANDLING AND STORAGE

Store in a well ventilated place away from sources of ignition, and oxidizing agents and in accordance with 29 CFR 1910.106. Store in metal containers. Ground and bond all storage and transfer equipment to prevent possible ignition from static sparks. Use spark resistant equipment (tools) in the isopropylbenzene area. Store in an area equipped with automatic sprinklers or fire extinguishing system. Wear appropriate protective equipment when handling isopropylbenzene. All seals, gaskets, liners and other such parts exposed to isopropylbenzene service should be made of aromatic resistant elastomers. Do not use rubber- lined tanks. Since emptied containers retain product residues, assume emptied containers to have the same hazards as full containers. Follow all federal, state and local regulations as well as all insurance codes when storing and handling isopropylbenzene.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Respiratory Protection
Use appropriate NIOSH approved respirators in accordance with 29 CFR 1910.132 and 1910.134, to prevent overexposure. Respirators must be selected based on the airborne levels found in the workplace and must not exceed the working limits of the respirator.

### Eye Protection
Use splash proof chemical safety goggles or appropriate full-face respirator. Follow the eye and face protection guidelines of 29 CFR 1910.132 and 1910.133. Where there is any possibility that an individual's eyes may be exposed to isopropylbenzene, an eye wash fountain (in accordance with 29 CFR 1910.151) should be within the immediate work area for emergency use.

### Protective Gloves
Use gloves in accordance with 29 CFR 1910.132 and 29 CFR 1910.138.

### Ventilation
Provide local ventilation to maintain exposure levels below recommended exposure limits, and to prevent accumulation of isopropylbenzene in explosive levels. Use explosion proof ventilation equipment. Local exhaust ventilation should comply with OSHA regulations and the American Conference of Governmental Industrial Hygienists, Industrial Ventilation - A Manual of Recommended Practice.

### Exposure Guidelines
The OSHA-PEL, NIOSH-REL and ACGIH-TLV for Isopropylbenzene [Cumene] is 50 ppm (8-hr TWA). The IDLH is 900 ppm [10% LEL].

### Other
Where there is a possibility of exposure of an individual's body to isopropylbenzene, facilities for quick drenching of the body should be provided (in accordance with 29 CFR 1910.151) within the immediate work area for emergency use. Such individuals should be provided with and required to use impervious clothing in accordance with 29 CFR 1910.132.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| **Appearance** | Clear colorless liquid |
| **Odor** | Sharp penetrating aromatic odor |
| **Molecular Weight** | 120.2 |
| **Boiling Point** | 152°C |
| **Melting Point** | -96°C |
| **Solubility** | Insoluble in water, soluble in alcohol, ether, benzene, and chlorinated solvents |
| **Specific Gravity (Water = 1.0)** | 0.86 |
| **Vapor Density (Air = 1.0)** | 4.14 |
| **Vapor Pressure** | 3.2 mm Hg @ 20°C |
| **pH** | Not Available |

# 10. STABILITY AND REACTIVITY

### Stability
Stable under normal conditions.

### Polymerization
Hazardous polymerization does not occur.

### Hazardous Decomposition Products
Combustion products of isopropylbenzene may include styrene, benzaldehyde, acetophenone, benzene, carbon monoxide, and carbon dioxide. Other unidentified organic compounds may be formed during combustion.

### Incompatible Materials
Violent reactions may take place between isopropylbenzene and nitric acid, oleum and chlorsulphonic acid. Isopropylbenzene reacts with oxidizing agents to form isopropylbenzene hydroperoxide, which may cause explosive hazards.

# 11. TOXICOLOGICAL INFORMATION

### Animal Toxicity:

| | | |
|---|---|---|
| **Oral:** | Rat $LD_{50}$ | 1.4 g/kg |
| **Inhalation:** | Rat $LC_{LO}$ | 8,000 ppm (4hr) |
| | Mouse $LC_{LO}$ | 5,042 ppm (2hr) |
| | Human $LC_{LO}$ | 200 ppm (somnolence, irritability) |

$LC_{LO}$ = Lowest air concentration that is lethal to a given species in a given time.
$LC_{50}$ = Dose that is lethal to 50% of a given species by a given route of exposure.

Animal experiments indicate that isopropylbenzene may be toxic at very high concentrations to the spleen and liver. Cataract formation has also been observed in experimental animals exposed to high concentrations of isopropylbenzene vapor.

# 12. ECOLOGICAL INFORMATION

**Environmental Fate**: The following information on isopropylbenzene [cumene] is extracted from the TOXNET database maintained by the National Library of Medicine.

**Atmosphere**: According to a model of gas/particle partitioning of semi-volatile organic compounds in the atmosphere, cumene, which has a vapor pressure of 4.5 mm Hg at 25 deg C, is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase cumene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 2.5 days, calculated from its rate constant of $6.5x10^{-12}$ cu cm/molecule-sec at 25 deg C. Vapor-phase cumene is also degraded in the atmosphere by reaction with ozone radicals; the half-life for this reaction in air is estimated to be 3 yrs, calculated from its estimated rate constant of $1.0x10^{-20}$ cu cm/molecule-sec at 25 deg C.

## 12. ECOLOGICAL INFORMATION (continued)

**Terrestrial:** Based on a classification scheme, an estimated Koc value of 820, determined from a structure estimation method, indicates that cumene is expected to have low mobility in soil. Volatilization of cumene from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of 0.0115 atm-cu m/mole. The potential for volatilization of cumene from dry soil surfaces may exist based upon a vapor pressure of 4.5 mm Hg. However, adsorption to soil is expected to attenuate volatilization. After a 10 and 20 day exposure of wastewater inoculum to cumene, a theoretical BOD of 62% and 70% was observed, respectively. Based on these results, cumene is expected to undergo considerable biodegradation in soil environments.

**Aquatic:** Based on a classification scheme, an estimated Koc value of 820, determined from an estimation method, indicates that cumene is expected to adsorb to sediment and suspended solids in water. Volatilization from water surfaces is expected based upon a Henry's Law constant of 0.0115 atm-cu m/mole. Using this Henry's Law constant and an estimation method, volatilization half-lives for a model river and model lake are 1.2 hrs and 4.4 days, respectively. In natural waters, cumene is degraded by reaction with hydroxyl radicals; the half-life for this reaction in water is estimated to be 107 days, calculated from its rate constant of $7.5x10^9$ L/mol sec at pH 7.

**Biodegradation:**
Aerobic: Using river water and sediment in a test system, the aerobic biodegradation of cumene was studied in a closed system. The disappearance rate constant of cumene (avg concn 2.5 mg/l) for total mineralization was 0.02/day; this equates to a half-life of 34.6 days. However, when volatilization was considered coupled with biodegradation, the half-life for cumene became 2.5 days. Cumene biodegradation experienced a lag time of approximately 5 days. Based on the results of this experiment, residence time of cumene in aquatic ecosystems will likely be brief.

Anaerobic: In an in-situ anaerobic biodegradation study of various alkyl benzene compounds, cumene was found to undergo considerable biodegradation. Biodegradation proceeded via methanogenic and fermentative bacteria.

**Ecotoxicity:**

$LC_{50}$ Daphnia magna 0.6 ppm/48 hr /Conditions of bioassay not specified
$LD_{50}$ Agelaius phoeniceus (red-winged blackbird) oral 98 mg/kg
Mytilus edulis (mussel larvae): no significant alteration of growth rate at concentrations of 1 to 50 ppm.

## 13. DISPOSAL CONSIDERATIONS

**Waste Management Information:** Any disposal practice must be in compliance with local, state and federal laws and regulations.

## 14. TRANSPORTATION INFORMATION

| | |
|---|---|
| **Proper shipping name** | Isopropylbenzene |
| **DOT Hazard class** | 3, (Flammable liquid) |
| **DOT Shipping I.D. No.** | UN 1918 |
| **PG** | III |
| **Labeling** | Flammable |
| **RQ** | Cumene |

# 15. REGULATORY INFORMATION

## SARA Title III

**Section 302 and 304 of the Emergency Planning and Community Right to Know Act; Extremely Hazardous Substances (40 CFR 355)**

| COMPONENT | CAS No. | TPQ (lbs) | RQ |
|---|---|---|---|
| None | Not Applicable | Not Applicable | Not Applicable |

NOTE: TPQ - Threshold Planning Quantity RQ - Reportable Quantity

**Section 311 and 312 Hazard Categorization (40 CFR 370)**

| ACUTE | CHRONIC | FIRE | PRESSURE | REACTIVE |
|---|---|---|---|---|
| X | X | X | | |

**Section 313 Toxic Chemicals (40 CFR 372.65)**

| COMPONENT | CAS No. | WT. % |
|---|---|---|
| Isopropylbenzene | 98-82-8 | 99.97 |

## CERCLA

**Section 102(a) Hazardous Substances (40 CFR 302.4)**

| COMPONENT | CAS No. | WT. % | RQ (lbs) |
|---|---|---|---|
| Isopropylbenzene | 98-82-8 | 99.97 | 5,000 |

## RCRA

40 CFR 261.21 Hazardous Waste Number:
Isopropylbenzene waste and material contaminated with isopropylbenzene would be regulated as a hazardous waste material under the hazardous waste number U055.

## TSCA

Isopropylbenzene is listed on the TSCA inventory.

## Canadian Regulations

This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33 and the MSDS contains all information required by this regulation. WHMIS Classification- BD2

## Canadian Environmental Protection Act (CEPA)

All substances in this product are listed on the Canadian Domestic Substances (DSL) list or are not required to be listed.

# 16. OTHER INFORMATION

**IMPORTANT**: The information and data herein are believed to be accurate and have been compiled from sources believed to be reliable. It is offered for your consideration, investigation and verification. Buyer assumes all risk of use, storage and handling of the product in compliance with applicable federal, state and local laws and regulations. **GEORGIA GULF CHEMICALS AND VINYLS, LLC MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, CONCERNING THE ACCURACY OR COMPLETENESS OF THE INFORMATION AND DATA HEREIN.** Georgia Gulf will not be liable for claims relating to any party's use of or reliance on information and data contained herein regardless of whether it is claimed that the information and data are inaccurate, incomplete or otherwise misleading. This information relates to the material designated and may not be valid for such material used in combination with any other materials nor in any process.

**MSDS Status**: Revision Date: 08/24/2007 Supersedes: 6/10/04

# NAPHTHALENE

**0667**
April 2005

**CAS No: 91-20-3**
RTECS No: QJ0525000
UN No: 1334 (solid); 2304 (molten)
EC No: 601-052-00-2

Naphthene
$C_{10}H_8$
Molecular mass: 128.18

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/SYMPTOMS | PREVENTION | FIRST AID/FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Combustible. | NO open flames. | Powder, water spray, foam, carbon dioxide. |
| **EXPLOSION** | Above 80/C explosive vapour/air mixtures may be formed. Finely dispersed particles form explosive mixtures in air. | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| **EXPOSURE** | | **PREVENT DISPERSION OF DUST!** | |
| **Inhalation** | Headache. Weakness. Nausea. Vomiting. Sweating. Confusion. Jaundice. Dark urine. | Ventilation (not if powder), local exhaust, or breathing protection. | Fresh air, rest. Refer for medical attention. |
| **Skin** | MAY BE ABSORBED! (Further see Inhalation). | Protective gloves. | Rinse skin with plenty of water or shower. |
| **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. Diarrhoea. Convulsions. Unconsciousness. (Further see Inhalation). | Do not eat, drink, or smoke during work. Wash hands before eating. | Rest. Refer for medical attention. |

| SPILLAGE DISPOSAL | PACKAGING & LABELLING | |
|---|---|---|
| Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. | Xn Symbol<br>N Symbol<br>R: 22-40-50/53<br>S: (2-)36/37-46-60-61<br>UN Hazard Class: 4.1<br>UN Pack Group: III | Do not transport with food and feedstuffs. Marine pollutant. |

| EMERGENCY RESPONSE | SAFE STORAGE |
|---|---|
| Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF1-II+III (solid); 41S2304 (molten)<br>NFPA Code: H2; F2; R0 | Separated from strong oxidants, food and feedstuffs. Store in an area without drain or sewer access. |

**IPCS**
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2005

**SEE IMPORTANT INFORMATION ON THE BACK.**

## IMPORTANT DATA

**Physical State; Appearance**
WHITE SOLID IN VARIOUS FORMS, WITH CHARACTERISTIC ODOUR.

**Physical dangers**
Dust explosion possible if in powder or granular form, mixed with air.

**Chemical dangers**
On combustion, forms irritating and toxic gases. Reacts with strong oxidants.

**Occupational exposure limits**
TLV: 10 ppm as TWA; 15 ppm as STEL; (skin); A4 (not classifiable as a human carcinogen); (ACGIH 2005).
MAK: skin absorption (H); Carcinogen category: 2; Germ cell mutagen group: 3B; (DFG 2004).

**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. See Notes.

**Effects of short-term exposure**
The substance may cause effects on the blood, resulting in lesions of blood cells (haemolysis). See Notes. The effects may be delayed. Exposure by ingestion may result in death. Medical observation is indicated.

**Effects of long-term or repeated exposure**
The substance may have effects on the blood, resulting in chronic haemolytic anaemia. The substance may have effects on the eyes, resulting in the development of cataract. This substance is possibly carcinogenic to humans.

## PHYSICAL PROPERTIES

Boiling point: 218/C Sublimation slowly at room temperature
Melting point: 80/C
Density: 1.16 g/cm$^3$
Solubility in water, g/100 ml at 25/C: none
Vapour pressure, Pa at 25/C: 11
Relative vapour density (air = 1): 4.42
Flash point: 80/C c.c.
Auto-ignition temperature: 540/C
Explosive limits, vol% in air: 0.9-5.9
Octanol/water partition coefficient as log Pow: 3.3

## ENVIRONMENTAL DATA

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

## NOTES

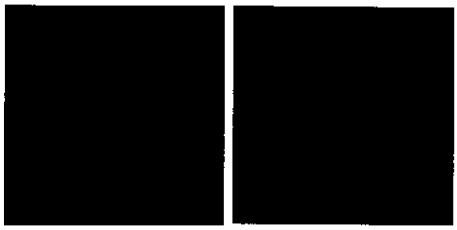
Some individuals may be more sensitive to the effect of naphthalene on blood cells.

## ADDITIONAL INFORMATION

**LEGAL NOTICE** Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2005

# Safety data for propylbenzene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

## General

Synonyms: 1-propylbenzene, n-propylbenzene, propyl benzene, 1-phenylpropane, isocumene
Molecular formula: $C_9H_{12}$
CAS No: 103-65-1
EC No: 203-132-9
Annex I Index No: 601-024-00-X

## Physical data

Appearance: colourless or light yellow liquid
Melting point: -99 C
Boiling point: 159 C
Vapour density: 4.14
Vapour pressure: 2 mm Hg at 20C
Specific gravity: 0.862
Flash point: 47 C
Explosion limits: 0.8 - 6%
Autoignition temperature: 450 C

## Stability

Stable. Flammable. Incompatible with strong oxidizing agents.

## Toxicology

Harmful if swallowed. Respiratory irritant.

**Toxicity data**
(The meaning of any toxicological abbreviations which appear in this section is given here.)
ORL-RAT LD50 6040 mg $kg^{-1}$
IHL-RAT LC50 65000 ppm/2h

**Risk phrases**
(The meaning of any risk phrases which appear in this section is given here.)
R10 R37 R51 R53 R65.

## Environmental information

Harmful in the environment - may cause long-term damage to the aquatic environment.

## Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
UN No 2364. Hazard class 3.0. Packing group III.

## Personal protection

Safety glasses, adequate ventilation. Do not release into the environment.

**Safety phrases**
(The meaning of any safety phrases which appear in this section is given here.)
S24 S37 S61 S62.

[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

---

This information was last updated on October 13, 2006. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL **begins** "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

---

# Safety data for p-cymene

Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

## General

Synonyms: dolcymene, p-isopropyltoluene
Use:
Molecular formula: $C_{10}H_{14}$
CAS No: 99-87-6
EINECS No: 202-796-7

## Physical data

Appearance: colourless liquid with a characteristic odour
Melting point: -68 C
Boiling point: 176 - 177 C
Vapour density:
Vapour pressure: 2 mbar at 20 C
Density (g $cm^{-3}$): 0.854
Flash point: 47 C
Explosion limits: 1 - 6%
Autoignition temperature: 435 C
Water solubility: negligible

## Stability

Stable. Flammable. Incompatible with strong oxidizing agents, strong acids, strong bases.

## Toxicology

Narcotic in high concentration. May irritate the eyes. Chronic exposure may cause liver or kidney damage.

**Toxicity data**
(The meaning of any toxicological abbreviations which appear in this section is

given here.)
ORL-RAT LD50 4750 mg $kg^{-1}$

**Iritation data**
(The meaning of any toxicological abbreviations which appear in this section is given here.)
SKN-RBT 500 mg/24h mod

**Risk phrases**
(The meaning of any risk phrases which appear in this section is given here.)
R10.

## Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
UN No 2046. Hazard class 3. Packing group III.

## Personal protection

Safety glasses, good ventilation.

**Safety phrases**
(The meaning of any safety phrases which appear in this section is given here.)
S16.

[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

---

This information was last updated on March 27, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL **begins** "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

---

# Material Safety Data Sheet

# sec-BUTYLBENZENE

February 28, 2002
MSDS #: 47160
Revision #: 1

CHEVRON PHILLIPS CHEMICAL COMPANY LP
10001 Six Pines Drive
The Woodlands, TX 77380

PHONE NUMBERS
HEALTH:
Chevron Phillips Emergency
Information Center 866.442.9628
(North America) and
1.832.813.4984(International)
TRANSPORTATION:
North America: CHEMTREC 800.424.9300
or 703.527.3887
ASIA: 1.703.527.3887
EUROPE: BIG .32.14.584545 (phone)
or .32.14.583516 (telefax)
SOUTH AMERICA SOS-Cotec
Inside Brazil: 0800.111.767
Outside Brazil: 55.19.3467.1600
Technical Services: (832) 813-4862
For Additional MSDSs: (800) 852-5530

## A. Product Identification

Synonyms: 2-Phenylbutane, secondary-Butylbenzene
Chemical Name: Benzene, (1-methylpropyl)-
Chemical Family: Aromatic hydrocarbon
Chemical Formula: C10H14
CAS Reg. No.: 135-98-8
Product No.: A66400

Product and/or Components Entered on EPA's TSCA Inventory: YES

This product is in U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals; hence, it may be subject to applicable TSCA provisions and restrictions.

## B. Components

| Ingredients | CAS Number | % By Wt. | OSHA PEL | ACGIH TLV |
|---|---|---|---|---|
| sec-Butylbenzene | 135-98-8 | 100 | NE | NE |

# C. Personal Protection Information

Ventilation: Use adequate ventilation.

Respiratory Protection: Not generally required unless needed to prevent respiratory irritation. In case of spill or leak resulting in unknown concentration, use NIOSH approved supplied air respirator.

Eye Protection: Use safety glasses with side shields and face shield for splash protection.

Skin Protection: Use protective garments to prevent skin contact.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

# D. Handling and Storage Precautions

Do not swallow, may be aspirated into lungs. Avoid contact with eyes, skin or clothing. Avoid breathing vapors, mist, fume or dust. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Wash thoroughly after handling. Launder contaminated clothing before reuse. Use with adequate ventilation.

Keep away from heat, sparks, and flames. Store in well-ventilated area. Store in closed container. Bond and ground during transfer.

# E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Oxygen and strong oxidizing agents

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Carbon oxides formed when burned.

# F. Health Hazard Data

## Recommended Exposure Limits:

Not Established.

## Acute Effects of Overexposure:

Eye: May cause mild irritation to the eyes.

Skin: May cause mild to moderate irritation to skin. Prolonged or repeated contact with the liquid may cause defatting of the skin resulting in drying, redness, and possibly blistering.
LD50 (rabbit) > 13 g/kg.

Inhalation: May cause slight to moderate upper airway irritatancy, with higher exposures causing central nervous system depression, headache, and dizziness.

Ingestion: May be slightly irritating to the gastrointestinal tract. If swallowed, may be aspirated resulting in inflammation and possible fluid accumulation in the lungs.
LD50 (rat) > 1.9 g/kg.

## Subchronic and Chronic Effects of Overexposure:

No known applicable information.

## Other Health Effects:

No known applicable information.

## Health Hazard Categories:

| | Animal | Human | | Animal | Human |
|---|---|---|---|---|---|
| Known Carcinogen | ___ | ___ | Toxic | ___ | ___ |
| Suspect Carcinogen | ___ | ___ | Corrosive | ___ | ___ |
| Mutagen | ___ | ___ | Irritant | ___ | ___ |
| Teratogen | ___ | ___ | Target Organ Toxin | _X_ | _X_ |
| Allergic Sensitizer | ___ | ___ | Specify - Lung - Aspiration Hazard | | |
| Highly Toxic | ___ | ___ | | | |

## First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Skin: Wash skin with soap and water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Inhalation: Remove from exposure. If breathing is difficult, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek immediate medical attention.

Ingestion: Do not induce vomiting. Seek immediate medical attention.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

# G. Physical Data

| | |
|---|---|
| Appearance: | Colorless liquid |
| Odor: | Acrid |
| Boiling Point: | 344F (173C) |
| Vapor Pressure: | 0.2 psia @ 130F (54C) |
| Vapor Density (Air = 1): | 4.6 |
| Solubility in Water: | Negligible |
| Specific Gravity (H2O = 1): | 0.866 @ 60/60F 16/16C |
| Percent Volatile by Volume: | 100 |
| Evaporation Rate (Ethyl Ether = 1): | |

# H. Fire and Explosion Data

| | |
|---|---|
| Flash Point (Method Used): | 126F (52C) (TOC, ASTM D 1310) |
| Flammable Limits (% by Volume in Air): | LEL - 0.8<br>UEL - 6.9 |
| Fire Extinguishing Media: | Dry chemical, foam or carbon dioxide (CO2) |
| Special Fire Fighting Procedures: | Evacuate area of all unnecessary personnel. Shut off source if possible. Use NIOSH approved self-contained breathing apparatus and other protective equipment and/or garments described in Section C if conditions warrant. Water fog or spray may be used to cool exposed containers and equipment. Do not spray water directly on fire product will float and could be reignited on surface of water. |
| Fire and Explosion Hazards: | Carbon oxides formed when burned. Highly flammable vapors which are heavier than air may accumulate in low areas and/or spread along ground away from handling site. |

# I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:

Evacuate area of all unnecessary personnel. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Shut off source, if possible and contain spill. Protect from ignition. Keep out of water sources and sewers. Absorb in a dry, inert material (sand, clay, etc). Transfer to disposal drums using non-sparking equipment.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or place in permitted waste management facility.

## J. DOT Transportation

Shipping Name: Butyl benzenes
Hazard Class: 3
ID Number: UN 2709
Packing Group: III
Marking: Butyl benzenes, UN 2709
Label: Flammable Liquid
Placard: Flammable/2709
Hazardous Substance/RQ: Not Applicable
Shipping Description: Butyl benzenes, 3, UN 2709,PG III
Packaging References: 49 CFR 173.150, 173.203, 173.241

## K. RCRA Classification - Unadulterated Product as a Waste

Ignitable (D001)

Prior to disposal, consult your environmental contact to determine if TCLP (Toxicity Characteristic Leaching Procedure, EPA Test Method 1311) is required. Reference 40 CFR Part 261.

## L. Protection Required for Work on Contaminated Equipment

Contact immediate supervisor for specific instructions before work is initiated. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

## M. Hazard Classification

___ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

| | | |
|---|---|---|
| _X_ Combustible Liquid | ___ Flammable Aerosol | ___ Oxidizer |
| ___ Compressed Gas | ___ Explosive | ___ Pyrophoric |
| ___ Flammable Gas | _X_ Health Hazard (Section F) | ___ Unstable |
| ___ Flammable Liquid | ___ Organic Peroxide | ___ Water Reactive |
| ___ Flammable Solid | | |

___ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

# N. Additional Comments

REVISION STATEMENT:

This revision updates Section J.

SARA 313

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NFPA 704 Hazard Codes - - - - - - - - Signals

| | | |
|---|---|---|
| | | Least - 0 |
| Health | : 0 | Slight - 1 |
| Flammability | : 2 | Moderate - 2 |
| Reactivity | : 0 | High - 3 |
| Special Haz. | : - | Extreme - 4 |

**Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by EHS Product Stewardship Group, Chevron Phillips Chemical Company LP, 10001 Six Pines Drive, The Woodlands, TX 77380**

**The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.**

# TOLUENE

**0078**
October 2002

**CAS No: 108-88-3**
RTECS No: XS5250000
UN No: 1294
EC No: 601-021-00-3

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

| 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 | 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 in large spill. | F Symbol<br>Xn Symbol<br>R: 11-38-48/20-63-65-67<br>S: (2-)36/37-46-62<br>UN Hazard Class: 3<br>UN Pack Group: II |

| EMERGENCY RESPONSE | SAFE STORAGE |
|---|---|
| Transport Emergency Card: TEC (R)-30S1294<br>NFPA Code: H 2; F 3; R 0 | Fireproof. Separated from strong oxidants. |

**IPCS**
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2004

**SEE IMPORTANT INFORMATION ON THE BACK.**

## 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/m$^3$; H; Peak limitation category: II(4); Pregnancy risk group: C; (DFG 2004).

**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 dysrhythmia and unconsciousness.

**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.

## NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
Use of alcoholic beverages enhances the harmful effect.
Card has been partly updated in October 2004. See sections Occupational Exposure Limits, EU classification, Emergency Response.

## ADDITIONAL INFORMATION

**LEGAL NOTICE** Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2004

# Appendix B
# Activity Hazard Analyses

| **Project Identification**<br>3140 Coney Island Ave | **Location**<br>Various | **Estimated Dates**<br>TBD |
|---|---|---|
| **Phase of Work**<br>Mobilization/ Demobilization | **Page 1 of 1** | **Analysis Approved by**<br>Kris Almskog, PM/HSM |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Mobilization and demobilization of equipment site tools, personnel | Slips/trips/falls | • Maintain alertness to slip/trip/fall hazards;<br>• Maintain good housekeeping;<br>• Walk, do not run;<br>• Wear footwear with soles that grip;<br>• Unloading areas should be on even terrain; and<br>• Mark and repair if possible tripping hazards. |
| | Manual lifting and material handling | • Instruct personnel on proper lifting techniques;<br>• Use proper lifting techniques; and<br>• Team lifting will be used for heavy loads or use mechanical lifting devices. |
| | Temperature extremes | • Drink plenty of fluids:<br>• Train personnel of signs/symptoms of heat/cold stress;<br>• Monitor air temperatures when extreme weather conditions are present; and<br>• Stay in visual and verbal contact with your buddy. |
| | Vehicular traffic | • Spotters will be used when backing up trucks and heavy equipment and when moving equipment. |
| | Overhead hazards | • Personnel will be required to wear hard hats that meet ANSI Standard Z89.1;<br>• Ground personnel will stay clear of suspended loads;<br>• Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and<br>• Overhead hazards will be identified prior to commencing work operations. |
| | Noise | • Ear plugs or ear muffs shall be worn for operations that exceed 85 decibels. |
| | Electrocution | • Equipment will be equipped with GFCI;<br>• A licensed electrician will conduct electrical work;<br>• Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV. |
| | Biological hazards | • Be alert to the presence of biological hazards;<br>• Wear insect repellent;<br>• Follow procedures in Section 4.2.2 for tick bites;<br>• FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings. |

| **Project Identification**<br>3140 Coney Island Ave | **Location**<br>Various | **Estimated Dates**<br>TBD |
|---|---|---|
| **Phase of Work**<br>Excavation | **Page 1 of 2** | **Analysis Approved by**<br>Kris Almskog, PM/HSM |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1. Excavate to required depths; soil handing and transport | Chemical hazards | • Wear appropriate PPE per Table 6-1;<br>• Perform air monitoring per Community Air Monitoring Plan;<br>• Practice contamination avoidance;<br>• Follow proper decontamination procedures; and<br>• Wash hands/face before eating, drinking or smoking. |
| | Hand and power tool usage | • Equip electrical equipment with GFCI's;<br>• Inspect electrical equipment and tools prior to use;<br>• Daily inspections will be performed;<br>• Remove broken or damaged tools from service;<br>• Use the tool for its intended purpose;<br>• Use in accordance with manufacturer instructions; and<br>Tag and remove defective equipment. |
| | Temperature extremes | • Drink plenty of fluids:<br>• Train personnel of signs/symptoms of heat/cold stress;<br>• Monitor air temperatures when extreme weather conditions are present; and,<br>• Stay in visual and verbal contact with your buddy. |
| | Manual lifting and material handling | • Instruct personnel on proper lifting techniques;<br>• Use proper lifting techniques; and<br>• Team lifting will be used for heavy loads or use mechanical lifting devices. |
| | Fire/Explosion | • ABC type fire extinguishers shall be readily available;<br>• No smoking in work area. |
| | Biological hazards | • Be alert to the presence of biological hazards;<br>• Wear insect repellent;<br>• Follow procedures in Section 4.2.2 for tick bites;<br>• FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings. |
| | Heavy equipment | • Ground personnel will stay clear of suspended loads;<br>• Ground personnel will stay out of the swing radius;<br>• Eye contact with operators will be made before approaching equipment;<br>• Equipment will not be approached on blind sides;<br>• Equipment will be equipped with backup alarms or spotters shall be used. |
| | Slips/Trips/Falls | • Maintain alertness to slip/trip/fall hazards;<br>• Maintain good housekeeping;<br>• Walk, do not run;<br>• Wear footwear with soles that grip;<br>• Unloading areas should be on even terrain; and mark and repair if possible tripping hazards are present. |
| | Electrocution | • Equipment will be equipped with GFCI;<br>• A licensed electrician will conduct electrical work;<br>• Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV. |

| **Project Identification**<br>3140 Coney Island Ave | **Location**<br>Various | **Estimated Dates**<br>TBD |
|---|---|---|
| **Phase of Work**<br>Drilling | **Page 2 of 2** | **Analysis Approved by**<br>Kris Almskog, PM/HSM |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| | Noise | • Hearing protection mandatory at or above 85 dBA.<br>• Instruct personnel how to properly wear heating protective devices.<br>• Disposable ear plugs or other hearing protection required when working near noisy equipment.. |
| | Steam/Heat/Splashing | • Use face shield and safety glasses or goggles;<br>• Stay out of the splash/steam radius;<br>• Do not direct steam at anyone;<br>• Do not hold objects with your foot and steam area near it;<br>• Direct spray to minimize spread of constituents of concern; and<br>• Use shielding as necessary. |
| | Excavation hazards | • Follow 29 CFR 1926 Subpart P. |
| | Overhead hazards | • Personnel will be required to wear hard hats that meet ANSI Standard Z89.1;<br>• Ground personnel will stay clear of suspended loads;<br>• Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and<br>• Overhead hazards will be identified prior to commencing work operations. |
| | Electrocution | • Equipment will be equipped with GFCI;<br>• A licensed electrician will conduct electrical work;<br>• Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV. |
| | Track Hazards | • Caution will be used when working in close proximity to the electrified third rail (see "Electrocution" above).<br>• Workers are required to have completed NYCT Track Safety Training<br>• Flag men will be used when necessary (e.g., working in limited access track areas). |

| **Project Identification**<br>3140 Coney Island Ave | **Location**<br>Various | **Estimated Dates**<br>TBD |
|---|---|---|
| **Phase of Work**<br>Soil/Groundwater Sampling | **Page 1 of 1** | **Analysis Approved by**<br>Kris Almskog, PM/HSM |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1.Collect soil/groundwater samples. | Chemical hazards | • Wear appropriate PPE per Table 6-1;<br>• Practice contamination avoidance;<br>• Follow proper decontamination procedures; and<br>• Wash hands/face before eating, drinking or smoking. |
| | Temperature extremes | • Drink plenty of fluids:<br>• Train personnel of signs/symptoms of heat/cold stress;<br>• Monitor air temperatures when extreme weather conditions are present; and<br>• Stay in visual and verbal contact with your buddy. |
| | Manual lifting and material handling | • Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available. |
| | Slips/Trips/Falls | • Maintain alertness to slip/trip/fall hazards;<br>• Maintain good housekeeping;<br>• Walk, do not run;<br>• Wear footwear with soles that grip;<br>• Unloading areas should be on even terrain; and<br>• Mark and repair if possible tripping hazards. |
| | Electrocution | • Equipment will be equipped with GFCI;<br>• A licensed electrician will conduct electrical work;<br>• Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV. |
| | Track Hazards | • Caution will be used when working in close proximity to the electrified third rail (see "Electrocution" above).<br>• Workers are required to have completed NYCT Track Safety Training<br>• Flag men will be used when necessary (e.g., working in limited access track areas). |

| **Project Identification**<br>3140 Coney Island Ave | **Location**<br>Various | **Estimated Dates**<br>TBD |
|---|---|---|
| **Phase of Work**<br>Decontamination | **Page 1 of 1** | **Analysis Approved by**<br>Kris Almskog, PM/HSM |
| **TASKS** | **HAZARDS** | **CONTROL MEASURES** |
| 1.Decontaminate equipment | Chemical hazards | • Wear appropriate PPE per Table 6-1;<br>• Practice contamination avoidance;<br>• Follow proper decontamination procedures; and<br>• Wash hands/face before eating, drinking or smoking. |
| | Temperature extremes | • Drink plenty of fluids:<br>• Train personnel of signs/symptoms of heat/cold stress;<br>• Monitor air temperatures when extreme weather conditions are present; and<br>• Stay in visual and verbal contact with your buddy. |
| | Manual lifting and material handling | • Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available. |
| | Slips/Trips/Falls | • Maintain alertness to slip/trip/fall hazards;<br>• Maintain good housekeeping;<br>• Walk, do not run;<br>• Wear footwear with soles that grip;<br>• Unloading areas should be on even terrain; and<br>• Mark and repair if possible tripping hazards. |
| | Electrocution | • Equipment will be equipped with GFCI;<br>• A licensed electrician will conduct electrical work;<br>• Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV. |
| | Track Hazards | • Caution will be used when working in close proximity to the electrified third rail (see "Electrocution" above).<br>• Workers are required to have completed NYCT Track Safety Training<br>• Flag men will be used when necessary (e.g., working in limited access track areas). |

# Appendix C
# Heat/Cold Stress Protocols

# HEAT STRESS

Heat Stress (Hyperthermia)

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.

2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.

3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.

4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.

5. *Heat exhaustion* results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.

6. *Treatment for heat exhaustion*: Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.

7. *Heat stroke* results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.

8. *Treatment of heat stroke*: Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

## TABLE 1

### SYMPTOMS OF HEAT STRESS

*Heat cramps* are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

*Heat exhaustion* occurs when body organs attempt to keep the body cool. Symptoms include;

- Pale, cool moist skin
- Core temperature elevated 1-2°
- Thirst
- Anxiety
- Rapid heart rate
- Heavy sweating
- Dizziness
- Nausea

*Heat stroke* is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration
- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104° or above
- Coma

**TABLE 2**

HEAT STRESS INDICATORS

| Heat stress indicator | When to measure | If Exceeds... | Action |
|---|---|---|---|
| Heart rate (pulse) | Beginning of rest period | 110 beats per minute | Shorten next work period by 33% |
| Oral temperature | Beginning of rest period | 99°F (after thermometer is under tongue for 3 minutes)<br><br>100.6°F | Shorten next work period by 33%<br><br>Prohibit work in impermeable clothing |
| Body weight | 1. Before workday begins (a.m.)<br>2. After workday ends (p.m.) | | Increase fluid intake |

# COLD STRESS

## Cold stress (Hypothermia)

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

## Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6°F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one in Table 3, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

## Frostbite

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

| Condition | Skin Surface | Tissue Under Skin | Skin Color |
|---|---|---|---|
| Frostnip | Soft | Soft | Initially red, then white |
| Frostbite | Hard | Soft | White and waxy |
| Freezing | Hard | Hard | Blotchy, white to yellow-gray to gray |

1. *Frostnip* is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.

2. *Treatment of frostnip*: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.

3. *Frostbite*: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. *DO NOT* squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.

4. *Treatment of frostbite*: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100°F to 106°F water bath. Water temperature will drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture or drain any blisters.

   **NOTE**: Never listen to myths and folk tales about the care of frostbite. *Never* rub a frostbitten or frozen area. *Never* rub snow on a frostbitten or frozen area. Rubbing the area may cause

serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. *General cooling/Hypothermia*: General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

| Body Temperature | °C | Symptoms |
|---|---|---|
| 99-96 | 37-35.5 | Intense, uncontrollable shivering |
| 95-91 | 35.5-32.7 | Violent shivering persists. If victim is conscious, he has difficulty speaking. |
| 90-86 | 32-30 | Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings. |
| 85-81 | 29.4-27.2 | Victim becomes irrational, loses contact with his environment, and drifts into a stuporous state. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias. |
| 80-78 | 26.6-18.5 | Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic |
| Below 78 | 25.5 | Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death. |

6. *Treatment of hypothermia*: Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

## TABLE 3[1]
## COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)

| Estimated wind Speed (in mph) | Actual Temperature Reading (°F)P | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 50 | 40 | 30 | 20 | 10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| | Equivalent Chill Temperature (°F) | | | | | | | | | | | |
| Calm | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| 5 | 48 | 37 | 27 | 16 | 6 | -5 | -15 | -26 | -36 | -47 | -57 | -68 |
| 10 | 40 | 28 | 15 | 4 | -9 | -24 | -33 | -46 | -58 | -70 | -83 | -95 |
| 15 | 36 | 22 | 9 | -5 | -18 | -32 | -45 | -58 | -72 | -85 | -99 | -112 |
| 20 | 32 | 18 | 4 | -10 | -25 | -39 | -53 | -67 | -82 | -96 | -110 | -121 |
| 25 | 30 | 16 | 0 | -15 | -29 | -44 | -59 | -74 | -88 | -104 | -118 | -133 |
| 30 | 28 | 13 | -2 | -18 | -33 | -48 | -63 | -79 | -94 | -109 | -125 | -140 |
| 35 | 27 | 11 | -4 | -20 | -35 | -51 | -67 | -82 | -98 | -113 | -129 | -145 |
| 40 | 26 | 10 | -6 | -21 | -37 | -53 | -69 | -85 | -100 | -116 | -132 | -146 |
| (Wind speeds greater than 40 mph have little additional effect.) | LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security. | | | | INCREASING DANGER Danger from freezing of exposed flesh within one minute | | | GREAT DANGER may freeze within 30 seconds. | | | | Flesh |
| | Trench foot and imersion foot may occur at any point on this chart | | | | | | | | | | | |

Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.

# Appendix D
# Medical Data Sheet

## MEDICAL DATA SHEET

The brief medical data sheet shall be completed by on-site personnel and will be kept in the Support Zone by the HSO as a project record during the conduct of site operations. It accompanies any personnel when medical assistance is needed or if transport to a hospital is required.

Project:
Name: Home Telephone: _____
Address: _____
Age: _____ Height: _____ Weight: _____ Blood Type: _____

Name and Telephone Number of Emergency Contact: _____

Drug or Other Allergies: _____

Particular Sensitivities: _____

Do You Wear Contacts? _____

Provide A Check List Of Previous Illnesses: _____

What Medications Are You Presently Using?_____

Do You Have Any Medical Restrictions? _____

Name, Address, And Phone Number Of Personal Physician:

# Appendix E
# General Health and Safety Work Practices

**GENERAL HEALTH AND SAFETY WORK PRACTICES**

1. Site personnel must attend each day's Daily Briefing and sign the attendance sheet.

2. Any individual taking prescribed drugs shall inform the FTL/HSO of the type of medication. The FTL/HSO will review the matter with the HSM and the Corporate Medical Consultant (CMC), who will decide if the employee can safely work on-site while taking the medication.

3. The personal protective equipment specified by the FTL/HSO and/or associated procedures shall be worn by site personnel. This includes hard hats and safety glasses which must be worn in active work areas.

4. Facial hair (beards, long sideburns or mustaches) which may interfere with a satisfactory fit of a respirator mask is not allowed on any person who may be required to wear a respirator.

5. Personnel must follow proper decontamination procedures and shower as soon as possible upon completion of work shift.

6. Eating, drinking, chewing tobacco or gum, smoking and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the exclusion zone or the contamination reduction zone. (Exceptions may be permitted by the HSM to allow fluid intake during heat stress conditions).
7. Lighters, matches, cigarettes and other forms of tobacco are prohibited in the Exclusion Zone.
8. Signs and demarcations shall be followed. Such signs and demarcation shall not be removed, except as authorized by the FTL/HSO.
9. No one shall enter a permit-required confined space without a permit and appropriate training. Confined space entry permits shall be implemented as issued.
10. Personnel must follow Hot Work Permits as issued.
11. Personnel must use the Buddy System in the Exclusion Zone.
12. Personnel must follow the work-rest regimens and other practices required by the heat stress program.
13. Personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.
14. No person shall operate equipment unless trained and authorized.
15. No one may enter an excavation greater than four feet deep unless authorized by the Competent Person. Excavations must be sloped or shored properly. Safe means of access and egress from excavations must be maintained.
16. Ladders and scaffolds shall be solidly constructed, in good working condition, and inspected prior to use. No one may use defective ladders or scaffolds.
17. Fall protection or fall arrest systems must be in place when working at elevations greater than six feet for temporary working surfaces and four feet for fixed platforms.

18. Safety belts, harnesses and lanyards must be selected by the Supervisor. The user must inspect the equipment prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.

19. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used.

20. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out walkways and puddles unless protected and rated for the service.

21. Improper use, mishandling, or tampering with health and safety equipment and samples is prohibited.

22. Horseplay of any kind is prohibited.

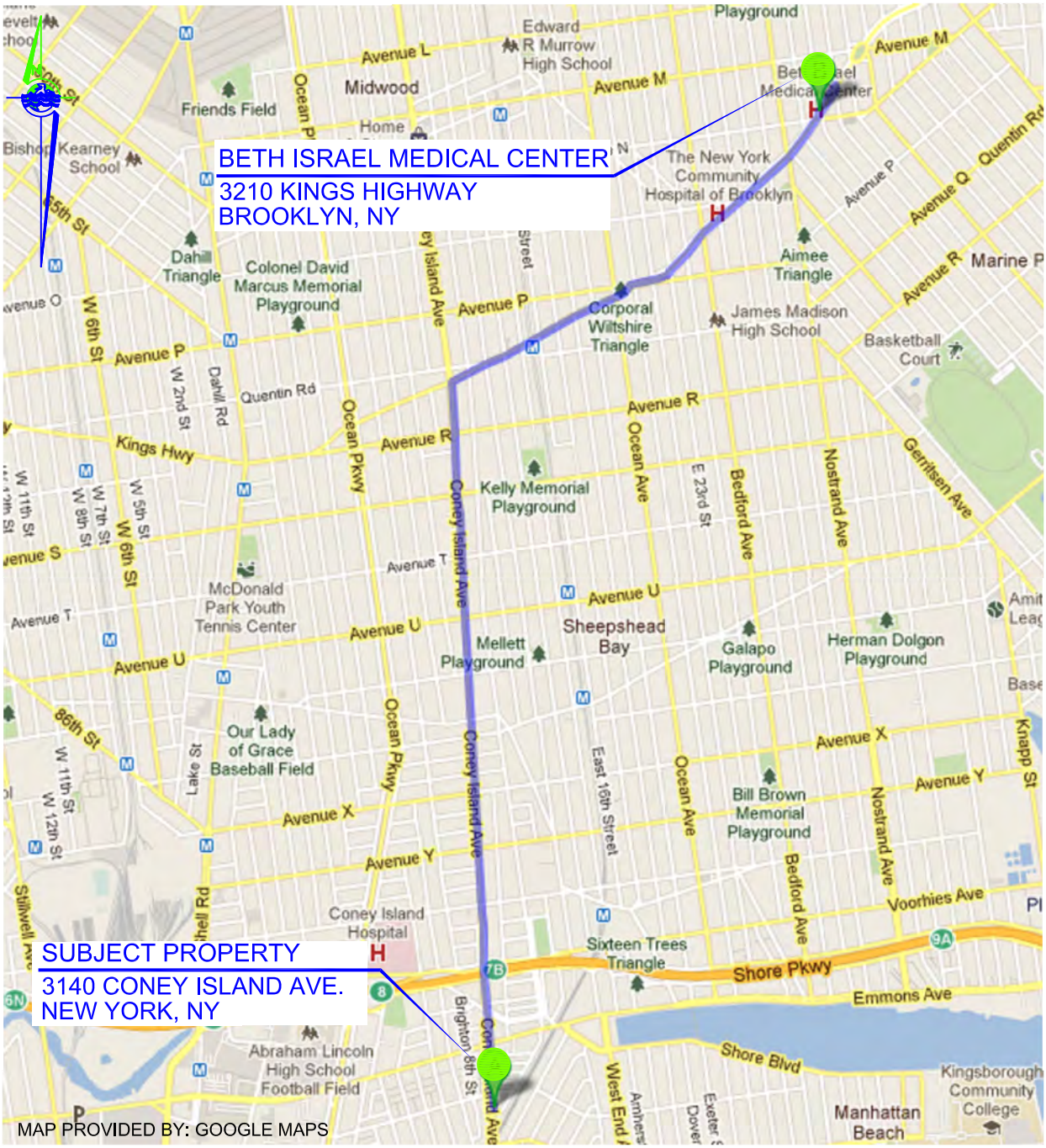
23. Possession or use of alcoholic beverages, controlled substances, or firearms on any site is forbidden.

24. Incidents, no matter how minor, must be reported immediately to the Supervisor.

25. Personnel shall be familiar with the Site Emergency Action Plan, which is contained in Section 12 of the HASP/EAP.

**The above Health and Safety Rules are not all inclusive and it is your responsibility to comply with regulations set forth by OSHA, the client, PWGC Supervisors, and the FTL/HSO.**

# Appendix F
# Hospital Route Map and Directions




## DIRECTIONS:

| | | |
|---|---|---|
| 1. | Head NORTH on CONEY ISLAND AVE. toward OCEAN VIEW AVE. | 1.9 Mi. |
| 2. | Turn RIGHT onto KINGS HIGHWAY | 0.5 Mi. |
| 3. | Slight LEFT to stay on KINGS HIGHWAY | 148 Ft. |
| 4. | Slight RIGHT onto AVENUE P. | 72 Ft. |
| 5. | Continue onto KINGS HIGHWAY | 0.8 Mi. |
| 6. | Make U-TURN at NEW YORK AVE. | 0.1 Mi. |
| 7. | DESTINATION WILL BE ON RIGHT | |

# HOSPITAL ROUTE MAP

SCALE: NOT TO SCALE

J:\Projects_A-D\CIR\CAD\Hospital_Route_Map.dwg

PWGC
Strategic Environmental & Engineering Solutions
630 Johnson Ave. Suite 7 Bohemia, N.Y. 11716-2618
Ph: 631 589-6353 Fx: 631 589-6705 E-mail: info@pwgroesser.com

3140 CONEY ISLAND AVE.
BROOKLYN, NY

| | |
|---|---|
| Project: | CIR1101 |
| Designed by: | CC |
| Approved by: | PWG |
| Drawn By: | JML |
| Figure No: | 1 |
| Date: | 12/1/11 |

# Appendix G
# Incident Report Form / Investigation Form

| INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 1 OF 2 | | | |
|---|---|---|---|
| | | | |
| **TYPE OF INCIDENT - CHECK ALL THAT APPLY** | | | |
| ☐ INJURY/ILLNESS | ☐ VEHICLE DAMAGE | ☐ PROPERTY DAMAGE | ☐ FIRE |
| ☐ SPILL/RELEASE | ☐ PERMIT EXCEEDENCE | ☐ NEAR MISS | ☐ OTHER |
| **GENERAL INFORMATION** | | | |
| PROJECT NAME: | DATE OF REPORT: | REPORT NO.: | |
| DATE OF INCIDENT: | TIME: | DAY OF WEEK: | |
| LOCATION OF INCIDENT: | | | |
| WEATHER CONDITIONS: | ADEQUATE LIGHTING AT SCENE? ☐ YES ☐ NO ☐ N/A | | |
| **DESCRIBE WHAT HAPPENED (STEP BY STEP - USE ADDITIONAL PAGES IF NECESSARY)** | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| **AFFECTED EMPLOYEE INFORMATION** | | | |
| NAME: | EMPLOYEE: ☐ YES ☐ NO | | |
| HOME ADDRESS: | | | |
| SOCIAL SECURITY NO.: | HOME PHONE NO.: | | |
| JOB CLASSIFICATION: | YEARS IN JOB CLASSIFICATION: | | |
| HOURS WORKED ON SHIFT PRIOR TO INCIDENT: | AGE: | | |
| DID INCIDENT RELATE TO ROUTINE TASK FOR JOB CLASSIFICATION? ☐ YES ☐ NO | | | |
| **INJURY/ILLNESS INFORMATION** | | | |
| NATURE OF INJURY OR ILLNESS: | | | |
| | | | |
| OBJECT/EQUIPMENT/SUBSTANCE CAUSING HARM: | | | |
| FIRST AID PROVIDED? ☐ YES ☐ NO | | | |
| IF YES, WHERE WAS IT GIVEN: ☐ ON-SITE ☐ OFF-SITE | | | |
| IF YES, WHO PROVIDED FIRST AID: | | | |
| WILL THE INJURY/ILLNESS RESULT IN: ☐ RESTRICTED DUTY ☐ LOST TIME ☐ UNKNOWN | | | |

| INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 2 OF 2 REPORT NO. |
|---|
| |
| **MEDICAL TREATMENT INFORMATION** |
| WAS MEDICAL TREATMENT PROVIDED? ☐ YES ☐ NO |
| IF YES, WAS MEDICAL TREATMENT PROVIDED: ☐ ON-SITE ☐ DR.'S OFFICE ☐ HOSPITAL |
| NAME OF PERSON(S) PROVIDING TREATMENT: |
| ADDRESS WHERE TREATMENT WAS PROVIDED: |
| TYPE OF TREATMENT: |
| **VEHICLE AND PROPERTY DAMAGE INFORMATION** |
| VEHICLE/PROPERTY DAMAGED: |
| DESCRIPTION OF DAMAGE: |
| **SPILL AND AIR EMISSIONS INFORMATION:** |
| SUBSTANCE SPILLED OR RELEASED: FROM WHERE: TO WHERE: |
| ESTIMATED QUANTITY/DURATION: |
| CERCLA HAZARDOUS SUBSTANCE? ☐ YES ☐ NO |
| REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY: |
| WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME: |
| RESPONSE ACTION TAKEN: |
| **PERMIT EXCEEDENCE** |
| TYPE OF PERMIT: PERMIT #: |
| DATE OF EXCEEDENCE: DATE FIRST KNOWLEDGE OF EXCEEDENCE: |
| PERMITTED LEVEL OR CRITERIA: |
| EXCEEDENCE LEVEL OR CRITERIA: |
| REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY: |
| WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME: |
| RESPONSE ACTION TAKEN: |
| **NOTIFICATIONS** |
| NAMES OF PERSONNEL NOTIFIED: DATE/TIME: |
| CLIENT NOTIFIED: DATE/TIME: |
| AGENCY NOTIFIED: DATE/TIME: |
| CONTACT NAME: |
| **PERSONS PREPARING REPORT** |
| EMPLOYEE'S NAME:(PRINT) SIGN: |
| SUPERVISOR'S NAME:(PRINT) SIGN: |

| INVESTIGATIVE REPORT | | | |
|---|---|---|---|
| DATE OF INCIDENT: | DATE OF REPORT: | REPORT NUMBER: | |
| INCIDENT COST: ESTIMATED: $_____ | ACTUAL: $_____ | | |
| OSHA RECORDABLE(S): □ YES □ NO # RESTRICTED DAYS ____ # DAYS AWAY FROM WORK ____ | | | |
| **CAUSE ANALYSIS** | | | |
| IMMEDIATE CAUSES - WHAT ACTIONS AND CONDITIONS CONTRIBUTED TO THIS EVENT? | | | |
| | | | |
| | | | |
| BASIC CAUSES - WHAT SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT? | | | |
| | | | |
| | | | |
| **ACTION PLAN** | | | |
| REMEDIAL ACTIONS - WHAT HAS AND OR SHOULD BE DONE TO CONTROL EACH OF THE CAUSES LISTED? | | | |
| ACTION | PERSON RESPONSIBLE | TARGET DATE | COMPLETION DATE |
| | | | |
| | | | |
| | | | |
| | | | |
| **PERSONS PERFORMING INVESTIGATION** | | | |
| INVESTIGATOR'S NAME: (PRINT) | SIGN: | DATE: | |
| INVESTIGATOR'S NAME: (PRINT) | SIGN: | DATE: | |
| INVESTIGATOR'S NAME: (PRINT) | SIGN: | DATE: | |
| **MANAGEMENT REVIEW** | | | |
| PROJECT MANAGER: (PRINT) | SIGN: | DATE: | |
| COMMENTS: | | | |
| H&S MANAGER: (PRINT) | SIGN: | DATE: | |
| COMMENTS: | | | |

## EXAMPLES OF IMMEDIATE CAUSES

Substandard Actions

1. Operating equipment without authority
2. Failure to warn
3. Failure to secure
4. Operating at improper speed
5. Making safety devices inoperable
6. Removing safety devices
7. Using defective equipment
8. Failure to use PPE properly
9. Improper loading
10. Improper placement
11. Improper lifting
12. Improper position for task
13. Servicing equipment in operation
14. Under influence of alcohol/drugs
15. Horseplay

Substandard Conditions

1. Guards or barriers
2. Protective equipment
3. Tools, equipment, or materials
4. Congestion
5. Warning system
6. Fire and explosion hazards
7. Poor housekeeping
8. Noise exposure
9. Exposure to hazardous materials
10. Extreme temperature exposure
11. Illumination
12. Ventilation
13. Visibility

## EXAMPLES OF BASIC CAUSES

Personal Factors

1. Capability
2. Knowledge
3. Skill
4. Stress
5. Motivation
6. Work Standards
7. Wear and tear
8. Abuse or misuse

Job Factors

1. Supervision
2. Engineering
3. Purchasing
4. Maintenance
5. Tools/equipment

## MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS

1. Leadership and administration
2. Management training
3. Planned inspections
4. Task analysis and procedures
5. Task observation
6. Emergency preparedness
7. Organizational rules
8. Accident/incident analysis
9. Personal protective equipment
10. Health control
11. Program audits
12. Engineering controls
13. Personal communications
14. Group meetings
15. General promotion
16. Hiring and placement
17. Purchasing controls

# Appendix H
# Daily Briefing Sign-In Sheet

## DAILY BRIEFING SIGN-IN SHEET

Date: _____ Project Name/Location: _____

Person Conducting Briefing: _____

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

_____

_____

_____

2. OTHER ISSUES (HASP/EAP changes, attendee comments, etc.)

_____

_____

_____

3. ATTENDEES (Print Name):

| | |
|---|---|
| 1. | 21. |
| 2. | 22. |
| 3. | 23. |
| 4. | 24. |
| 5. | 25. |
| 6. | 26. |
| 7. | 27. |
| 8. | 28. |
| 9. | 29. |
| 10. | 30. |
| 11. | 31. |
| 12. | 32. |
| 13. | 33. |
| 14. | 34. |
| 15. | 35. |
| 16. | 36. |
| 17. | 37. |
| 18. | 38. |
| 19. | 39. |
| 20. | 40. |

# 3140 CONEY ISLAND AVENUE
# BROOKLYN, NEW YORK

# COMMUNITY AIR MONITORING PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
Hunters Point Plaza
47-40 21st Street
Long Island City, New York 11101

PREPARED FOR:

3140 Coney Island Realty, LLC
3061 Brighton 6th Street
Brooklyn, New York 11235

**PREPARED BY:**

P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353
Fax: 631-589-8705

Kris Almskog, Vice President krisa@pwgrosser.com
Jennifer Lewis, Senior Hydrogeologist JenniferL@pwgrosser.com

PWGC Project Number: CIR1101

## JUNE 13, 2013

PWGC
Strategic Environmental Engineering Solutions

**COMMUNITY AIR MONITORING PLAN**
**3140 CONEY ISLAND AVENUE**
**BROOKLYN, NEW YORK**

**TABLE OF CONTENTS** **PAGE**


1.0 INTRODUCTION ..... 1
1.1 Regulatory Requirements ..... 1
2.0 AIR MONITORING ..... 1
2.1 Real-Time Monitoring ..... 1
2.1.1 Work Area ..... 1
2.1.2 Community Air Monitoring Requirements ..... 2
3.0 VAPOR EMISSION RESPONSE PLAN ..... 3
4.0 MAJOR VAPOR EMISSION RESPONSE PLAN ..... 4
5.0 VAPOR SUPPRESSION TECHNIQUES ..... 5
6.0 DUST SUPPRESSION TECHNIQUES ..... 5
7.0 DATA QUALITY ASSURANCE ..... 5
7.1 Calibration ..... 5
7.2 Operations ..... 5
7.3 Data Review ..... 5
8.0 RECORDS AND REPORTING ..... 6

## 1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial investigation) from potential airborne contaminant releases resulting from remedial activities performed at 3140 Coney Island Avenue, Brooklyn, New York.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air.

Based on previous investigations at the site, the primary concerns for this site are VOCs and dust particulates.

### 1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- 29 CFR 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of protection for workers.
- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan: 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

The following sections contain information describing the types, frequency and location of real-time monitoring.

### 2.1 Real-Time Monitoring

This section addresses the real-time monitoring that will be conducted within the work area, and along the site perimeter, during intrusive activities such as excavation, product recovery, manipulation of soil piles, extraction of sheet piling, etc.

#### 2.1.1 *Work Area*

The following instruments will be used for work area monitoring:

- Photoionization Detector (PID)

- Dust Monitor

Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas.

### 2.1.2 *Community Air Monitoring Requirements*

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before investigation activities begin. These points will be monitored periodically in series during the site work.

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 Photovac MicroTip PID or equivalent. Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas. All air monitoring data is documented in a site log book by the designated site safety officer. PWGC's 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.

**Table 1-1**

**Frequency and Location of Air Monitoring**

| ACTIVITY | AIR MONITORING INSTRUMENT | FREQUENCY AND LOCATION |
|---|---|---|
| Drilling, Sampling, Excavation | PID, Dust Monitor | Continuous in Breathing Zone (BZ) during intrusive activities or if odors become apparent, screening in the BZ every 30 minutes during non-intrusive activities |

**Table 1-2**

**Real-Time Air Monitoring Action Levels**

| AIR MONITORING INSTRUMENT | MONITORING LOCATION | ACTION LEVEL | SITE ACTION | REASON |
|---|---|---|---|---|
| PID | Breathing Zone | 0-25 ppm, non-transient | None | Exposure below established exposure limits |
| PID | Breathing Zone | 25-100 ppm, non-transient | Don APR | Based on potential exposure to VOCs |
| PID | Breathing Zone | >100 ppm, non-transient | Don ASR or SCBA, Institute vapor/odor suppression measures, Notify HSM. | Increased exposure to site contaminants, potential for vapor release to public areas. |
| PID | Work Area Perimeter | < 5 ppm | None | Exposure below established exposure limits. |
| PID | Work Area Perimeter | > 5 ppm | Stop work and implement vapor release response plan until readings return to acceptable levels, Notify HSM. | Increased exposure to site contaminants, potential for vapor release to public areas |
| Aerosol Monitor | Work Area Perimeter | >100 but < 150 µg/m$^3$ for 15 minutes | Institute dust suppression measures, Notify HSM. | Work to continue if particulate concentrations remain below 150 µg/m$^3$ |
| Aerosol Monitor | Work Area Perimeter | >150 µg/m$^3$ | Don ASR or SCBA, Institute dust suppression measures, Notify HSM. | Stop work and implement dust suppression techniques until readings return to acceptable levels, Notify HSM. |

## 3.0 VAPOR EMISSION RESPONSE PLAN

This section is excerpted from the NYSDOH guidance for Community Air Monitoring Plan - Ground Intrusive Activities.

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. Vapor suppression measures can also be taken at this time. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- The organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down. When work shutdown occurs, downwind air monitoring as directed by the Site Health & Safety Officer (SHSO) will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission Response Plan Section.

## 4.0 MAJOR VAPOR EMISSION RESPONSE PLAN

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source (see Section 5.0) are unsuccessful and if organic vapor levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

However, the Major Vapor Emission Response Plan shall be immediately placed in effect if organic vapor levels are greater than 10 ppm above background.

Upon activation, the following activities will be undertaken:

1. All emergency Response Contacts as listed in the Health & Safety Plan will go into effect.
2. The local police authorities will immediately be contacted by the Health & Safety Officer and advised of the situation.
3. Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by

the Health & Safety Officer.

## 5.0 VAPOR SUPPRESSION TECHNIQUES

Vapor suppression techniques must be employed when action levels warrant the use of these techniques.

The techniques to be implemented for control of VOCs from stockpiled soil or from the open excavation will include one or more of the following:

- cover with plastic
- cover with "clean soil"
- application of hydro-mulch material or encapsulating foam
- limit working hours to favorable wind and temperature conditions

## 6.0 DUST SUPPRESSION TECHNIQUES

Reasonable dust-suppression techniques must be employed during all work that may generate dust, such as drilling, excavation, grading, and placement of clean fill. The following techniques were shown to be effective for controlling the generation and migration of dust during remedial activities:

- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Hauling materials in properly covered containers; and,
- Restricting vehicle speeds to 10 mph.

It is imperative that utilizing water for suppressing dust will not create surface runoff.

## 7.0 DATA QUALITY ASSURANCE

### 7.1 Calibration

Instrument calibration shall be documented in the designated field logbook. All instruments shall be calibrated before each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

### 7.2 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 FOL/HSO for reference.

### 7.3 Data Review

The Field Team Leader FOL/SHSO will interpret all monitoring data based on Table 1-2 and his/her professional

judgment. The FOL/HSO shall review the data with the HSM 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 HSM.

## 8.0 RECORDS AND REPORTING

All readings must be recorded and available for review by personnel from NYSDEC and NYSDOH. Should any of the action levels be exceeded, the NYSDEC Division of Air Resources must be notified in writing within five (5) working days.

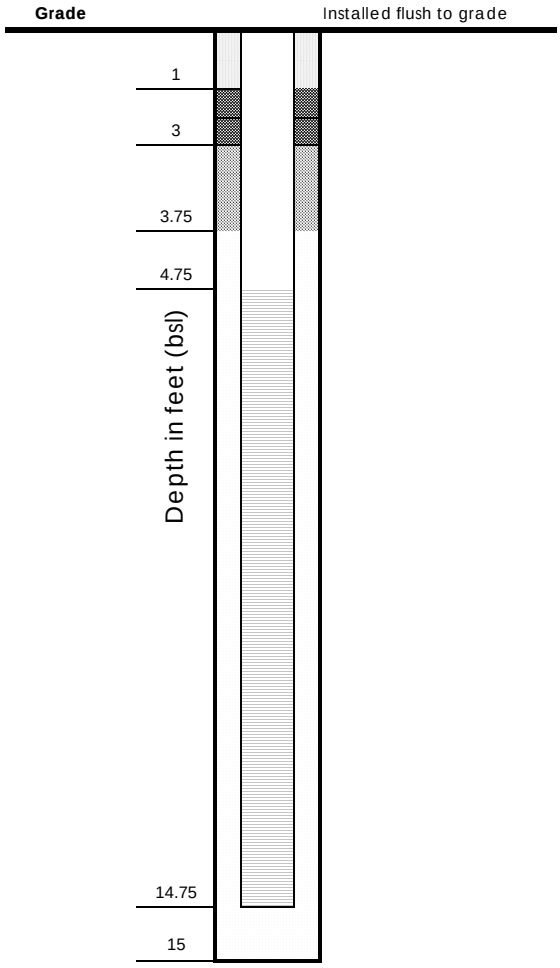
The notification shall include a description of the control measures implemented to prevent further exceedances.

# SMP – Appendix G

P.W. Grosser Consulting

## Monitoring Well Construction and Development Log

| | | | |
|---|---|---|---|
| **MW Designation:** | **MW-10** | **Logged By:** | Associated Environmental |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **PWGC Project Number:** | CIR1301 |
| **Drilling Contractor:** | Associated Environmental | **Driller Name:** | Jose |
| **Drilling Method:** | Hollow Stem Augers | **Borehole Diameter:** | 4.25 inches |
| **Soil Sampling Method:** | N/A | **Total Borehole Depth (bls):** | 15 feet |
| **Drilling Fluid:** | N/A | **Fluid Loss During Drilling:** | N/A |
| **Start Time:** | N/A | **Completion Time:** | N/A |
| **Start Date:** | 9/10/2013 | **Completion Date:** | 9/10/2013 |
| **Surveyor:** | PWGC | **Survey Date:** | 9/30/2013 |




Legend:

- #2 sand filter pack
- #00 sand filter pack
- bentonite pellets
- native fill
- well screen
- well riser

Notes:

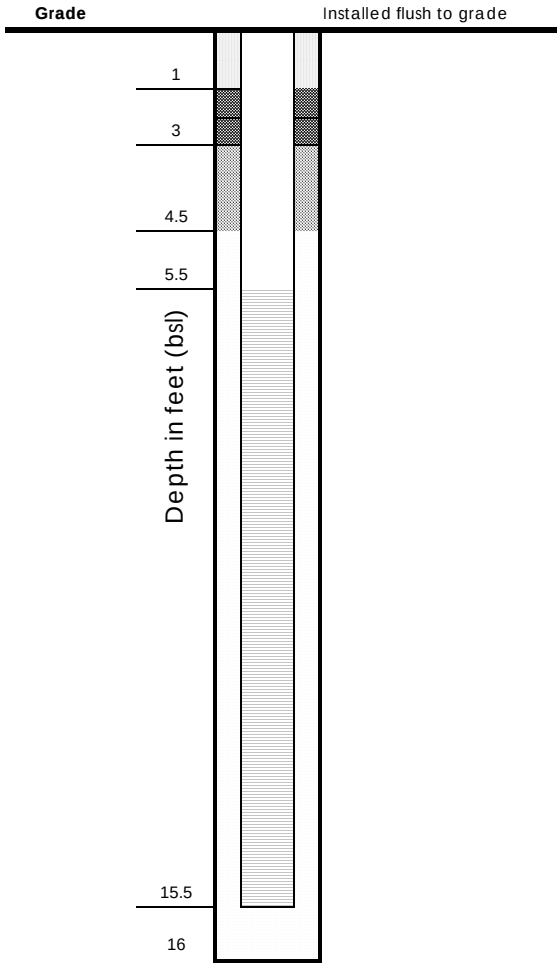
bls = below sidewalk grade

bmp = below measuring point

P.W. Grosser Consulting

## Monitoring Well Construction and Development Log

| | | | |
|---|---|---|---|
| **MW Designation:** | **MW-11** | **Logged By:** | Associated Environmental |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **PWGC Project Number:** | CIR1301 |
| **Drilling Contractor:** | Associated Environmental | **Driller Name:** | Jose |
| **Drilling Method:** | Hollow Stem Augers | **Borehole Diameter:** | 4.25 inches |
| **Soil Sampling Method:** | N/A | **Total Borehole Depth (bls):** | 16 feet |
| **Drilling Fluid:** | N/A | **Fluid Loss During Drilling:** | N/A |
| **Start Time:** | N/A | **Completion Time:** | N/A |
| **Start Date:** | 9/11/2013 | **Completion Date:** | 9/11/2013 |
| **Surveyor:** | PWGC | **Survey Date:** | 9/30/2013 |




Legend:

- #2 sand filter pack
- #00 sand filter pack
- bentonite pellets
- native fill
- well screen
- well riser

Notes:

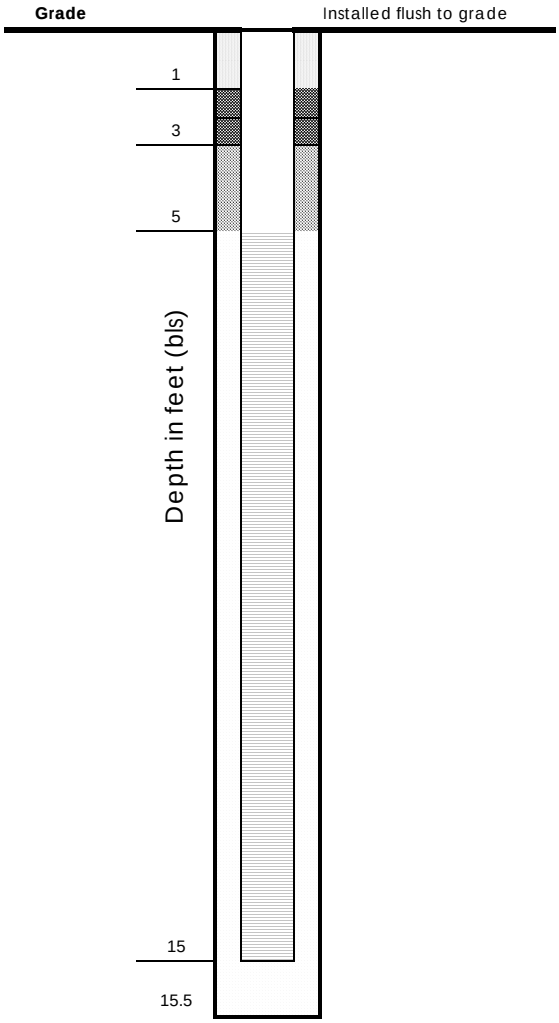
bls = below sidewalk grade

bmp = below measuring point

P.W. Grosser Consulting

## Monitoring Well Construction and Development Log

| | | | |
|---|---|---|---|
| **MW Designation:** | **MW-12** | **Logged By:** | JV |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **PWGC Project Number:** | CIR1301 |
| **Drilling Contractor:** | Associated Environmental | **Driller Name:** | John Veiss |
| **Drilling Method:** | Hollow Stem Augers | **Borehole Diameter:** | 2" |
| **Soil Sampling Method:** | NA | **Total Borehole Depth (bls):** | 15' |
| **Drilling Fluid:** | NA | **Fluid Loss During Drilling:** | NA |
| **Start Time:** | | **Completion Time:** | |
| **Start Date:** | 9/21/2015 | **Completion Date:** | 9/21/2015 |
| **Surveyor:** | PWGC | **Survey Date:** | NA |




Legend:

- #2 sand filter pack
- #00 sand filter pack
- bentonite pellets
- native fill
- well screen
- well riser

Notes:

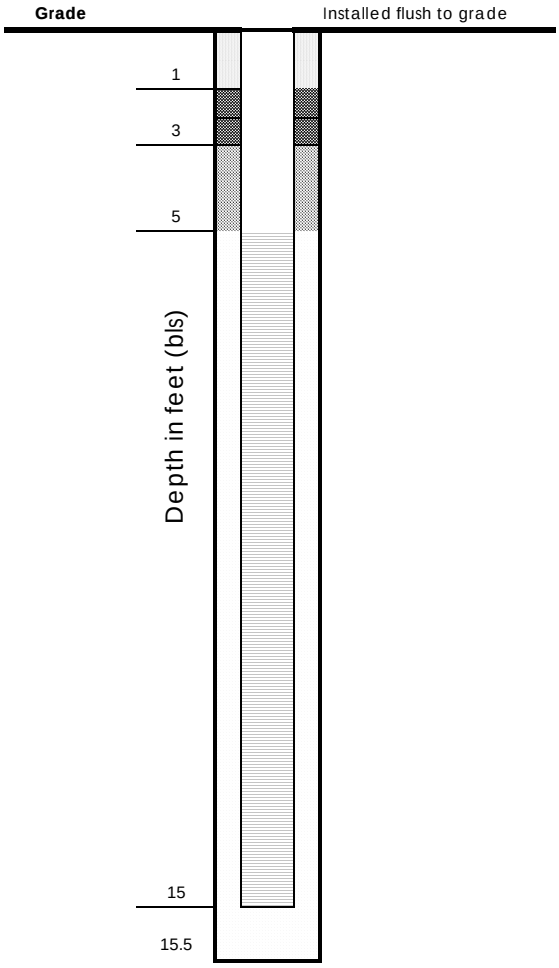
bls = below sidewalk grade

bmp = below measuring point

P.W. Grosser Consulting

## Monitoring Well Construction and Development Log

| | | | |
|---|---|---|---|
| **MW Designation:** | **MW-13** | **Logged By:** | JV |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **PWGC Project Number:** | CIR1301 |
| **Drilling Contractor:** | Associated Environmental | **Driller Name:** | John Veiss |
| **Drilling Method:** | Hollow Stem Augers | **Borehole Diameter:** | 2" |
| **Soil Sampling Method:** | NA | **Total Borehole Depth (bls):** | 15' |
| **Drilling Fluid:** | NA | **Fluid Loss During Drilling:** | NA |
| **Start Time:** | | **Completion Time:** | |
| **Start Date:** | 9/21/2015 | **Completion Date:** | 9/21/2015 |
| **Surveyor:** | PWGC | **Survey Date:** | NA |




Legend:

- #2 sand filter pack
- #00 sand filter pack
- bentonite pellets
- native fill
- well screen
- well riser

Notes:

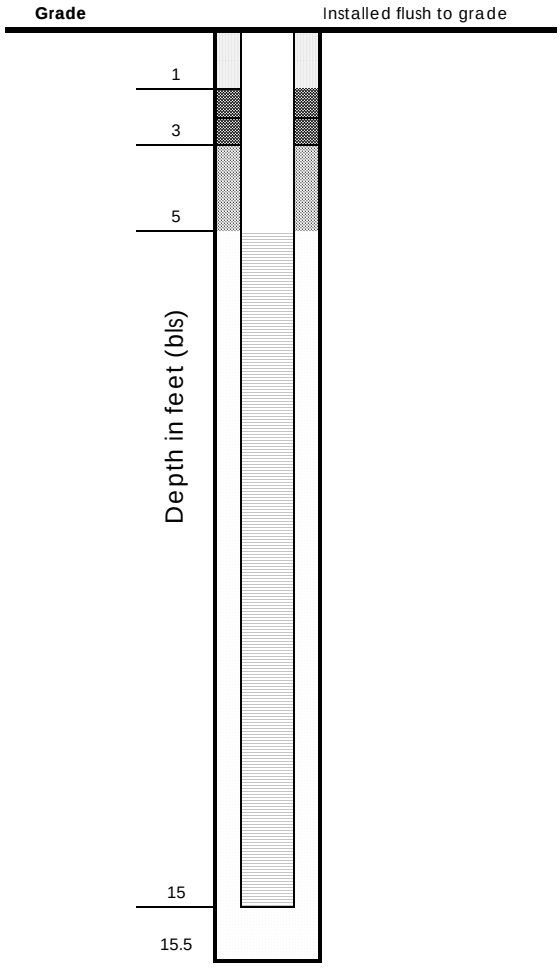
bls = below sidewalk grade

bmp = below measuring point

P.W. Grosser Consulting

## Monitoring Well Construction and Development Log

| | | | |
|---|---|---|---|
| **MW Designation:** | **MW-14** | **Logged By:** | JV |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **PWGC Project Number:** | CIR1301 |
| **Drilling Contractor:** | Associated Environmental | **Driller Name:** | John Veiss |
| **Drilling Method:** | Hollow Stem Augers | **Borehole Diameter:** | 2" |
| **Soil Sampling Method:** | NA | **Total Borehole Depth (bls):** | 15' |
| **Drilling Fluid:** | NA | **Fluid Loss During Drilling:** | NA |
| **Start Time:** | | **Completion Time:** | |
| **Start Date:** | 9/21/2015 | **Completion Date:** | 9/21/2015 |
| **Surveyor:** | PWGC | **Survey Date:** | NA |




Legend:

- #2 sand filter pack
- #00 sand filter pack
- bentonite pellets
- native fill
- well screen
- well riser

Notes:

bls = below sidewalk grade

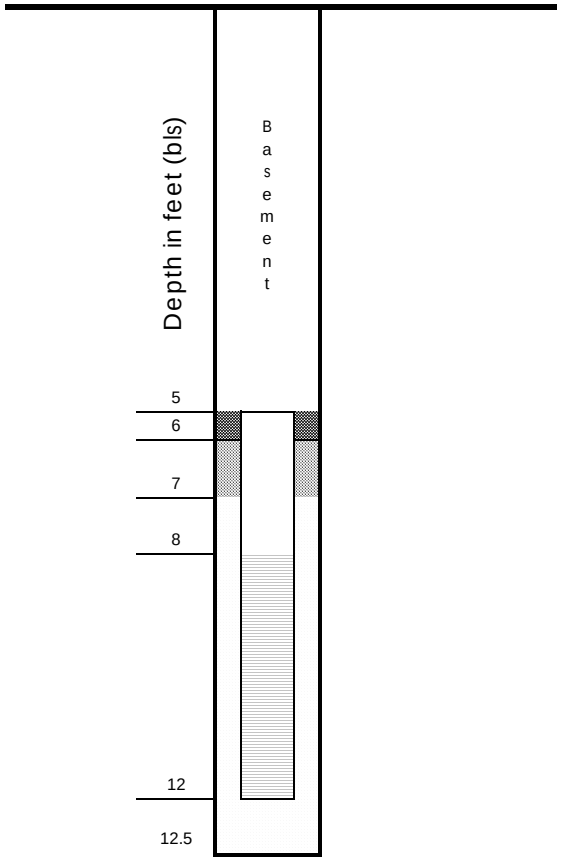
bmp = below measuring point

P.W. Grosser Consulting

## Monitoring Well Construction and Development Log

| | | | |
|---|---|---|---|
| **MW Designation:** | **MW-15** | **Logged By:** | JV |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **PWGC Project Number:** | CIR1301 |
| **Drilling Contractor:** | Associated Environmental | **Driller Name:** | John Veiss |
| **Drilling Method:** | Hollow Stem Augers | **Borehole Diameter:** | 1" |
| **Soil Sampling Method:** | NA | **Total Borehole Depth (bls):** | 6' |
| **Drilling Fluid:** | NA | **Fluid Loss During Drilling:** | NA |
| **Start Time:** | | **Completion Time:** | |
| **Start Date:** | 9/21/2015 | **Completion Date:** | 9/21/2015 |
| **Surveyor:** | PWGC | **Survey Date:** | NA |

**Grade:** Installed flush to grade in basement




Legend:

- #2 sand filter pack
- #00 sand filter pack
- bentonite pellets
- native fill
- well screen
- well riser

Notes:

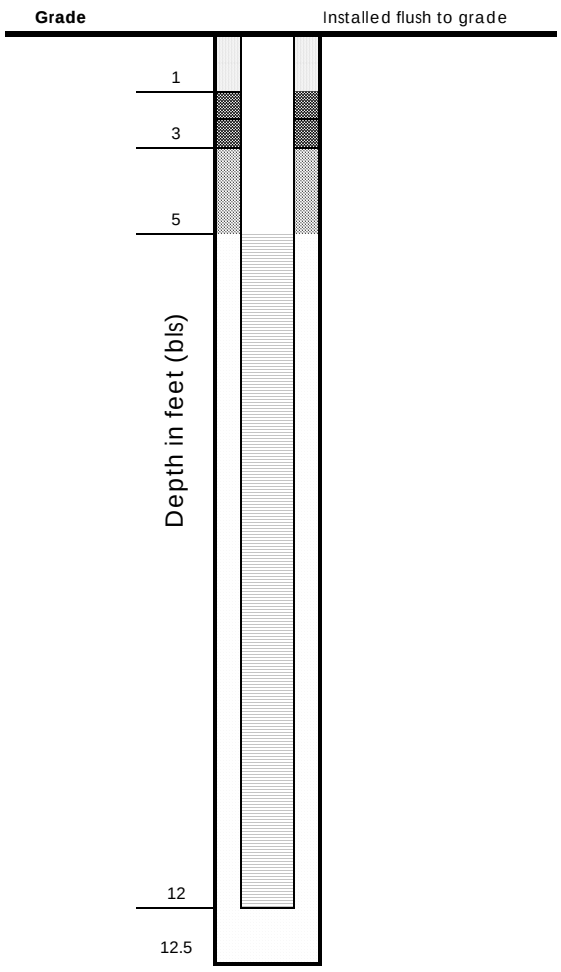
bls = below sidewalk grade

bmp = below measuring point

P.W. Grosser Consulting

## Monitoring Well Construction and Development Log

| | | | |
|---|---|---|---|
| **MW Designation:** | **MW-16** | **Logged By:** | JV |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **PWGC Project Number:** | CIR1301 |
| **Drilling Contractor:** | Associated Environmental | **Driller Name:** | John Veiss |
| **Drilling Method:** | Hollow Stem Augers | **Borehole Diameter:** | 1" |
| **Soil Sampling Method:** | NA | **Total Borehole Depth (bls):** | 12' |
| **Drilling Fluid:** | NA | **Fluid Loss During Drilling:** | NA |
| **Start Time:** | | **Completion Time:** | |
| **Start Date:** | 9/28/2015 | **Completion Date:** | 9/28/2015 |
| **Surveyor:** | PWGC | **Survey Date:** | NA |




Legend:

- #2 sand filter pack
- #00 sand filter pack
- bentonite pellets
- native fill
- well screen
- well riser

Notes:

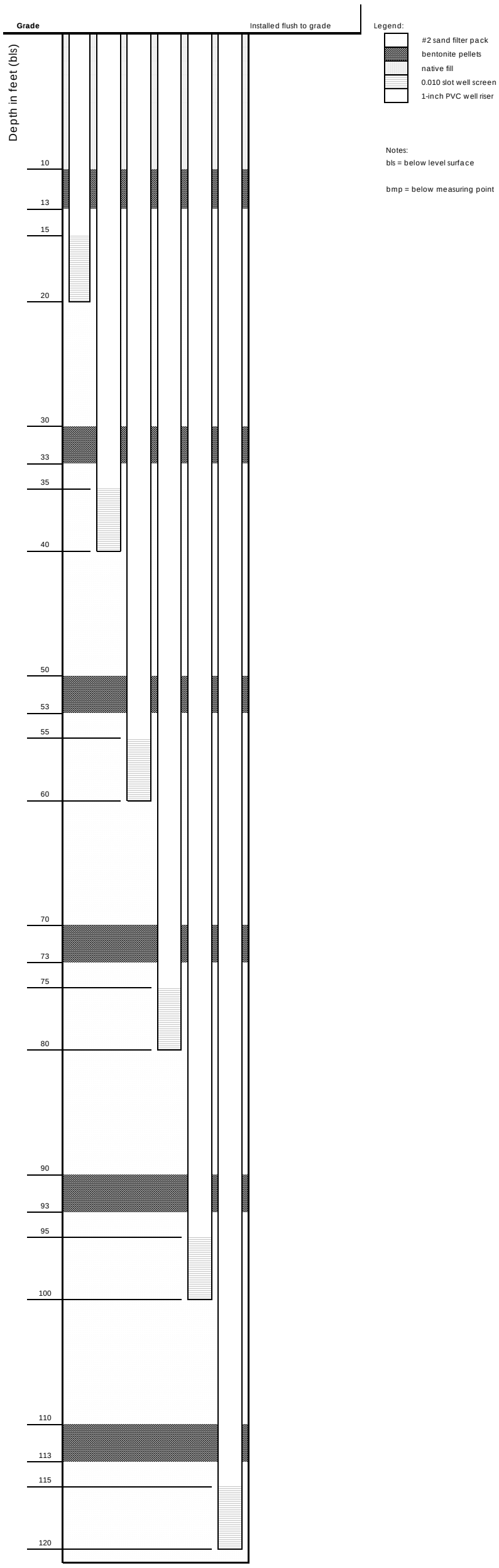
bls = below sidewalk grade

bmp = below measuring point

P.W. Grosser Consulting

## Monitoring Well Construction and Development Log

| | | | |
|---|---|---|---|
| **MW Designation:** | **ML Well** | **Logged By:** | ZH |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | KA |
| **Project Name:** | Former Brighton Cleaners | **PWGC Project Number:** | CIR1201 |
| **Drilling Contractor:** | Associated Environmental | **Driller Name:** | Charles Blumberg |
| **Drilling Method:** | Hollow Stem Augers | **Borehole Diameter:** | 4.25 inches |
| **Soil Sampling Method:** | Split Spoons | **Total Borehole Depth (bls):** | 120 feet |
| **Drilling Fluid:** | NA | **Fluid Loss During Drilling:** | NA |
| **Start Time:** | 11:15 | **Completion Time:** | 17:00 |
| **Start Date:** | 10/2/2012 | **Completion Date:** | 10/2/2012 |
| **Surveyor:** | PWGC | **Survey Date:** | NA |



# SMP – Appendix H

# P.W. GROSSER CONSULTING

**Well Sampling Log**

| | | | |
|---|---|---|---|
| **Well Designation:** | MW-10 | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | 9.60 | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | 9.60 |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | 9.60 |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 2 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | NA |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Low-Flow | **Sample Method:** | Low-Flow |
| **Purge Rate (mL/min):** | 250 | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# P.W. GROSSER CONSULTING

**Well Sampling Log**

| | | | |
|---|---|---|---|
| **Well Designation:** | MW-11 | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | 9.73 | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | 9.73 |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | 9.73 |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 2 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | NA |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Low-Flow | **Sample Method:** | Low-Flow |
| **Purge Rate (mL/min):** | 250 | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# P.W. GROSSER CONSULTING

**Well Sampling Log**

| | | | |
|---|---|---|---|
| **Well Designation:** | MW-12 | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | 9.65 | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | 9.65 |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | 9.65 |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 2 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | NA |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Low-Flow | **Sample Method:** | Low-Flow |
| **Purge Rate (mL/min):** | 250 | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# P.W. GROSSER CONSULTING

**Well Sampling Log**

| | | | |
|---|---|---|---|
| **Well Designation:** | MW-13 | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | 9.89 | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | 9.89 |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | 9.89 |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 2 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | NA |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Low-Flow | **Sample Method:** | Low-Flow |
| **Purge Rate (mL/min):** | 250 | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# P.W. GROSSER CONSULTING

## Well Sampling Log

| | | | |
|---|---|---|---|
| **Well Designation:** | MW-14 | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | 9.85 | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | 9.85 |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | 9.85 |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 2 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | NA |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Low-Flow | **Sample Method:** | Low-Flow |
| **Purge Rate (mL/min):** | 250 | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# P.W. GROSSER CONSULTING

## Well Sampling Log

| | | | |
|---|---|---|---|
| **Well Designation:** | MW-15 | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | 2.49 | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | 2.49 |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | 2.49 |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 1 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | 0.00 |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Check Valve | **Sample Method:** | Check Valve |
| **Purge Rate (mL/min):** | N/A | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# P.W. GROSSER CONSULTING

**Well Sampling Log**

| | | | |
|---|---|---|---|
| **Well Designation:** | MW-16 | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | 10.25 | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | 10.25 |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | 10.25 |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 1 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | 0.00 |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Low-Flow | **Sample Method:** | Low-Flow |
| **Purge Rate (mL/min):** | 250 | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# P.W. GROSSER CONSULTING

## Well Sampling Log

| | | | |
|---|---|---|---|
| | ML Well1 (15-20') | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | 9.90 | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | 9.90 |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | 9.90 |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 1 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | 0.00 |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Check Valve | **Sample Method:** | Check Valve |
| **Purge Rate (mL/min):** | 250 | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# P.W. GROSSER CONSULTING

## Well Sampling Log

| | | | |
|---|---|---|---|
| | ML Well1 (35-40') | **Sampled By:** | TF |
| **Site Address:** | 3140 Coney Island Ave. | **Project Manager:** | JLL |
| **Project Name:** | Former Brighton Cleaners | **Project Number:** | CIR1301 |

| | | | |
|---|---|---|---|
| **Relative TOC Elevation (ft):** | N/A | **Well Use:** | Monitoring/Observation |
| **Depth to Product (ft):** | No Product | **Product Elevation (ft):** | NA |
| **Depth to Water (ft):** | | **Groundwater Elevation (ft):** | #VALUE! |
| **Depth to Bottom (ft):** | | **Bottom Elevation (ft):** | #VALUE! |
| **Height of Water Column (ft):** | 0.00 | **Well Diameter (in):** | 1 |
| **Standing Water Volume (gal):** | 0.00 | **Calculated Purge Volume (gal):** | 0.00 |
| **Sample Date:** | | **Begin Purge Time:** | |
| **Sample Time:** | | **Complete Purge Time:** | |
| **Purge Method:** | Check Valve | **Sample Method:** | Check Valve |
| **Purge Rate (mL/min):** | 250 | **Purge Time (min):** | 0:00 |
| **Sample Appearance:** | | **Odors Observed:** | |
| **Analytical Laboratory:** | | **Notes:** | |
| **Date Shipped:** | | | |
| **Analyses Requested:** | | | |
| VOC | | | |

**Field Indicator Parameters**

| Time | Temp. (ºC) | pH | Cond. (mS/cm) | ORP (mV) | DO (mg/L) | Turb. (NTU) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# SMP – Appendix I

# Monthly System Performance Log

## Former Brighton Cleaners
## 3140 Coney Island Ave, Brooklyn, NY
## NYSDEC BCP #C224157

Inspector's Name: _____ Inspection Time: _____

Inspection Date: _____ Weather Conditions: _____

| YES | NO | |
|---|---|---|
| ☐ | ☐ | Were any system alarms on upon arrival? |
| ☐ | ☐ | Was the system operating upon arrival? |
| ☐ | ☐ | Was the SVE Blower Intake Filter clear upon arrival? |
| ☐ | ☐ | Was the SVE Blower Intake Filter replaced during this visit? |
| ☐ | ☐ | Was the SVE Blower Dilution Filter clear upon arrival? |
| ☐ | ☐ | Was the SVE Blower Dilution Filter replaced during this visit? |
| ☐ | ☐ | Is the moisture separator high level alarm float free of dirt and debris? Drain liquids within the moisture separator. |
| ☐ | ☐ | Are any switches in Hand Mode? Operating in hand mode is for testing purposes only. |
| ☐ | ☐ | Are the groundwater and vacuum monitoring wells and ISCO wells (if applicable) properly secured? |

**System Parameters**

| Gauge | Reading | Units |
|---|---|---|
| VI-701 | | " W.C. |
| FI-701 | | CFM |
| VI-703 | | " W.C. |
| TI-701 | | ºF |
| PI-701 | | " W.C. |
| PI-702 | | " W.C. |
| Hours | | Hours |

**Groundwater Monitoring**

| Well | DTP (ft) | DTW (ft) | DTB (ft) |
|---|---|---|---|
| MW-10 | | | |
| MW-11 | | | |
| MW-12 | | | |
| MW-13 | | | |
| MW-14 | | | |
| MW-15 | | | |
| MW-16 | | | |
| ML-Well1 (15-20') | | | |
| ML-Well1 (35-40') | | | |

DT – Depth to: P-Product, W-Water, B-Bottom

# Monthly System Performance Log

## Former Brighton Cleaners

## 3140 Coney Island Ave, Brooklyn, NY

## NYSDEC BCP #C224157

Vacuum Monitoring Points

| **Well** | VM-01 | VM-02 | VM-03 | VM-04 | VM-05 | VM-06 | VM-07 | VM-08 | VM-09 | VM-10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Vacuum ( " WC )** | | | | | | | | | | |

Vapor Sample Information

| **Location** | **PID (ppm)** | **Start Time** | **Start Vacuum** | **End Time** | **End Vacuum** | **PID Field Screen** | **Sample ID** | **Notes** |
|---|---|---|---|---|---|---|---|---|
| Pre-Moisture Separator | | | | | | | | |
| Post-Treatment | | | | | | | | |

Which SVE Legs are operating (valves are open to create vacuum when SVE / SSDS is operating)? See diagram on following page.

_____

Comments: _____

_____

_____

Items to be Addressed / Fixed: _____

_____

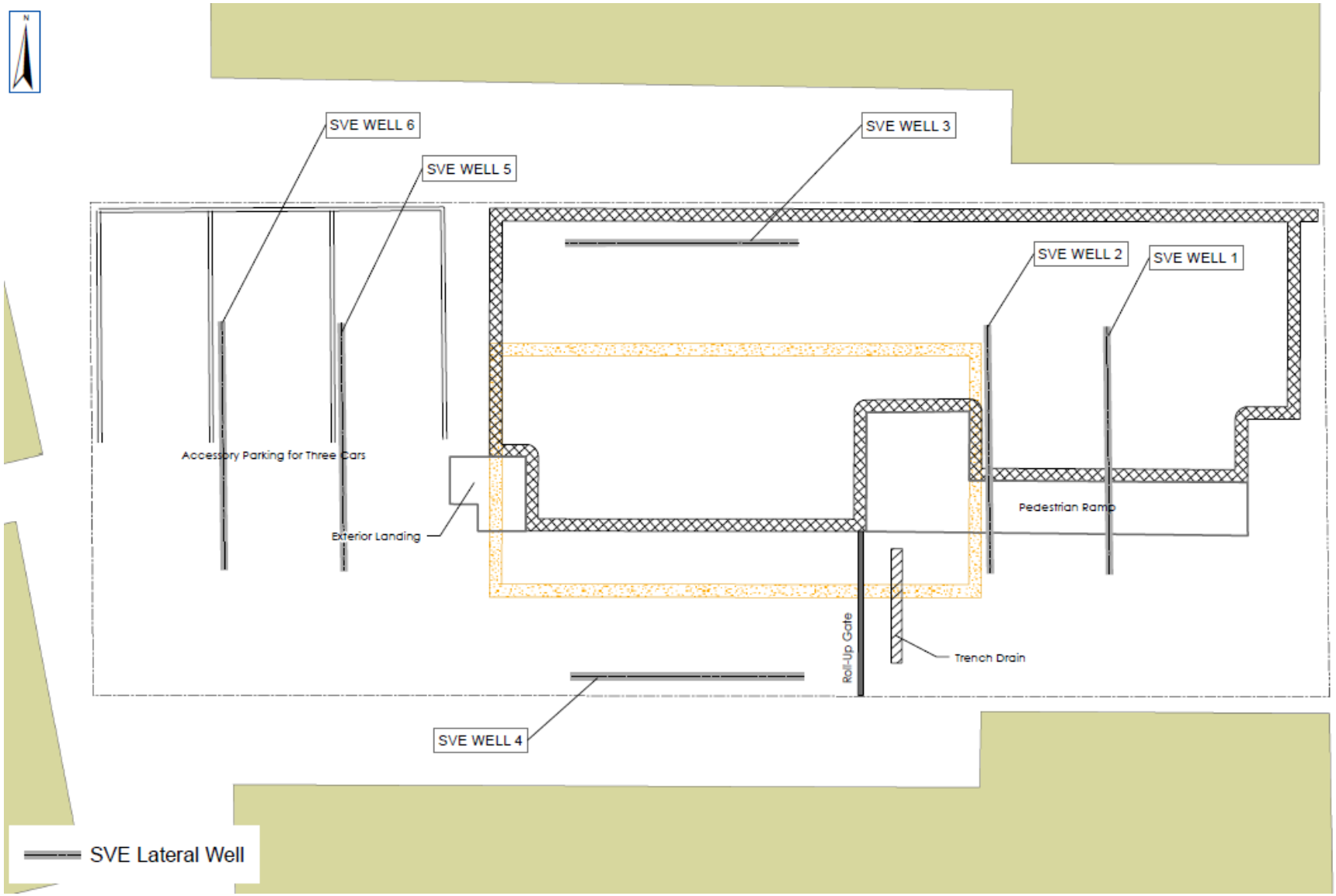
_____

# Monthly System Performance Log

**Former Brighton Cleaners**

**3140 Coney Island Ave, Brooklyn, NY**

**NYSDEC BCP #C224157**



# SMP – Appendix J

# Annual / Severe Weather Inspection Form

## Former Brighton Cleaners
## 3140 Coney Island Ave, Brooklyn, NY
## NYSDEC BCP #C224157

Inspector's Name: _____ Inspection Time: _____

Inspection Date: _____ Weather Conditions: _____

General Site Conditions: _____

_____

_____

**SVE System / SSDS Inspection**

- Inspect and record gauge readings and instruments for appropriate operating parameters.
- Inspect the moisture separator drum.
- Inspect visible fasteners for integrity.
- Inspect for cleanliness, remove dust and grease on motor housing, inspect air filter.
- Are the indicator lights on the control panel functioning property?

**Cover System - Interior**

- Any visible cracks or settlement in the ground floors?
- Any other visible openings (unintended) in the ground floors?

**Cover System – Exterior**

- Are there any signs of significant cracks, settlement, or deterioration of paved areas?
- Has any of the pavement material been removed?
- Are there any signs of intrusive activities (drilling, digging, trenching, excavating, etc?)

**Monitoring Wells**

- Are the flush-mounted caps, protective casings, and well plugs / caps for the groundwater, vacuum, and ISCO (if applicable) monitoring wells secured?

**Comments:** _____

_____

_____

_____

_____

_____

Inspector's Signature: _____

# SMP – Appendix K

# 3140 CONEY ISLAND AVENUE
# BROOKLYN, NEW YORK

# QUALITY ASSURANCE PROJECT PLAN

**SUBMITTED TO:**

New York State Department of Environmental Conservation
Division of Environmental Remediation
Hunters Point Plaza
47-40 21st Street
Long Island City, New York 11101

**PREPARED FOR:**

3140 Coney Island Realty, LLC
3061 Brighton 6th Street
Brooklyn, New York 11235

**PREPARED BY:**

P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353
Fax: 631-589-8705

Kris Almskog, Vice President krisa@pwgrosser.com
Jennifer Lewis, Senior Hydrogeologist JenniferL@pwgrosser.com

PWGC Project Number: CIR1201

## OCTOBER 22, 2013

# QUALITY ASSURANCE PROJECT PLAN

## CONTENTS

Page

1.0 INTRODUCTION ..... 1
1.1 Site Location and Description ..... 1
1.2 Site History ..... 2
2.0 PROJECT ORGANIZATION AND PERSONNEL RESPONSIBILITIES ..... 3
3.0 QUALITY ASSURANCE PROJECT OBJECTIVES ..... 4
3.1 Data Quality Objective Process ..... 4
3.2 Data Quality Categories ..... 4
3.2.1 Screening Data Standard Operating Procedures ..... 5
3.3 QA/QC Characteristics ..... 6
3.4 Impact of Failure to Meet Data Quality Objectives ..... 9
4.0 REMEDIAL ACTION MONITORING ACTIVITIES ..... 10
4.1 Remedial Action Monitoring Procedures ..... 10
4.1.1 Mobilization and Demobilization ..... 10
4.1.2 Monitoring Well Installation and Development ..... 10
4.1.3 Monitoring Well Survey ..... 11
4.1.4 Water Level Measurements ..... 11
4.1.5 Groundwater Field Parameter Measurement ..... 11
4.1.6 Monitoring Well Sampling ..... 11
4.1.7 SVE System Monitoring/Sampling ..... 12
4.1.8 Soil Excavation ..... 12
4.1.9 In-Situ Chemical Oxidation Injections ..... 12
5.0 SAMPLE CUSTODY AND DOCUMENTATION ..... 13
5.1 Sample Identification System ..... 13
5.2 Sample Custody, Packaging, and Shipping ..... 14
5.2.1 Field Custody, Packaging, and Shipping Procedures ..... 14
5.2.2 Laboratory Custody Procedures ..... 15
6.0 ANALYTICAL REQUIREMENTS ..... 16
6.1 Groundwater Samples ..... 17
6.2 Soil Samples ..... 17
6.3 Air Samples ..... 17
7.0 DECONTAMINATION PROCEDURES ..... 18
7.1.1 General Procedures ..... 18
7.1.2 Drilling Equipment ..... 18
7.1.3 Sampling Equipment ..... 18
7.1.4 Meters and Probes ..... 18
8.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS ..... 19
8.1 Field Quality Control Samples ..... 19
8.1.1 Field Blanks ..... 19
8.1.2 Trip Blanks ..... 19
8.1.3 Temperature Blanks ..... 19
8.1.4 Field Environmental Duplicate Samples ..... 20
8.2 Laboratory Quality Control Samples ..... 20
8.2.1 Method Blanks/Preparation Blanks ..... 20
8.2.2 Matrix Spikes/Matrix Spike Duplicates ..... 20
8.2.3 Laboratory Control Samples ..... 21
8.2.4 Surrogate Compounds ..... 21
8.2.5 Internal Standards ..... 21
8.2.6 Interference Check Samples ..... 21
10.0 INSTRUMENT CALIBRATION AND PREVENTIVE MAINTENANCE ..... 22
10.1 Calibration ..... 22
10.2 Preventive Maintenance ..... 22
11.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS ..... 24
11.1 Field Blanks ..... 24
11.2 Trip Blanks ..... 24
11.3 Temperature Blanks ..... 24

11.4 Field Environmental Blind Duplicate Samples ..... 24
12.0 DATA REDUCTION, VALIDATION AND REPORTING ..... 26
12.1 Data Reduction ..... 26
12.1.1 Field Data Reduction ..... 26
12.1.2 Laboratory Data Reduction ..... 26
12.1.3 Project Data Reduction ..... 26
12.1.4 Non-Direct Measurements ..... 26
12.2 Data Usability and Validation ..... 26
12.2.1 Data Usability and Validation Requirements ..... 27
12.2.2 Data Usability and Validation Methods ..... 27
13.0 CORRECTIVE ACTION ..... 28

**TABLES** **Page**

Table 3-1 QA Objectives for Field and Analytical Data 7
Table 6-1 Quality Assurance Summary Table 16

## 1.0 INTRODUCTION

P.W. Grosser Consulting Engineer & Hydrogeologist, PC (PWGC) has prepared this Quality Assurance Project Plan (QAPP) for Remedial Action (RA) activities to be undertaken at the 3140 Coney Island Avenue site (the site) in Brooklyn, New York (Brownfield Cleanup Program [BCP] ID# C224157). This QAPP has been prepared to define the quality assurance (QA) and quality control (QC) measures to be implemented, to verify the integrity of the work to be performed at the site, and that the data collected will be of the appropriate type and quality needed for the intended use. Specifically, this QAPP addresses the following:

- Description of Project
- Organization and Responsibilities of Project Personnel
- Project Objectives, including Quality Assurance Objectives for Data
- Overview of Field Sampling Program and Procedures
- Sample Packaging and Shipping
- Sample Documentation
- Sample Analytical Program
- Quality Assurance/Quality Control Procedures

RA activities, as specified in the Remedial Action Work Plan (RAWP) for the site, will be performed in accordance with the selected remedy for the site, as determined in the Alternatives Analysis (AA). The selected remedy includes:

- soil remediation to 10 feet below existing grade,
- installation of a soil vapor extraction (SVE) system and sub-slab depressurization system (SSDS),
- hot-spot in-situ chemical oxidation (ISCO) treatment,
- groundwater monitoring (GM), and
- implementation of institutional controls (ICs)/engineering controls (ECs).

### 1.1 Site Location and Description

The subject site is located at 3140 Coney Island Avenue in the City of New York, New York as shown on Figure 1 of the RAWP. The site is located within the Borough of Brooklyn (Kings County). The site is situated on the west side of Coney Island Avenue, between Ocean View Avenue and Brighton Beach Avenue. The property is identified as Block: 8678 Lot: 64 by the New York City Department of Assessment. The site is approximately 4,000 square feet (0.1 acre) and is currently vacant and unoccupied.

The project site elevation is approximately 10 feet above mean sea level and is generally level. The previously existing structure at the site has been demolished and the site is currently vacant. Ground cover at the site is minimal and consists primarily of grass and weeds. Tetrachloroethene (PCE) impacted soils in

the western section of the site were excavated and replaced with tunnel rock material up to 4 feet below sidewalk grade. A site plan is included as Figure 2 of the RAWP.

### 1.2 Site History

The site was formerly improved with a one-story commercial building with a basement, which was demolished in 2009. The building was used as a dry cleaning facility run by Brighton Cleaners. Sanborn maps show operations within the building as cleaning and dyeing from 1950 to 2007. A 1930 Sanborn map shows the building use as a market and 1896 and 1905 Sanborn maps reveal that the site was used as a horse racing track. The site was also heated with a fuel oil underground storage tank (UST) which appears to be the source of petroleum impact to the site.

Additional information regarding the history of the site, including previous environmental investigations is included in the RAWP.

## 2.0 PROJECT ORGANIZATION AND PERSONNEL RESPONSIBILITIES

The investigative efforts defined in the RAWP plan will be coordinated by PWGC on behalf of 3140 Coney Island Realty, LLC (CIR). The New York State Department of Environmental Conservation (NYSDEC) is the lead regulatory agency overseeing remedial action at the site. An organization structure has been developed to identify the roles and responsibilities of the various parties involved with the project, as discussed below. A Quality Assurance Officer will not be required for this project based upon the size of the project and the routine procedures and sampling methodologies that will be conducted.

The **NYSDEC Project Manager** will be responsible for reviewing and approving this work plan, coordinating approval of requested modifications, and providing guidance on regulatory requirements. The NYSDEC Project Manager for this project is Mr. Yuk Yin Wong.

The **PWGC Project Director** will provide technical expertise for review of the project plans, reports and ongoing field activities. The program manager will be responsible for the coordination of the overall Voluntary Cleanup Program with the NYSDEC. The PWGC Project Director for this project is Mr. Kris Almskog.

The **PWGC Project Manager** will be responsible for the day to day project management, task leadership, and project engineering support and for the planning and implementation of RI activities. The Project Manager is responsible for ensuring that the requirements of the RAWP are implemented. The project manager will also act as the site Health and Safety Manager (HSM). The PWGC Project Manager for this project is Miss Jennifer Lewis.

The **PWGC Field Team Leader** will be responsible for sample collection, oversight of subcontractor personnel, and coordination of daily field activities. The Field Team Leader will act as the Site Health and Safety Officer ensuring implementation of the Site Health and Safety Plan. The PWGC Field Team Leader for this project is Mr. Ryan Morley.

A New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory (to be determined) will be contracted to perform required analyses and reporting, including Analytical Services Protocol (ASP) Category B Deliverables, which will allow for data validation.

Subcontractors will perform remedial construction, surveying, drilling, and/or sampling at the direction of the Field Team Leader in accordance with this work plan.

## 3.0 QUALITY ASSURANCE PROJECT OBJECTIVES

The objective of RA monitoring activities for the site is to obtain sufficient data at a known quality level to assess the effectiveness of the selected remedy in eliminating, reducing, or controlling risks to human health and the environment.

### 3.1 Data Quality Objective Process

Data quality objectives (DQOs) are qualitative and quantitative statements that specify the quality of the data required to support decisions during remedial activities. DQOs can be defined as what the end user expects to obtain from the analysis results and are developed through a seven-step process:

- Step 1 State the problem
- Step 2 Identify the decision
- Step 3 Identify inputs to the decision
- Step 4 Define the study boundaries
- Step 5 Develop a decision rule
- Step 6 Specify limits on decision errors
- Step 7 Optimize the decision for obtaining data

For the site, screening data generated by rapid, less precise methods of analysis (PID screening, collection of groundwater field parameters, etc.) will achieve a data use level for site characterization and monitoring. Definitive laboratory analytical data generated during the soil, groundwater, and air influent and effluent monitoring activities will achieve a data use level to support an assessment of the overall effectiveness of the site remedy. Specifically, these data will be used to:

- Monitor the extent of residual soil contamination on site, through the comparison of constituent results to applicable criteria;
- Monitor the extent of residual groundwater contamination on site, through the comparison of constituent results to applicable criteria and the development of isoconcentration maps (as applicable);
- Monitor the SVE system to determine its effectiveness, calculate contaminant mass recovery rates, and to estimate a cumulative total of recovered mass.

Known contaminants present in samples collected from the site and the nearby vicinity include volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The principal contaminants of concern at the site are chlorinated solvents, specifically PCE and its degradation products. Site contaminants and their respective site cleanup objectives are discussed in greater detail in the RAWP.

### 3.2 Data Quality Categories

DQOs are composed of written expectations for precision, accuracy, representativeness, completeness, and comparability of a data set (see Section 3.3). The DQO process provides a logical basis for linking the

QA/QC procedures to the intended use of the data, primarily through the decision maker's acceptable limits on decision error. Two descriptive data categories - screening data and definitive data - will be used for the site.

Screening data are generated by rapid, less precise methods of analysis and are deemed non-critical to project objectives. Portable instruments to be used during this field investigation to collect screening data include:

- Interface probe/water level indicator
- Dissolved oxygen meter
- pH meter
- Specific conductivity meter
- Temperature meter
- Turbidity meter
- Photoionization detector (PID)

Definitive data are generated using specific analytical methods and guidelines and have satisfied known QA/QC requirements. Analytical data provided by an off-site laboratory shall be definitive data and are deemed critical to project objectives. QA/QC elements of definitive data include determination and documentation of calibrations, detection limits, method blanks, and matrix spike recoveries.

### *3.2.1 Screening Data Standard Operating Procedures*

Standard operating procedures for screening data will be employed throughout the project.

Water quality measurements, such as dissolved oxygen, pH, specific conductivity, temperature, and turbidity will be collected with a Horiba U-22 water quality meter or equivalent. The water quality meter will be calibrated on a daily basis at the beginning of each day of use using the manufacturer's provided calibration kit.

Water level measurements will be collected with a Solinst Interface probe or equivalent. The interface probe will be properly decontaminated with an alcolnox wash and water rinse at the start of each day and in between well measurements. If product is detected in a well, the thickness of it will be measured three times to ensure precision in measurements.

Soils will be screened for the presence of volatile organics with a MiniRAE 2000 PID or equivalent. At the beginning of each day of use, the PID will undergo a fresh air zeroing and a span calibration with 100 ppm isobutylene gas. PID readings will be reported as isobutylene equivalent.

### 3.3 QA/QC Characteristics

The overall QA/QC objective for RA monitoring activities is to develop and implement procedures that will provide data of known and documented quality. QA/QC characteristics for data include precision, accuracy, representativeness, completeness, and comparability (PARCC). Data quality objectives for each of these parameters are determined based on the level of data required. Descriptions of these characteristics are provided below and specific QA objectives for both screening and definitive data are presented in Table 3-1. Analytical matrices and methods are provided on the table.

**Table 3-1**
**QA Objectives for Field and Laboratory Data**

| Parameter | Measurement | Matrix | Method | Units | Precision | Accuracy | CRQL/MDL | Completeness |
|---|---|---|---|---|---|---|---|---|
| Water Level | Screening | Aqueous | Field Measurement | Feet | ±0.01 feet | N/A | N/A | 90% |
| pH | Screening | Aqueous | Field Measurement | Std. units | ±0.1 units | N/A | N/A | 90% |
| Conductivity | Screening | Aqueous | Field Measurement | mS/cm | ±1%* | N/A | N/A | 90% |
| Temperature | Screening | Aqueous | Field Measurement | ºC | ±0.1ºC | N/A | N/A | 90% |
| VOCs | Screening | Air | Field Measurement | ppm | ±1% | N/A | N/A | 90% |
| TCL VOCs | Definitive | Aqueous | EPA Method 8260B | ppb | ±25% RPD | 172%R | 1-5 ppb | 90% |
| TCL SVOCs | Definitive | Aqueous | EPA Method 8270C | ppb | ±25% RPD | 172%R | 1-5 ppb | 90% |
| TCL VOCs | Definitive | Soil | EPA Method 8260/5035 | ppb | ±25% RPD | 172%R | 1-5 ppb | 90% |
| TCL SVOCs | Definitive | Soil | EPA Method 8270C | ppb | ±25% RPD | 172%R | 1-5 ppb | 90% |
| TCL VOCs | Definitive | Air/Vapor | EPA Method TO-15 | µg/m$^3$ | ±25% RPD | 70 – 130%R | 5 µg/m$^3$ | 90% |
| Persulfate | Definitive | Aqueous | | | ±25% RPD | | | 90% |

*Notes*:
Abbreviations include:

%R = Percent Recovery
GC = Gas Chromatography
N/A = Not Applicable
NTU = Nephelometric Turbidity Units
TAL = Target Analyte List
TCL = Target Compound List
CRQL = Contract Required Quantitation Limit
MDL = Method Detection Limit
VOCs = Volatile Organic Compounds
RPD = Relative Percent Difference

* Precision dependent on meter and scale.
· Target VOCs include tetrachloroethene and its degradation products

**Precision** is the measurement of agreement in repeated tests of the same or identical samples, under prescribed conditions. Analytical precision can be expressed in terms of Standard Deviation (SD), Relative Standard Deviation (RSD) and/or Relative Percent Difference (RPD). The precision of analytical environmental samples has two components - laboratory precision and sampling precision. Laboratory precision is determined by replicate measurements of laboratory duplicates and by analysis of reference materials. The objectives for laboratory precision are specified in the analytical methodologies and are presented on Table 3-1. The precision of the field sampling effort is determined by the analysis of field duplicate samples. Field duplicate analysis will be performed at a rate of five percent (i.e., one duplicate collected for every 20 samples). Acceptance criteria for duplicates analyzed by an off-site laboratory shall be an RPD of 25 percent. The precision limits provided in Table 3-1 for the screening measurements are acceptance criteria for duplicate and calibration analyses of field measurement parameters.

**Accuracy** is the degree of agreement of a measured sample result or average of results with an accepted reference or true value. It is the quantitative measurement of the bias of a system, and is expressed in terms of percent recovery (%R). Measurements of accuracy for the laboratory include surrogate spike, laboratory control spike, matrix spike and matrix spike duplicate samples. The laboratory must meet or exceed control limit objectives, as stated in Table 3-1 and the applicable methodologies.

**Representativeness** is the degree to which the results of the analyses accurately and precisely represent a characteristic of a population, a process condition, or an environmental condition. In this case, representativeness is the degree to which the data reflect the contaminants present and their concentration magnitudes in the sampled site areas. Representativeness of data will be ensured through the selection of sampling locations and implementation of approved sampling procedures. Results from environmental field duplicate sample analyses can be used to assess representativeness, in addition to precision.

**Completeness** is defined as the percentage of samples that meet or exceed all the criteria objective levels for accuracy, precision and detection limits within a defined time period or event. It is the measure of the number of data "points" which are judged to be valid, usable results. The objective for completeness for this project is 90 percent, and will be calculated by dividing the number of usable data results (i.e., all results not considered to be "rejected" and all samples able to be analyzed) by the number of possible data results (i.e., the total number of field samples collected), and then multiplying by 100 percent.

**Comparability** is the degree of confidence with which results from two or more data sets, or two or more laboratories, may be compared. To achieve comparability, standard environmental methodologies will be employed in the field and in the laboratory. See Table 3-1 and Section 6.0 for analysis methods and detection limits for this field investigation.

### 3.4 Impact of Failure to Meet Data Quality Objectives

The QA objectives presented in Table 3-1 represent the data quality necessary to meet the project's technical goals. The QA/QC efforts discussed in this QAPP focus on controlling measurement error and ultimately providing a database for estimating the uncertainty in the measurement data for the project. QA objectives will be evaluated throughout the RA monitoring effort to see if the results for the project meet the stated objectives. If these objectives are not being met, the precision and/or accuracy of the sampling data will be decreased, and corrective actions shall be taken, as documented in Section 13.0.

## 4.0 REMEDIAL ACTION MONITORING ACTIVITIES

This section provides an overview of the planned RA monitoring operations by matrix and type of procedures. It also includes activities that may be necessary in the future to supplement the existing groundwater monitoring well network (i.e., site survey; monitoring well installation, etc.). Field monitoring and sampling activities include the following:

- Mobilization and Demobilization
- Monitoring Well Installation and Development (if necessary)
- Monitoring Well Survey (if necessary)
- Water Level Measurements
- Groundwater Field Screening
- Monitoring Well Sampling
- SVE System Monitoring/Sampling
- Soil Excavation
- ISCO Injections
- Decontamination (discussed in Section 7.0)

### 4.1 Remedial Action Monitoring Procedures

RA monitoring activities to be performed at the site will be conducted in accordance with established technical guidelines, methods, policies, and Standard Operating Procedures (SOPs). The subsections below present an overview of the sampling program procedures; a more detailed discussion of the monitoring activities is presented in the RAWP.

#### *4.1.1 Mobilization and Demobilization*

The mobilization effort will consist of logistical planning, identification of sampling locations, equipment mobilization to the site, and field personnel orientation. The orientation meeting will familiarize the sampling team with a brief history of the site, health and safety requirements, and RA monitoring procedures. Mobilization and demobilization will take place before and after completion of routine periodic RA monitoring events. Demobilization will consist of site area clean-up, staging and inventory of monitoring-derived wastes, decontamination and demobilization of field equipment, and organization of monitoring records.

#### *4.1.2 Monitoring Well Installation and Development*

The current site groundwater monitoring well network consists of 6 monitoring wells. These monitoring wells will initially be sampled on a quarterly basis as part of the long-term groundwater monitoring program for the site. Installation of new and replacement of monitoring wells damaged during the interim remedial measure (IRM) will be installed using a rotary drill rig and hollow stem augers. If necessary, replacement monitoring wells will be constructed of 2-inch diameter schedule 40 pvc casing and 10 feet of 0.020 inch slotted screen set at the same depth as the monitoring well it is replacing. A Morie® # 2 filter pack will be placed to 2 feet above top of the screen followed by a 2 foot thick bentonite pellet seal and

cement/bentonite grout to ground surface. Monitoring wells will be developed by pumping and/or surging until pH, conductivity, temperature, and turbidity have stabilized.

### *4.1.3 Monitoring Well Survey*

Any new monitoring wells will be surveyed for horizontal location (nearest 0.1 foot), ground elevation (nearest 0.1 foot), and measuring point elevation (nearest 0.01 foot). The survey will include the elevation of a marked location at the top of the monitoring well casing, with the well cap removed, for determination of water table elevations.

### *4.1.4 Water Level Measurements*

Static water level measurements will be collected from each of the wells in the groundwater monitoring well network prior to each round of quarterly groundwater sampling. A water level indicator will be used to collect measurements in the monitoring wells from surveyed measuring points. Readings will be recorded in a field logbook in increments of 0.01 feet. The water level indicator will be tested prior to the commencement of measurements with a jar of water and the depths will be calibrated on the ground against a steel measuring tape.

### *4.1.5 Groundwater Field Parameter Measurement*

Groundwater field parameters, including temperature, pH, and conductivity will be monitored during purging of monitoring wells using a Horiba U-22 multi parameter water quality meter (or equivalent). The water quality meter will be calibrated in accordance with the manufacturer's instructions at the start of each day of groundwater sampling. The meter probe will be positioned in the flow-through cell and measurements will be collected every two minutes during well purging. Readings will be recorded in a field logbook. The well will be considered stabilized and ready for sample collection when the groundwater field parameters have stabilized for three consecutive measurements as follows:

- ±1°C for temperature
- ±0.1 for pH
- 3 percent for conductivity
- < 50 NTU for tubridity

The water quality meter probe will be decontaminated between wells by rinsing it with de-ionized water in accordance with the decontamination procedures specified in Section 4.2.

### *4.1.6 Monitoring Well Sampling*

The site groundwater monitoring network (currently 6 wells) will be sampled on a quarterly basis. Monitoring wells will be purged and sampled in accordance with the procedures detailed in the RAWP.

Groundwater samples will be placed into laboratory glassware and a cooler and maintained at 4°C while taken under chain of custody to a NYSDOH ELAP certified laboratory for analysis. Groundwater samples will

be analyzed for VOCs by EPA Method 8260.

#### *4.1.7 SVE System Monitoring/Sampling*

Routine operation and maintenance (O&M) of the SVE system will be performed on a weekly basis for the four weeks of operation, after which routine O&M will be performed on a monthly basis. Routine O&M will include assessing the system's current condition and recording gauge readings in accordance with the system O&M Manual (to be prepared and submitted with the Final Engineering Report). The system's operating parameters will be documented on the System Monitoring Form (included in the O&M Plan) and submitted with quarterly monitoring reports. In addition to routine system monitoring, influent and effluent groundwater samples and effluent air samples will be collected to verify the systems effectiveness and compliance with discharge requirements. These samples will be collected directly from labeled sampling ports in accordance with the RAWP.

#### *4.1.8 Soil Excavation*

Selected hot-spot excavations will be conducted in areas where soil concentrations exceeded the Commercial Use Soil Cleanup Objectives (SCOs), including the area along the western boundary in the vicinity of the utility pole. Soils will be excavated by backhoe and loaded directly into a dump truck for disposal at Biogenie in Montreal, Canada.

Following hot-spot excavations, soil endpoint samples will be collected in accordance with NYSDEC DER-10. Endpoint samples will be collected with a Terra Core and placed in laboratory supplied glassware. Samples will be placed on ice in a cooler and maintained at 4°C while taken under chain of custody to a NYSDOH ELAP certified laboratory for analysis. Soil samples will be analyzed for VOCs by EPA Method 8260.

#### *4.1.9 In-Situ Chemical Oxidation Injections*

ISCO injections will be conducted to reduce concentrations of VOCs in the groundwater and soil. It is anticipated that the first round of ISCO injections will be installed before the vapor barrier and floor slab are installed. If needed, additional rounds of injections and endpoint samples may be required at a later time through the floor slab. If needed, up to twenty-two 4 inch diameter sleeves will be installed in the concrete slab and capped with removable covers to allow for future access to the sub-surface without damage to the vapor barrier. The opening in the sleeves will be sealed with a minimum of 6 inches of bentonite to form an appropriate vapor seal.

## 5.0 SAMPLE CUSTODY AND DOCUMENTATION

Each day that samples are collected, a chain-of-custody/request for analysis form will be completed and submitted to the laboratory with samples to be analyzed. A copy of the chain-of-custody will be retained by the Project Manager. The chain-of-custody will include the project name, sampler's signature, sample IDs, date and time of sample collection, and analysis requested.

Samples will be packaged and shipped in a manner that maintains sample preservation requirements during transport (i.e., ice to keep samples cool until receipt at the laboratory), ensures that sample holding times can be achieved by the laboratory, and prevents samples from being tampered with.

If a commercial carrier ships samples, a bill of lading (waybill) will be used as documentation of sample custody. Receipts for bills of lading and other documentation of shipment shall be maintained as part of the permanent custody documentation. Commercial carriers are not required to sign the chain-of-custody as long as it is enclosed in the shipping container and evidence tape (custody seal) remains in place on the shipping container.

Identification and documentation of samples are important in maintaining data quality. Strict custody procedures are necessary to ensure the integrity of the environmental samples. Sections below address sample identification, packaging, shipping, and documentation.

### 5.1 Sample Identification System

The method of identification of a sample depends on the type of measurement or analysis performed. When field screening measurements (e.g., pH, conductivity) are made, data are recorded directly in logbooks. Identifying information such as project name, sample location and depth, date and time, name of sampler, field observations, remarks, etc. shall be recorded.

Each sample collected for off-site laboratory analysis during the field investigation will be specifically designated by PWGC for unique identification. Samples will be identified using a letter code to indicate sample collection methodology. A letter code (see below) will follow, along with the name and/or number that identifies the specific location where the sample was collected. Field equipment blanks will be denoted by the letter code "FB" and trip blanks with "TB". Sample collection date and time will be recorded in the field logbook, chain of custody, as well as the sample label.

Letter code prefixes for RA monitoring activities are as follows:

- MW Monitoring Well Groundwater Sample
- SVE-INF SVE System Influent Air Sample
- SVE-EFF SVE System Effluent Air Sample
- FB Field Blank Sample

- TB Trip Blank Sample

At a minimum, all location and identification information for the samples shall be recorded in the field sampling logbook and on the appropriate chain of custody record form for shipment.

## 5.2 Sample Custody, Packaging, and Shipping

Sample custody shall be strictly maintained and carefully documented each time sample material is collected, transported, received, prepared, and analyzed. Custody procedures are necessary to ensure the integrity of the samples and samples collected during RA monitoring activities must be traceable from the time the samples are collected until they are disposed of and/or stored and their derived data are used in the subsequent monitoring report. Sample custody is defined as (1) being in the sampler's possession; (2) being in the sampler's view, after being in the sampler's possession; (3) being locked in a secured container, after being in the sampler's possession; and (4) being placed in a designated secure area.

### *5.2.1 Field Custody, Packaging, and Shipping Procedures*

Field custody procedures shall be implemented for each sample collected. The field sampler shall be responsible for the care and custody of the samples until they are properly transferred or dispatched. To maintain the integrity of the samples, the samples are to be stored in a designated, secure area and/or be custody sealed in the appropriate containers prior to shipment.

Each environmental sample will be properly identified and individually labeled. Labels will be filled out in indelible ink with at least the following information: sample identification (see Section 5.1), type and matrix of sample, date and time of sample acquisition, name of sampler, analysis required, and preservation (as necessary). The sample label will be securely attached to the sample container.

Environmental samples being analyzed by off-site laboratories will be properly packaged and shipped for analysis. Samples are to be packed with sufficient wet ice to cool the samples to 4$^{o}$C. Additionally, each cooler will be packed with a cooler temperature blank. Lastly, the cooler should be filled with adequate cushioning material to minimize the possibility of container breakage.

A laboratory supplied completed chain of custody form will be included with all sample shipments.

When the samples are being shipped by an overnight delivery service to the laboratory, the chain of custody form and any other paperwork shall be checked against the sample labels and field documentation, and then placed in a waterproof sealable plastic bag and taped securely to the inside lid of the cooler. The cooler must then be secured, with custody seals affixed over the lid opening in at least two locations, and the cooler wrapped with strapping tape (without obscuring the custody seals). Orientation “this end up” arrows shall be drawn or attached on two sides of the cooler, and a completed

overnight delivery service shipping label shall be attached to the top of the cooler.

Samples to be shipped by an overnight delivery service shall be shipped within 24 hours of sample collection and arrive at the laboratory within 24 hours of sample shipment. A member of the field team will notify the laboratory of a sample shipment.

### *5.2.2 Laboratory Custody Procedures*

The following generally summarizes laboratory custody procedures; more detailed operations are presented in the laboratory's SOPs.

- A designated sample custodian will accept custody of the shipped samples and will verify that the information on the sample labels matches that on the chain of custody record(s),
- The laboratory custodian will use the sample label number or assign a unique laboratory number to each sample label and will assure that all samples are transferred to the proper analyst or stored in the appropriate secure area; and,
- Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or returned to the custodian or sample storage area. Internal chain of custody records shall be maintained by the laboratory.

The laboratory shall communicate with PWGC personnel by telephone, email or facsimile, as necessary, throughout the process of sample scheduling, shipment, analysis and data reporting, to ensure that samples are properly processed. If a problem occurs during sample shipment or receipt (e.g., a sample container arrives broken or with insufficient sample volume, a sample was not preserved correctly, a sample was not listed on the chain of custody, etc.), the laboratory shall immediately notify the appropriate person for resolution.

Samples received by the laboratory will be retained until analyses and QA checks are completed. When sample analyses and necessary QA checks have been completed, the unused portion of the sample and the sample container must be disposed of properly by the laboratory. All identifying tags, data sheets, and laboratory records shall be retained as part of the permanent documentation.

## 6.0 ANALYTICAL REQUIREMENTS

Analytical services will be provided by a NYSDOH ELAP approved laboratory. The laboratory will follow NYSDEC Analytical Sampling Protocol (ASP) and provide data in results only format (ASP-A), with the exception of the final round of sampling in which data will be reported with Category B deliverables (ASP-B). Analyses not available using ASP-B will be provided in results only format.

Analytical methods, sampling frequency, and sample containers, and holding times are summarized in the table below.

**Table 6-1**
**Quality Assurance Summary Table**

| matrix type | Soil | Groundwater | Air |
|---|---|---|---|
| **frequency** | 1 bottom and 1 sidewall for each hot spot excavation | 1 per monitoring well interval | Influent and effluent sampled weekly for the first four weeks, monthly for the next two months, afterwards quarterly while system is operating. |
| **blanks** | 1 field blank per 20 samples collected of the same matrix, 1 trip blank per cooler | 1 field blank per 20 samples collected of the same matrix, 1 trip blank per cooler | N/A |
| **analytical methods** | VOCs - 8260/5035 (low level) SVOCs - 8270 CP-51 (in vicinity of UST) | VOCs - 8260 SVOCs - 8270 CP-51 (in vicinity of UST) | VOCs - TO-15 |
| **spikes** | 1 matrix spike and 1 matrix spike duplicate per 20 samples of the same matrix | 1 matrix spike and 1 matrix spike duplicate per 20 samples of the same matrix | N/A |
| **duplicates** | 1 blind duplicate per 20 samples of the same matrix | 1 blind duplicate per 20 samples of the same matrix | 1 blind duplicate per 20 samples of the same matrix |
| **preservation** | Cool to 4°C Methanol (for VOCs) | Cool to 4°C 1:1 HCl (for VOCs) | N/A |
| **sample volume and container type** | 3 - 40mL VOAs (for VOCs) 8 ounce wide mouth glass jar (for SVOCs) | 3 - 40mL VOAs (for VOCs) 2 - 1 Liter wide mouth glass jar (for SVOCs) | Summa Canister |
| **holding time** | VOCs - 48 hours SVOCs - 14 days | VOCs - 14 days SVOCs - 14 days | 30 days |

### 6.1 Groundwater Samples

Groundwater samples will be collected as described in the RAWP. All groundwater samples will be analyzed for TCL VOCs by USEPA Method 8260 and groundwater samples collected in the vicinity of the former UST will be analyzed for semi-volatile organic compounds (SVOCs) by USEPA method 8270 CP-51 list. A colorimetric kit or a quenching agent, such as ascorbic acid, may be used when collecting groundwater samples still containing oxidant following an ISCO injection. Data will be provided in results only format, except as noted above.

Groundwater samples will be collected in three 40 ml VOA vials w/Teflon lined septum, preserved with 1:1 HCl to a pH of less than 2 and stored in a cooler on ice to a temperature of 4ºC. The hold time for preserved groundwater samples for VOC and SVOC analyses is 14 days.

### 6.2 Soil Samples

Soil samples will be collected as described in the RAWP. All soil samples will be analyzed for TCL VOCs by USEPA method 8260 and soil samples collected in the vicinity of the former UST will be analyzed for SVOCs by USEPA method 8270 CP-51 list. Data will be provided in results only format, except as noted above.

VOC soil samples will be collected in three 40 ml VOA vials w/Teflon lined septum, one with methanol preservative and two with de-ionized water and stored in a cooler on ice to a temperature of 4ºC. SVOC soil samples will be collected in one 4 ounce jar and stored in a cooler on ice to a temperature of 4ºC. The hold time for soil samples for VOC analysis is 48 hours and SVOC analysis is 14 days.

### 6.3 Air Samples

Air samples will be collected as described in the RAWP. Air samples will be analyzed for VOCs by USEPA Method TO-15. Data will be provided in results only format, except as noted above.

Air samples will be collected in pre-cleaned SUMMA vacuum canisters. The hold time for air samples for VOC analysis is 30 days. There is no preservation required for air samples collected in SUMMA canisters.

## 7.0 DECONTAMINATION PROCEDURES

In order to minimize the potential for cross-contamination, non-dedicated drilling and sampling equipment shall be properly decontaminated prior to and between sampling/drilling locations.

### *7.1.1 General Procedures*

Drilling equipment will be decontaminated in a designated area. Sampling equipment and probes will be decontaminated in an area covered with plastic sheeting near the sampling location. Waste material generated during decontamination activities will be containerized, stored and disposed of in accordance with the procedures detailed in Section 5.9. Decontamination of sampling equipment shall be kept to a minimum and, whenever possible, dedicated sampling equipment shall be used. Personnel directly involved in equipment decontamination shall wear appropriate protective equipment.

### *7.1.2 Drilling Equipment*

Drilling equipment shall be decontaminated by steam cleaning prior to performance of the first boring/excavation and between all subsequent borings/excavations. This shall include hand tools, casing, augers, drill rods, temporary well material and other related tools and equipment. Water used during drilling and/or steam cleaning operations shall be from a potable source.

### *7.1.3 Sampling Equipment*

Sampling equipment (i.e., trowels, knives, split-spoons, bowls, hand augers, etc...) will be decontaminated prior to each use as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
- Generous tap water rinse
- Distilled water rinse

### *7.1.4 Meters and Probes*

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, e.g., PID meters) will be decontaminated between uses as follows:

- Laboratory-grade detergent and tap water solution wash
- Tap water rinse
- Distilled water rinse (triple rinse)

Decontamination of sampling equipment will be kept to a minimum in the field and, whenever possible, dedicated disposable sampling equipment will be used. Decontamination fluids will be stored in US Department of Transportation (DOT)-approved 55-gallon drums or in an on-site storage tank (liquids only) until proper disposal. Personnel directly involved in equipment decontamination will wear protective clothing in accordance with the project Health and Safety Plan (HASP).

## 8.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS

This section will discuss the type and quantities of QA/QC samples to be utilized during implementation of the field program.

### 8.1 Field Quality Control Samples

The subsections below and Table 6-0 present general information and guidance on field QC samples, including definition and frequency of QC blanks. Field QC samples will be labeled and shipped according to the procedures outlined in Section 5.0.

#### *8.1.1 Field Blanks*

A field blank will be collected to evaluate the potential for contamination of environmental samples from inadequate decontamination of field equipment. Field blanks shall be collected by pouring laboratory supplied distilled/deionized (DI) water over and/or through decontaminated non-disposable equipment or disposable equipment, and collecting the rinsate. Field blanks will be collected at a frequency of one per decontamination event per type of sampling equipment, not to exceed one per day per sample matrix. Preservation and analysis of field blanks will be identical to that of the associated environmental samples.

During the groundwater sampling utilizing the low flow sampling and purging method, the field blank will be collected after sampling from the most contaminated well (as per previous data and/or location estimation). This blank will be collected by pumping DI water through the decontaminated low flow sampling apparatus and collecting the rinsate. If dedicated pumps are used, a field blank will not be collected.

#### *8.1.2 Trip Blanks*

A trip blank serves to detect possible cross-contamination of samples resulting from handling, storage, and shipment procedures. Trip blanks will accompany VOC glassware in transit through sample collection and shipment to the laboratory. In addition, trip blanks are stored by the laboratory under the same conditions as the environmental samples. A trip blank will accompany each cooler containing samples submitted for VOC analysis and will be preserved as per the groundwater samples and analyzed identically to the associated environmental samples. VOC samples will be consolidated in one cooler for daily shipment, if possible, to minimize the number of trip blanks required in the field program. It is anticipated that only one trip blank per day will be necessary.

#### *8.1.3 Temperature Blanks*

A temperature blank will be sent with each cooler of samples to verify that the cooler temperature has been maintained at 4ºC. One non-preserved VOA vial shall be filled with either potable or DI water, and labeled with "USEPA cooler temperature indicator" and the date. If supplied, the laboratory's temperature blank will be used in place of the VOA vial. The laboratory shall record the temperature of the blank water on the chain of custody immediately upon cooler arrival.

### *8.1.4 Field Environmental Duplicate Samples*

Duplicate environmental samples will be analyzed by the off-site laboratories to evaluate the reproducibility of the sampling procedures. Duplicate samples will be collected at a rate of five percent of the total samples for each specific matrix for each type of analysis (i.e., one duplicate for up to every 20 samples). The duplicate samples will be collected from the same location and at the same time as the original environmental sample; however, the duplicated samples will be "coded" in such a manner that the laboratory will not be able to determine of which original field sample they are duplicated (i.e., "blind" duplicates). For example, the duplicate sample of location MW01 may be "coded" as location MW21, as long as there are not more than twenty groundwater monitoring wells being sampled (i.e., the coded sample name should not be assigned a legitimate sample location identification). An explanation of the duplicate "coding" must be written in the field logbook. Preservation and analysis of duplicate samples will be identical to those for the environmental samples. Precision of field data will be evaluated based on the calculation of Relative Percent Difference (RPD), with acceptance criteria of 25 percent for the off-site laboratory samples. Blind duplicate samples will be collected in the same manner as the environmental samples.

## 8.2 Laboratory Quality Control Samples

General information and guidance on laboratory QC samples are presented in the subsections below. A summary of QC procedures, frequencies, criteria, and corrective actions for the samples, as determined by the applicable method guidelines.

### *8.2.1 Method Blanks/Preparation Blanks*

A method blank (for organics) or a preparation blank (for inorganics) will be analyzed with every batch of samples to ensure that contamination has not occurred during the analytical process. Method blanks consist of a portion of analyte-free water or solid that is processed through the entire sample procedure the same as an environmental sample.

### *8.2.2 Matrix Spikes/Matrix Spike Duplicates*

Matrix spike/matrix spike duplicate samples (also known as spike/duplicate samples) will be used to assess precision and accuracy of the analytical methods. In this procedure, three aliquots of an actual field sample are collected at a specific location, and two aliquots are “spiked” by the addition of known amounts of an analyte or analytes and these samples are then analyzed identically to the field samples. A comparison of the resulting concentration to the original sample concentration and among the two “spiked” sample concentrations provides information on the ability of the analytical procedure to generate a correct result from the sample. Matrix spike/matrix spike duplicate samples will be collected in the field at a rate of five percent, and will be analyzed on a per batch basis, with up to 20 samples per week constituting a batch. The validity of matrix spike/matrix spike duplicate recovery and relative percent difference values will be determined using the acceptance criteria

### 8.2.3 Laboratory Control Samples

A laboratory control sample (LCS) consists of an analyte-free water or solid phase sample that is spiked with target analytes at a known concentration. The LCS shall be analyzed for every batch of samples (i.e., 1 per 20) to assess the ability of the analytical procedure to generate a correct result without matrix effects/interferences affecting the analysis. The percent recoveries for the LCS compounds will be compared to QC limits stated in the appropriate methods.

### 8.2.4 Surrogate Compounds

Surrogates (also known as System Monitoring Compounds) are compounds of known concentrations added to every organic analysis sample for analytical chromatography methods at the beginning of the sample preparation to monitor their recovery. Surrogate recoveries will be used to assess potential matrix interferences and to monitor any potential effects of sample preparation and analysis on final analyte concentrations. The recovery values will be compared to values established in the applicable methodologies to determine the validity of the data.

### 8.2.5 Internal Standards

Internal standards are used to provide instrument correction for variation in instrument performance and injection volumes. Internal standards also establish relative response factors for the analytes.

### 8.2.6 Interference Check Samples

An interference check sample (ICS), which contains target analytes at known concentrations, verifies the laboratory's interelement and background correction factors. Analysis of ICS samples is unique to metals analysis using the inductively coupled plasma (ICP) method.

## 10.0 INSTRUMENT CALIBRATION AND PREVENTIVE MAINTENANCE

### 10.1 Calibration

Equipment will be inspected and approved by the Field Team Leader before being used. Equipment will be calibrated to factory specifications, if required. Monitoring equipment will be calibrated following manufacturers recommended schedules. Daily field response checks and calibrations will be performed as necessary (i.e. PID calibrations) following manufacturers standard operating procedures. Equipment calibrations will be documented in a designated field logbook.

The Field Team Leader or his designee will be responsible for ensuring that instrumentation are of the proper range, type and accuracy for the measurement/test being performed, and that all of the equipment are calibrated at their required frequencies, according to their specific calibration protocols/procedures.

All field measurement instruments must be calibrated according to the manufacturer's instructions prior to the commencement of the day's activities. Exceptions to this requirement shall be permitted only for instruments that have fixed calibrations pre-set by the equipment manufacturer. Calibration information shall be documented on in a designated field logbook. Information to be recorded includes the date, the operator, and the calibration standards (concentration, manufacturer, lot number, expiration date, etc.). All project personnel using measuring equipment or instruments in the field shall be trained in the calibration and usage of the equipment and are personally responsible for ensuring that the equipment has been properly calibrated prior to its use.

In addition, all field instruments must undergo response verification checks at the end of the day's activities and at any other time that the user suspects or detects anomalies in the data being generated. The checks consist of exposing the instrument to a known source of analyte (e.g., the calibration solution), and verifying a response. If an unacceptable instrument response is obtained during the check the data shall be labeled suspect, the problem documented in the site logbook, and appropriate corrective action taken.

Any equipment found to be out of calibration shall be recalibrated. When instrumentation is found to be out of calibration or damaged, an evaluation shall be made to ascertain the validity of previous test results since the last calibration check. If it is necessary to ensure the acceptability of suspect items, the originally required tests shall be repeated (if possible), using properly calibrated equipment. Any instrument consistently found to be out of calibration shall be repaired or replaced.

### 10.2 Preventive Maintenance

Field equipment shall be maintained at its proper functional status in accordance to manufacturer manual specifications. A check of the equipment shall be performed before field activities begin, and any potential spare parts (e.g., batteries, connectors, etc.) and maintenance tools will be brought on site, to minimize equipment downtime during the field activities. Visual checks of the equipment will be conducted

on a daily basis. Routine preventive maintenance shall be performed to assure proper operation of the equipment. Any maintenance performed on field equipment will be documented in the designated field logbook, and shall be undertaken by personnel who have the appropriate skills and/or training in the type of maintenance required.

## 11.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE REQUIREMENTS

Quality Control (QC) procedures will be followed in the field and at the laboratory to ensure that reliable data are obtained. When performing field sampling, care shall be taken to prevent the cross-contamination of sampling equipment, sample bottles, and other equipment that could compromise sample integrity. QC samples, including blind duplicates, equipment blanks, trip blanks, method blanks, matrix spike and matrix spike duplicates, and their frequency to be collected in the field are detailed below. Field QC samples will be labeled and shipped according to the procedures outlined in Section 8.0.

### 11.1 Field Blanks

A field blank will be collected to evaluate the potential for contamination of environmental samples from inadequate decontamination of field equipment. Field blanks shall be collected by pouring laboratory supplied distilled/deionized (DI) water over and/or through decontaminated non-disposable equipment or disposable equipment, and collecting the rinsate. Field blanks will be collected at a frequency of one per day per sample matrix. Preservation and analysis of field blanks will be identical to that of the associated environmental samples.

### 11.2 Trip Blanks

A trip blank serves to detect possible cross-contamination of samples resulting from handling, storage and shipment procedures. Trip blanks will accompany VOC glassware in transit through sample collection and shipment to the laboratory. In addition, trip blanks are stored by the laboratory under the same conditions as the environmental samples. A trip blank will accompany each cooler containing samples submitted for VOC analysis, and will be preserved as per the groundwater samples and analyzed identically to the associated environmental samples. VOC samples will be consolidated in one cooler for daily shipment, if possible, to minimize the number of trip blanks required in the field program. It is anticipated that only one trip blank per day will be necessary.

### 11.3 Temperature Blanks

A temperature blank will be sent with each cooler of samples to verify that the cooler temperature has been maintained at 4ºC. One non-preserved VOA vial shall be filled with either potable or DI water, and labeled with "cooler temperature indicator" and the date. If supplied, the laboratory's temperature blank will be used in place of the VOA vial. The laboratory shall record the temperature of the blank water on the chain of custody immediately upon cooler arrival.

### 11.4 Field Environmental Blind Duplicate Samples

Blind duplicate environmental samples will be analyzed by the off-site laboratories to evaluate the reproducibility of the sampling procedures. Duplicate samples will be collected at a rate of five percent of the total samples for each specific matrix for each type of analysis (i.e., one duplicate for up to every 20 samples). The duplicate samples will be collected from the same location and at the same time as the original environmental sample; however, the duplicated samples will be "coded" in such a manner that the laboratory will not be able to determine of which original field sample they are duplicated. For example,

the duplicate sample of location MW01 may be "coded" as location MW21, as long as there are not more than twenty groundwater monitoring wells being sampled (i.e., the coded sample name should not be assigned a legitimate sample location identification). An explanation of the duplicate "coding" must be written in the field logbook. Preservation and analysis of duplicate samples will be identical to those for the environmental samples. Blind duplicate samples will be collected in the same manner as the environmental samples.

## 12.0 DATA REDUCTION, VALIDATION AND REPORTING

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.

### 12.1 Data Reduction

#### *12.1.1 Field Data Reduction*

Field instrumentation data will be reported by site personnel in field logbooks associated with the monitoring event. At the end of each monitoring event, the field screening data results shall be summarized in tabulated form, as warranted.

#### *12.1.2 Laboratory Data Reduction*

All data generated by the off-site laboratory will be reported in a specified format containing all required elements to perform data validation. Analytical results shall be presented on standard NYSDEC ASP-B forms (when necessary) or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used. 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.

#### *12.1.3 Project Data Reduction*

Following receipt of the laboratory analytical results by PWGC, the data results will be compiled and presented in an appropriate tabular form for inclusion in PWGC prepared reports. Results will also be reported electronically in a format that is compatible with EQuIS technology. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

#### *12.1.4 Non-Direct Measurements*

If information necessary for the project has not been measured directly in the field, non-direct measurement data may be obtained from literature files, texts, computer databases, etc. References utilized will be acknowledged sources within the specific discipline. An explanation of the rationale behind using the reference and a description of any concern regarding the use of the referenced data (e.g., uncertainty, conflicting literature, etc.) shall be made within the report. Non-direct measurement data, after usage, will be filed within the project files for the length of the project.

### 12.2 Data Usability and Validation

The main purpose of the data is for use in defining the extent of contamination at the site, to aid in evaluation of potential human health and ecological exposure assessments, and to support remedial

action decisions. Based upon this, data use usability and validation will be performed as described below. Complete data packages will be archived in the project files, and if deemed necessary additional validation can be performed using procedures in the following sections. It is anticipated that data validation will be performed on data collected during the final round of sampling, only.

### *12.2.1 Data Usability and Validation Requirements*

Data usability and validation are performed on analytical data sets, primarily to confirm that sampling and chain-of-custody documentation are complete, sample IDs can be tied to specific sampling locations, samples were analyzed within the required holding times, and analyses are reported in conformance to NYSDEC ASP, Category B data deliverable requirements as applicable to the method utilized.

### *12.2.2 Data Usability and Validation Methods*

If deemed necessary by NYSDEC, a data usability evaluation for the data collected during the RA and a data usability summary report (DUSR) will be prepared. The DUSR will be prepared in accordance with NYSDEC DER-10, Appendix 2B.

Independent third party data validation will be performed on 5% of the sample data, or on one sample from each sample delivery group (SDG), whichever is greater. Data validation will be performed by a qualified subcontractor independent of the project.

## 13.0 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 PWGC 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 the project, all changes to the RA monitoring program or GWET system operation will be documented in field logs/sheets and the PWGC PM will be advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify PWGC PM, who will consult with other PWGC 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 PWGC PM shall be responsible for controlling, tracking, implementing and distributing identified changes.

# SMP – Appendix L

**ENVIRO-EQUIPMENT, INC.**
**10120 Industrial Drive**
**PINEVILLE, NC 28134**
**704-556-7723 - Phone**
**704-556-7228 - Fax**
**www.enviroequipment.com**

# SYSTEM MANUAL

**SVE System 3374**
**VA EZ AIR, LLC**



**Enviro-Equipment, Inc.**

**ENVIRO-EQUIPMENT, INC.**
**10120 Industrial Drive**
**PINEVILLE, NC 28134**
**704-556-7723 - Phone**
**704-556-7228 - Fax**
**www.enviroequipment.com**

# Operation and Maintenance Procedures

## Rotron Blower

## Air Filters

## Blower Enclosure

## Carbon Filter

## Flow Meters and Gauges

## KO Tank

## Control Panel

Enviro-Equipment, Inc.
Remediation Division
10120 Industrial Drive
Pineville NC 28134

# Enviro-Equipment New and Used Remediation Equipment Warranty and Returns Policy

**New Equipment NOT Manufactured By Enviro-Equipment**

- All new equipment NOT manufactured by Enviro-Equipment carries the manufacturer's warranty and begins the date the manufacturer states.
- Should any new item NOT manufactured by Enviro-Equipment become defective within the warranty period, Enviro-Equipment, Inc. will coordinate with the manufacturer for the return of the equipment for evaluation in accordance with the manufacturer's warranty, repairs and returns policy. After evaluation, if new equipment NOT manufactured by Enviro-Equipment is deemed defective by the manufacturer, the equipment will be repaired or replaced by the manufacturer in accordance with the manufacturer's warranty.
- All shipping, freight, removal of equipment, preparation for shipping, evaluation of equipment and all costs associated with shipping, freight, removal of the equipment, preparation for shipping and evaluation of equipment are the responsibility of the buyer regarding items shipped for evaluation, repair or replacement.
- All items shipped will be F.O.B Enviro-Equipment or F.O.B origin point if drop shipped. Enviro-Equipment shall not be responsible or liable for any damage including any loosening or disconnecting of piping, fittings, and conduit or wire connections from vibration caused by the freight carrier during shipping. Acceptance of freight by carrier is acknowledgement that containers or method of shipping was acceptable when picked up.
- All warranty claims must be filed with the proper documentation deemed by the manufacturer and within the manufacturer's warranty period to be honored.
- All warranties on new equipment NOT manufactured by Enviro-Equipment are contingent upon the proper installation, use and storage of the equipment and any other conditions stated in the manufacturer's warranty. The warranty will not apply if equipment is misused, subjected to unusual physical stress, neglect, wired plumbed mounted or installed incorrectly or not to manufacturer specifications, connected to a deficient power source or damaged because of improper storage. The buyer assumes all liability for the misuse, installation or improper storage of the equipment by the Buyer, the Buyer's employees, and all others.
- **ENVIRO-EQUIPMENT WILL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES IN ANY CLAIM, SUIT OR PROCEEDINGS ARISING UNDER WARRANTY. NOR WILL ENVIRO-EQUIPMENT ACCEPT ANY LIABILITY FOR CLAIMS FOR LABOR, LOSS OF PROFIT, REPAIRS OR OTHER EXPENSES INCIDENTAL TO REPLACEMENT. IN THE CASE OF ENVIRO-EQUIPMENT'S SOLE NEGLIGENCE, IN NOCIRCUMSTANCE SHALL ENVIRO-EQUIPMENT'S LIABILITY EXCEED THE PURCHASE PRICE OF THE EQUIPMENT.**
- Enviro-Equipment expressly disclaims any expressed or implied warranties, including any warranty of fitness for a particular purpose, merchantability, or any warranty arising from a course of dealing or usage of trade. Enviro-Equipment shall not be liable, in tort, contract or otherwise, for any loss or damage, whether direct, consequential or incidental, of any person or entity arising in connections with the equipment, except to the extent required by applicable law.
-Warranty claims will not be accepted if the customer's account has any past due invoices.

**New Equipment Manufactured by Enviro-Equipment**

- All new equipment manufactured by Enviro-Equipment carries a 1 year warranty (365 Calendar Days) which begins the day the equipment leaves our facility or on the invoice date, whichever comes first.
- Should any equipment manufactured by Enviro-Equipment become defective within the warranty period, Enviro-Equipment will evaluate the equipment with the labor required to perform the evaluation being free of charge. Enviro-Equipment will perform this evaluation either at our facility in Pineville, NC or in the field. Whether the evaluation is performed in the field or at our Pineville, NC facility will be handled on a case by case basis at Enviro-Equipment's discretion. Travel expenses required performing the field evaluation including airfare, fuel, mileage, food, lodging and travel time are the responsibility of the buyer. After performing the evaluation of the defective equipment, if Enviro-Equipment deems the equipment defective NOT due to the negligence of the buyer, the buyer's employees, the buyer's agents and all others, Enviro-Equipment will repair the equipment at our Pineville, NC facility or in the field with parts and the labor required to perform the repair free of charge. Travel expenses required performing a field repair including airfare, fuel, mileage, food, lodging and travel time are the responsibility of the buyer. If the defective equipment is beyond repair, Enviro-Equipment will replace the item with equivalent new equipment.
- All shipping, freight, removal of equipment, preparation for shipping, and all costs associated with shipping, freight, removal of the equipment and preparation for shipping are the responsibility of the buyer regarding items shipped for evaluation, repair or replacement.
- All items shipped will be F.O.B Enviro-Equipment or F.O.B origin point if drop shipped. Enviro-Equipment shall not be responsible or liable for any damage including any loosening or disconnecting of piping, fittings, and conduit or wire connections from vibration caused by the freight carrier during shipping. Acceptance of freight by carrier is acknowledgement that containers or method of shipping was acceptable when picked up.
- All warranty claims must be filed with the proper documentation and within the warranty period to be honored.
- All warranties on new equipment manufactured by Enviro-Equipment are contingent upon the proper installation, use and storage of the equipment. The warranty will not apply if equipment is misused, subjected to unusual physical stress, neglect, wired plumbed mounted or installed incorrectly or not to manufacturer specifications, connected to a deficient power source or damaged because of improper storage. The buyer assumes all liability for the misuse, installation or improper storage of the equipment by the Buyer, the Buyer's employees, and all others.
- **ENVIRO-EQUIPMENT WILL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES IN ANY CLAIM, SUIT OR PROCEEDINGS ARISING UNDER WARRANTY. NOR WILL ENVIRO-EQUIPMENT ACCEPT ANY LIABILITY FOR CLAIMS for LABOR, LOSS OF PROFIT, REPAIRS OR OTHER EXPENSES INCIDENTAL TO REPLACEMENT. IN THE CASE OF ENVIRO-**

**EQUIPMENT'S SOLE NEGLIGENCE, IN NO CIRCUMSTANCE SHALL ENVIRO-EQUIPMENT'S LIABILITY EXCEED THE PURCHASE PRICE OF THE EQUIPMENT.**

- Enviro-Equipment expressly disclaims any expressed or implied warranties, including any warranty of fitness for a particular purpose, merchantability, or any warranty arising from a course of dealing or usage of trade. Enviro-Equipment shall not be liable, in tort, contract or otherwise, for any loss or damage, whether direct, consequential or incidental, of any person or entity arising in connections with the equipment, except to the extent required by applicable law.
- Warranty claims will not be accepted if the customer's account has any past due invoices.

**Used Equipment**

-All used equipment is sold "is as" with no warranty.

-All used equipment will be thoroughly tested and the tests documented in order to prove the equipment to be in good working order prior to shipment, delivery or buyer pickup. Buyer has the option to inspect equipment or view test runs in person at Enviro-Equipment Inc.'s Pineville NC facility. Buyer accepts full responsibility for the equipment once the equipment is picked up, delivered, or shipped.

- All items shipped will be F.O.B Enviro-Equipment or F.O.B origin point if drop shipped. Enviro-Equipment shall not be responsible or liable for any damage including any loosening or disconnecting of piping, fittings, and conduit or wire connections from vibration caused by the freight carrier during shipping. Acceptance of freight by carrier is acknowledgement that containers or method of shipping was acceptable when picked up.

- **ENVIRO-EQUIPMENT WILL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES IN ANY CLAIM, SUIT OR PROCEEDINGS ARISING UNDER WARRANTY. NOR WILL ENVIRO-EQUIPMENT ACCEPT ANY LIABILITY FOR CLAIMS FOR LABOR, LOSS OF PROFIT, REPAIRS OR OTHER EXPENSES INCIDENTAL TO REPLACEMENT. IN THE CASE OF ENVIRO-EQUIPMENT'S SOLE NEGLIGENCE, IN NO CIRCUMSTANCE SHALL ENVIRO-EQUIPMENT'S LIABILITY EXCEED THE PURCHASE PRICE OF THE EQUIPMENT.**
- Enviro-Equipment expressly disclaims any expressed or implied warranties, including any warranty of fitness for a particular purpose, merchantability, or any warranty arising from a course of dealing or usage of trade. Enviro-Equipment shall not be liable, in tort, contract or otherwise, for any loss or damage, whether direct, consequential or incidental, of any person or entity arising in connections with the equipment, except to the extent required by applicable law.

**Returns**

- All new equipment items not manufactured by Enviro-Equipment are subject to the manufacturer's return policy and any costs resulting from the manufacturer's return policy will be at the expense of the buyer. All new equipment returns are subject to a 10% restocking fee in addition to any manufacturer restocking fees. All special orders are non-returnable. All returnable items must be in new, unused, resalable condition and in original packaging. All freight costs incurred due to returns are at the expense of the buyer.
- All sales of used equipment are final.

Enviro-Equipment Inc.
10120 Industrial Drive
Pineville NC 28134
704-556-7723

## QUCIK REFERENCE MAINTENANCE PARTS AND INTERVALS

| DESCRIPTION | MFG. | PART# | Frequency |
|---|---|---|---|
| SVE Blower Intake Filter Element | Solberg | 235P | Annually or as needed |
| SVE Blower Dilution Filter Element | Solberg | 31P | Annually or as needed |

ALL MAINTENANCE PARTS ARE AVAILABLE FROM ENVIRO-EQUIPMENT. PLEASE CALL US AT 704-556-7723 OR EMAIL US AT REMEDIATION@ENVIROEQUIPMENT.COM TO ORDER MAINTENANCE PARTS!

**Enviro-Equipment Estimate Terms and Conditions**

- This estimate may only be accepted on, and is expressly limited to acceptance of the terms described herein. Enviro-Equipment's New and Used Purchased Remediation Equipment Warranty and Returns Policy, Enviro-Equipment's Rental/Service Agreement Terms and Conditions and Enviro-Equipment's Invoice Terms and Conditions are incorporated herein by reference. Acceptance of this estimate by the buyer shall be deemed as acceptance of all of these terms.
- Enviro-Equipment assumes the information provided by the buyer is the full extent of the information necessary to determine the scope of the estimate. It is the responsibility of the buyer to provide all information necessary to prepare the estimate to Enviro-Equipment. In the preparation of the estimate, Enviro-Equipment cannot consider any information germane to the project not provided by the buyer. This includes but is not limited to: local and federal applicable codes, government regulations, site conditions, project specifications, available electric power, hazardous location classifications, etc. Any errors or omissions in the proposal resulting from unidentified legal or technical requirements are outside the scope of this estimate and Enviro-Equipment will not be responsible for them.
- No changes shall be made in the estimate or purchase order unless agreed to by the seller in writing. Orders resulting from this estimate are not subject to conflicting terms in customer's confirming purchase order.
- Pricing is subject to credit approval, Net 30 days, or as stated in the estimate. Terms stated within the estimate take precedence.
- The quoted price does not include sales, use, excise or similar taxes except as noted in the estimate. If sales taxes are quoted as a component of the price, such tax amounts have been calculated based on representations by the buyer. The buyer retains responsibility for any sales, use, excise or similar taxes not expressly outlined in the estimate and paid by Enviro-Equipment on the buyers behalf.
- All items in the estimate will be shipped F.O.B. Enviro-Equipment or F.O.B origin point if drop shipped. Enviro-Equipment shall not be responsible nor liable for any damage including any loosening or disconnecting of piping, fittings, conduit or wire connections from vibration caused by the freight carrier during shipping. Acceptance of freight by carrier is acknowledgement that containers or method of shipping was acceptable when picked up.
- The estimate is valid for thirty (30) days unless otherwise stated in the estimate.
- Issuance of a purchase order or notice to proceed constitutes the acceptance of Enviro-Equipment's Estimate Terms and Conditions, Enviro-Equipment's New and Used Purchased Remediation Equipment Warranty and Returns Policy and Enviro-Equipment's Invoice Terms and Conditions. In the event of a conflict with any customer terms, Enviro-Equipment's terms shall take precedence.
- Enviro-Equipment is not responsible for any discrepancies between the written RFP documents and the RFP drawings. Pricing is limited to only those items described in the estimate. Accidental errors or omissions in interpreting the bid documents may require additional costs.
- Pricing is based on the equipment specified. No additional pressure loss calculations have been performed. The actual mechanical installation of the system may require pipe, fittings or instruments that impact operational flows, vacuums and pressures.
- Sizing and costs for equipment containers, sheds, trailers or skids may changed based upon engineered and scaled drawings during the submittal process.
- Every effort will be made to locate flow sensors/meters in desired locations. However, installation per manufacturer's specifications may be influenced by enclosure or skid sizing and/or system operating temperatures and pressures.
- A third party inspection (UL/NFPA) of the entire system is NOT included unless specifically listed in the estimate but may be required by the local jurisdiction responsible for inspection of the system. It is the responsibility of the buyer to determine if a third party inspection is necessary. If a third party inspection is required but was not included in the estimate the buyer is responsible for all costs for the third party inspection. Payment will not be delayed or withheld due to third party inspection.
- All systems which include a PLC (Programmable Logic Controller) or HMI (Human Machine Interface) may need a phone line or internet connection with static IP address depending upon the type of PLC or HMI.

The buyer is responsible for all costs and labor associated with establishing and maintaining the phone or internet service.

- If customer is unready to accept shipment at time of notification to ship, customer will advise Enviro-Equipment in writing of the reason for delay, anticipated readiness date, and acknowledge ownership of the equipment as of the notification to ship date. Enviro-Equipment will store the equipment for a period of 30 days free of charge. Customer will be invoiced monthly storage charges at a rate of $5.00 per square foot per month, plus any applicable one-time mobilization charges to relocate equipment to a storage facililty other than Enviro-Equipment.
- No costs for permitting, inspections or P.E Sealed Drawings are included unless otherwise stated.
- On site construction services, on site ancillary piping, or on site electrical work are not included in this estimate unless otherwise stated.
- Equipment offloading services at the destination or job site have not been included unless otherwise stated.
- Estimated lead time stated in the estimate is based upon our current schedule and general parts availability and is subject to change at any time without notice. Enviro-Equipment will not be liable for any damages resulting from delay in shipment past the estimated completion date for any reason whatsoever.
- Pursuant to NEC Article 409; Enviro-Equipment provides U.L. or U.L. Equivalent listed industrial control panels manufactured with short circuit current ratings (SCCR) of 5kA as standard product. The need for an alternate SCCR must be communicated in writing to Enviro-Equipment prior to placing any order.
- Not having any ambient sound level data regarding the site, Enviro-Equipment cannot guarantee meeting any sound level requirement if specified.
- Steel shipping containers are not NFPA certified with fire wall ratings. They may not meet national fire code requirements.
- Due to the volatility of fuel costs, transportation quotes/estimates older than one week will be re-quoted and may result in additional costs.

Enviro-Equipment, Inc.
Remediation Division
10120 Industrial Drive
Pineville, NC 28134
Ph. (704) 556-7723
Fax. (704) 556-7228
www.enviroequipment.com

# EEI JOB 3374 - Operation and Maintenance Manual

## General

- FIRST - Review all manufacturer documentation.
- Perform and document routine maintenance at manufacturer recommended intervals. Documentation of routine maintenance performed at manufacturer recommended intervals must be provided when making a warranty claim. Failure to perform and document routine maintenance at manufacturer recommended intervals will void any warranty claims.
- Only qualified individuals should connect, start up, operate, maintain and decommission this system.

## System Control Panel

- FIRST – Review all control panel documentation.
- A licensed electrician should bring power from the electrical service into the main system control panel.
- Check all wiring connections for proper tightness and torque before powering the system. Verify proper grounding at the control panel. Verify all selector switches are in the OFF position. Verify all valve settings on each system component are set properly for startup.
- Verify proper voltage at the top of disconnect or main terminal block in the main system control panel enclosure.
- If the system has a phase monitor, adjust the phase monitor for proper input voltage, then turn the power on. Check for steady green light on phase monitor, if incorrect, turn off all power then switch L1 and L3.
- Close and secure the enclosure then turn power on to the system.
- Turn all HOA switches to the auto position. Operating in hand mode is for testing purposes only. Damage to the system may result from continuously operating in hand mode which will void the warranty.

### Alarm Descriptions

| Control Device | Result Condition | Control Panel Indication |
|---|---|---|
| Moisture Separator High Level Alarm | Shuts down SVE Blower | Moisture Separator High Level Alarm Light Illuminates |
| Blower Low Vacuum Alarm | Shuts down SVE Blower | SVE Low Vacuum Alarm Light Illuminates |
| Blower High Vacuum Alarm | Shuts down SVE Blower | SVE High Vacuum Alarm Light Illuminates |

### Alarm Troubleshooting

| Component | Problem | Possible Cause | Solution |
|---|---|---|---|
| Any Pump or Blower Motor | Will not run in hand | Tripped overload or Faulty Component | Check to see if overload if tripped, if not tripped, contact EEI about faulty component |
| SVE Blower | Blower will run in hand but not in auto | Any High Liquid Level Alarm | Drain below High Level Alarm then Reset Alarm |
| | | SVE Low Vacuum Alarm | Check for Pipe Leaks or Blower Damage |
| | | SVE High Vacuum Alarm | Check for Pipe Blockages, Air Filter |

| | | | |
|---|---|---|---|
| | | | Cleanliness, Blower Damage |

**Soil Vapor Extraction Blower**

- FIRST - Review all Soil Vapor Extraction blower documentation.
- Ensure valves are open in vacuum lines. If the system has a dilution air valve open it completely. Start the blower up under as little vacuum as possible and increase the vacuum gradually as needed once started up.
- Ensure rotation is correct by "bumping" the blower on in hand mode and then off. Check rotation against rotation arrows or see if there is suction at the vacuum connections and pressure at the exhaust outlet. If rotation is backwards, have an electrician exchange two of the power leads. Be sure to lock out and tag the main incoming power. Verify that there is not power with a multimeter. If the system has a phase monitor the rotation should already be correct and this process may not be necessary.
- Do not operate beyond maximum vacuum capacity of the blower. Vacuum relief valve should be set at maximum vacuum threshold to protect blower. Set vacuum relief valve by tightening/loosening the adjustment nut until the valve opens at the blower's maximum vacuum. You may have to artificially apply vacuum to the system in order to achieve high enough vacuum to initially set the valve. A similar process should be done with the high vacuum switch. Adjust the blower to maximum vacuum and then adjust the switches adjustment screw until the blower shuts down on alarm.
- Check air filters per manufacturer's recommendation or at least once a month. Clean and replace as necessary.

**Moisture Separator**

- FIRST - Review all moisture separator documentation.
- The moisture separator high level alarm float is installed so the moisture separator does not flood and allow liquid to be sucked into the vacuum blower. Dirt and debris can cause this float to not operate properly so it should be gently flushed with clean water at least once a month or as necessary.
- Upon shut down, ensure all sources of water are disabled. Drain completely.

**Carbon Vessels**

- FIRST – Review all Carbon Vessel documentation.
- Do not exceed maximum flow rate or maximum pressure rating for the vessel.
- Note the pressure before and after the vessel. An increase in differential pressure is a sign the carbon media is spent or the vessel is plugged.
- Take regular samples before and after each carbon vessel. An increase in effluent concentration is a sign the carbon media is spent.
- Remove and properly dispose of spent carbon media and replace with new carbon media as needed.

# SERVICE AND PARTS MANUAL FOR BLOWER MODEL

# EN707 – EN808 THREE PHASE



AMETEK

**Technical & 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 200°F. 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<br>510218<br>510219 | 205<br>206<br>207 | Polyacrylic | Nye Rheotemp 500<br>30% +/- 5% Fill | Yes – 325 F |
| 510449<br>516440<br>516648 | 203<br>202<br>307 | Buna N | Exxon Polyrex Grease | NO |
| 516840<br>516841<br>516842<br>516843<br>516844<br>516845<br>516846<br>516847 | 206<br>207<br>208<br>210<br>309<br>310<br>311<br>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<br>2. * One phase of stator winding open<br>3. Bearings defective<br>4. Impeller jammed by foreign material<br>5. Impeller jammed against housing or cover<br>6. ** Capacitor open | 1. Connect<br>2. Rewind or buy new motor<br>3. Change bearings<br>4. Clean and add filter<br>5. Adjust<br>6. Change capacitor |
| | No Sound | 1. * Two phases of power line not connected<br>2. * Two phases of stator winding open | 1. Connect<br>2. Rewind or buy new motor |
| IMPELLER TURNS | Blown Fuse | 1. Insufficient fuse capacity<br>2. Short circuit | 1. Use time delay fuse of proper rating<br>2. Repair |
| | Motor Overheated Or Protector Trips | 1. High or low voltage<br>2. * Operating in single phase condition<br>3. Bearings defective<br>4. Impeller rubbing against housing or cover<br>5. Impeller or air passage clogged by foreign material<br>6. Unit operating beyond performance range<br>7. Capacitor shorted<br>8. * One phase of stator winding short circuited | 1. Check input voltage<br>2. Check connections<br>3. Check bearings<br>4. Adjust<br>5. Clean and add filter<br>6. Reduce system pressure/vacuum<br>7. Change capacitor<br>8. Rewind or buy new motor |
| | Abnormal Sound | 1. Impeller rubbing against housing or cover<br>2. Impeller or air passages clogged by foreign material<br>3. Bearings defective | 1. Adjust<br>2. Clean and add filter<br>3. Change bearings |
| | Performance Below Standard | 1. Leak in piping<br>2. Piping and air passages clogged<br>3. Impeller rotation reversed<br>4. Leak in blower<br>5. Low voltage | 1. Tighten<br>2. Clean<br>3. Check wiring<br>4. Tighten cover, flange<br>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

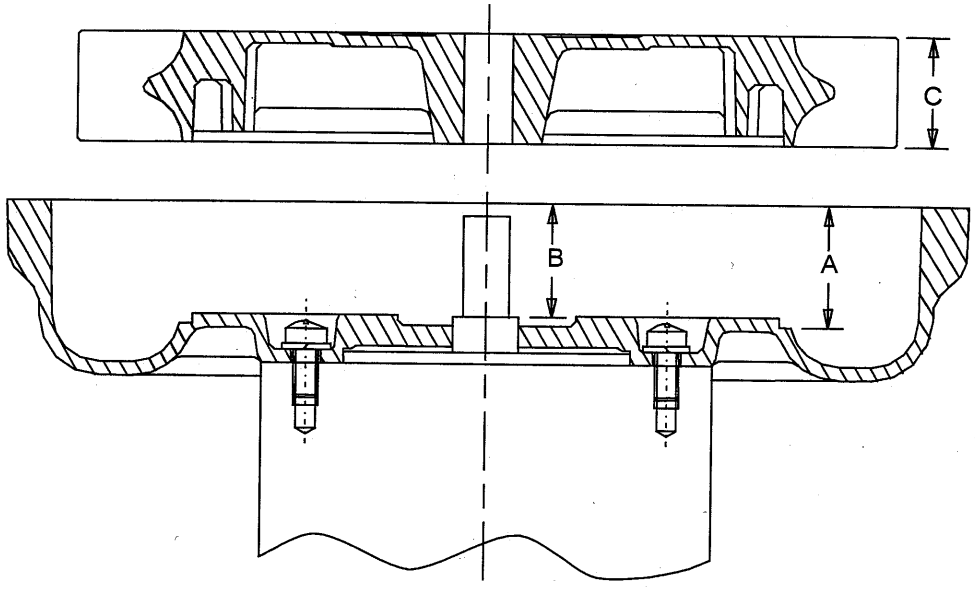
Measure the Following:

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.



AMETEK®
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

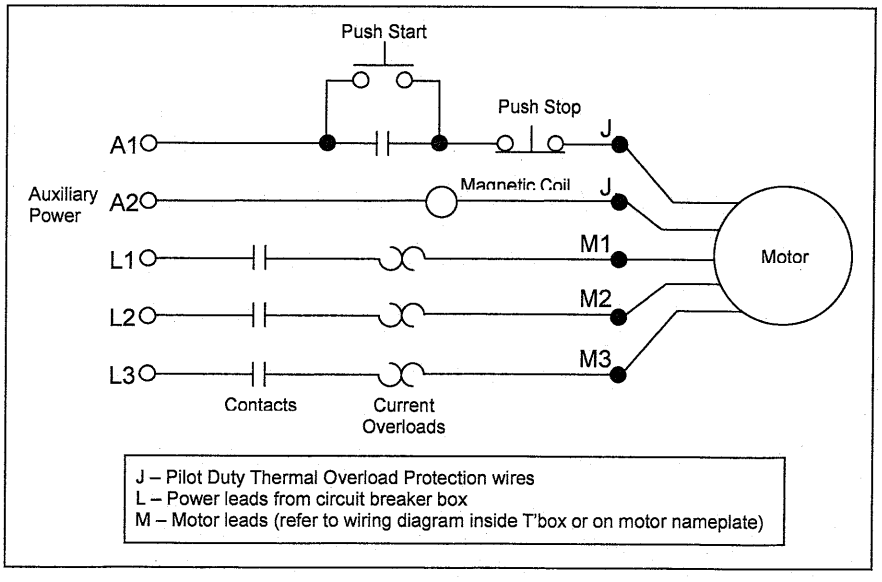
IMPORTANT: Read before wiring this Explosion-proof Blower

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.

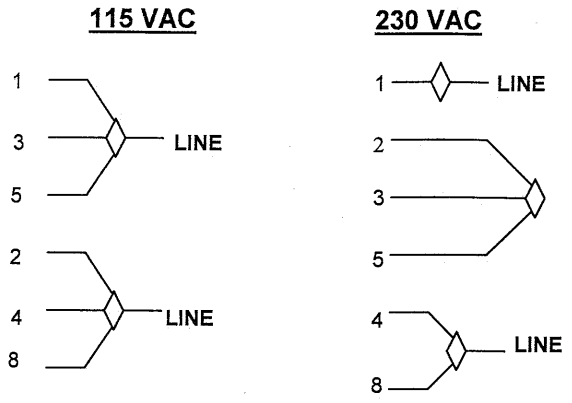
AMETEK Rotron has a complete line of Chemical Processing and Nasty Gas™ regenerative blowers with Chem-Tough™, stainless steel parts, and seals.

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

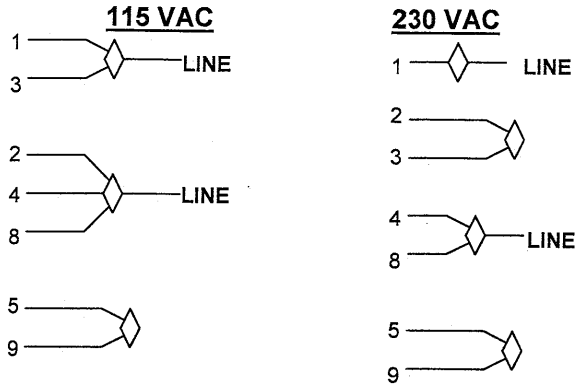
# WIRING DIAGRAMS, XP MOTORS

## H. 1∅, 6 WIRE



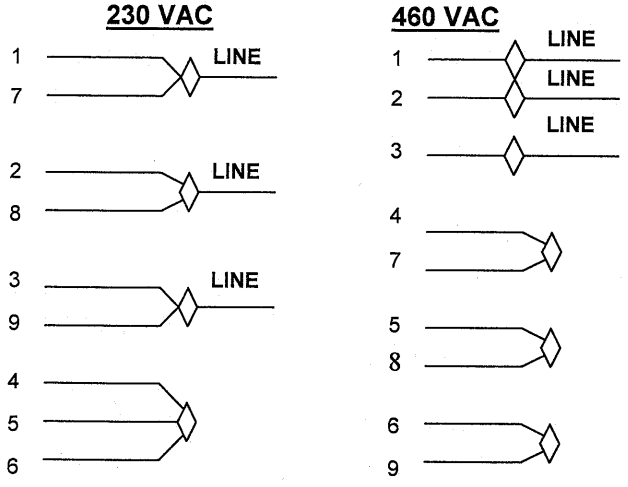

INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

## I. 1∅, 7 WIRE



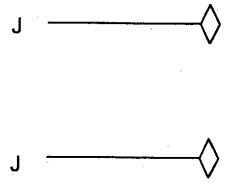

INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

## K. 3∅, 9 WIRE




INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

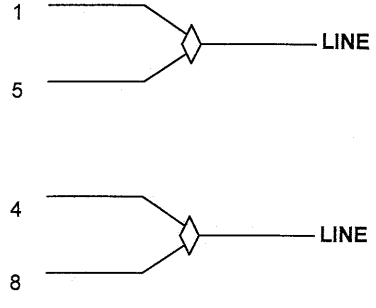
## L. PILOT DUTY THERMAL OVERLOADS




HOOK J LEADS TO CONTROL CIRCUITRY

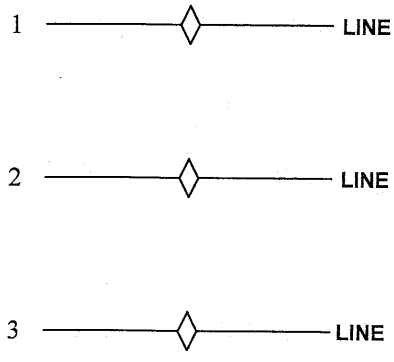
## M. 1∅ 230 VAC

SINGLE VOLTAGE



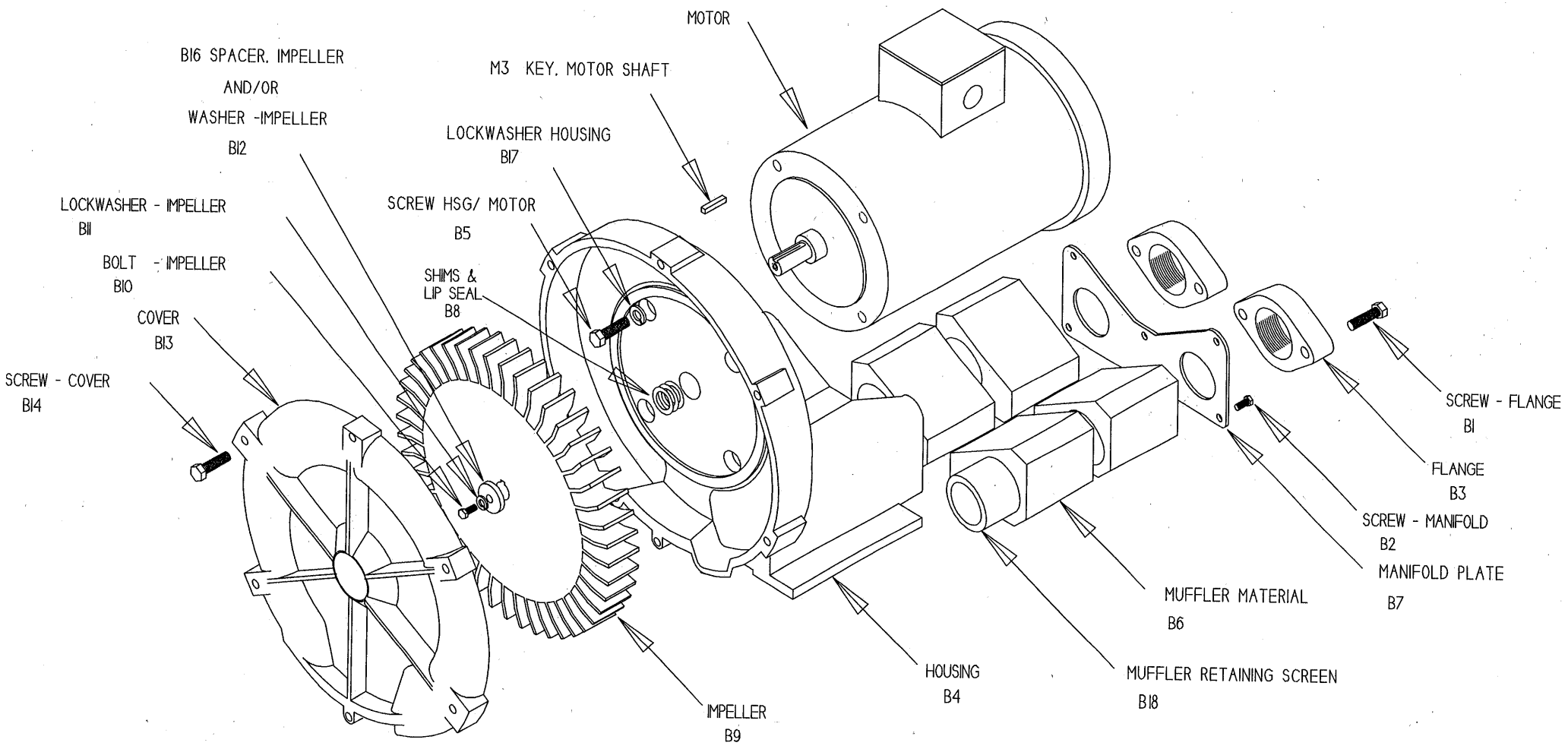

INTERCHANGE LEADWIRES 5 & 8 TO REVERSE ROTATION

## N. 3∅ 575 VAC




INTERCHAGE ANY TWO LEAD LINES TO REVERSE ROTATION

# ASSEMBLY DIAGRAM
# DR/EN/CP/HiE X0X



***EN 707/808 3 Phase***
***Service and Parts Manual***

## Parts Breakdown

| | EN707 | EN808 | EN707F_MXL | EN757 | EN757 | EN808BA_MXL | EN808BA__MXL |
|---|---|---|---|---|---|---|---|
| ***Model:*** | | | | | | | |
| ***Part No.:*** | ***038181*** | ***038182*** | 038710 | 081176 | 081174 | *038729* | 081229 |
| | ***038439*** | ***038440*** | 038711 | 081177 | | *038731* | 081230 |
| | ***OBSOLETE*** | ***OBSOLETE*** | | | | ***OBSOLETE*** | |

| Item No. | Qty. Req'd | Description | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| M3 | 1 | Key Motor Shaft | 510212 | 511532 | 510212 | 510629 | 510212 | 511532 | 511532 |
| B1 | 4 | Screw, Flange | 155095 | 155025 | 155067 | 155067 | 155067 | 155067 | 155067 |
| B2 | | Screw, Manifold | (13 pcs) 120214 | 120214 | Not Used | Not Used | Not Used | Not Used | Not Used |
| B3 | 2 | Flange | 511480 | 511614 | 511614 | 511614 | 511614 | 511614 | 511614 |
| | | Screen, Flange Guard | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B4 | 1 | Housing | 516752 | 516758 | 516752 | 552021 | 552037 | 550081 | 516764 |
| B5 | 4 | Screw, Hsg /Motor | 251792 | 140014 | 251792 | 251791 | 251792 | 140014 | 155034 |
| B6 | 36 | Muffler Material (Gray) | (40 pcs) 515493 | 515405 | (7) 551720 14 pcs) 552044 | | 14 pcs) 552044 | 551736 | 551736 |
| | 1 | Muffler Material (White) | Not Used | Not Used | 551721 (2 pcs) 552045 | | (2 pcs) 552045 | (2) 551737 | (2) 551737 |
| B7 | | Manifold Plate | 551264 | 523432 | Not Used | Not Used | Not Used | Not Used | Not Used |
| B8 | * | Shim .002" | 272703 | 511547 | 272703 | 510356 | 272703 | 511547 | 511547 |
| | * | Shim .005" | 272704 | 511548 | 272704 | 510357 | 272704 | 511548 | 511548 |
| | * | Shim .010" | 272705 | 511549 | 272705 | 510358 | 272705 | 511549 | 511549 |
| | * | Shim .020" | 272706 | 511550 | 272706 | 510359 | 272706 | 511550 | 511550 |
| | * | Shim .030" | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B9 | 1 | Impeller | 515461 | 516452 | 515461 | 552035 | 552036 | 550071 | 552062 |
| B10 | 1 | Bolt, Impeller | 251791 | 155068 | 251791 | 120215 | 120007 | 155068 | 120210 |
| B11 | 1 | Lockwasher, Impeller | 251787 | 251788 | 251787 | 120203 | 251787 | 251788 | 251788 |
| B12 | | Washer, Impeller | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | 511529 |
| B13 | 1 | Cover | 515462 | 516447 | 515462 | 552023 | 552023 | 516447 | 552061 |
| B14 | 7 | Screw, Cover | (7 pcs) 120215 | 140016 | 155236 (9 pcs) | | 155236 (9 pcs) | 155236 | (8 pcs) 140016 |
| B15 | | Eye Bolt | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B16 | 1 | Spacer, Impeller Bolt | 478336 | 511529 | 478336 | 510355 | 478336 | 511529 | 515555 |
| B17 | | Lockwasher, Housing | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| B18 | 1 | Screen, Muffler Retaining, Right (**) | 515492 | 515408 | 551723 | 552046 | 552046 | 551723 | 551723 |
| | 1 | Screen, Muffler Retaining, Left (**) | 515491 | 515407 | 551723 | 552046 | 552046 | 551723 | 551723 |
| B19 | 6 | Bolt, Muffler Hsg/Hsg | 120251 | 155025 | 120251 | 120007 | 120007 | 155025 | 155025 |
| B19A | 4 | Bolt, Muffler Hsg/Hsg | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | 120214 |
| B20 | 1 | Muffler Housing | 515480 | 515370 | 550023 | 552017 | 552017 | 550017 | 550017 |
| | | Muffler Discrete | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used |
| | 2 | Bolt, Motor/Muffler | Not Used | 120325 | Not Used | Not Used | Not Used | Not Used | Not Used |
| | 2 | Lockwasher, Motor/Muffler | Not Used | 120203 | Not Used | Not Used | Not Used | Not Used | Not Used |
| | 2 | Washer, Motor/Muffler | Not Used | 155029 | 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 | 516691 | 516693 | 516691 | 516587 | 516693 | 516693 | 516693 |

*As needed **Viewed looking at inlet/outlet ports

| Model | Part No. | Motor | Wiring Diagram | Specific Parts | Bearing, Rear (M1) | Bearing, Impeller End (M2) |
|---|---|---|---|---|---|---|
| EN707F72MXL | 038710 | 515552 | K + L | | 510217 | 510218 |
| EN707F86MXL | 038711 | 529633 | N + L | | | |
| EN757M72XL | 081176 | 516687 | K + L | | 510449 | 510217 |
| EN757M86XL | 081177 | 529630 | N + L | | | |
| EN757F72XL | 081174 | 515552 | K + L | | 510217 | 510218 |
| EN808BA86MXL | 081230 | 529626 | N + L | | 516840 | 516844 |
| EN808BA72MXL | 081229 | 515558 | K + L | | | |
| ***Discontinued*** | | | | | | |
| EN707F72XL | 038181 | 515552 | K + L | | 510217 | 510218 |
| EN707F86XL | 038439 | 529633 | N + L | | | |
| EN808BA72XL | 038182 | 515558 | K + L | | 510840 | 516844 |
| EN808BA86XL | 038440 | 529626 | N + L | | Call Factory | Call Factory |
| EN808BA86MXL | 038731 | 529626 | N + L | | 516840 | 516844 |
| EN808BA72MXL | 038729 | 515558 | K + L | | | |

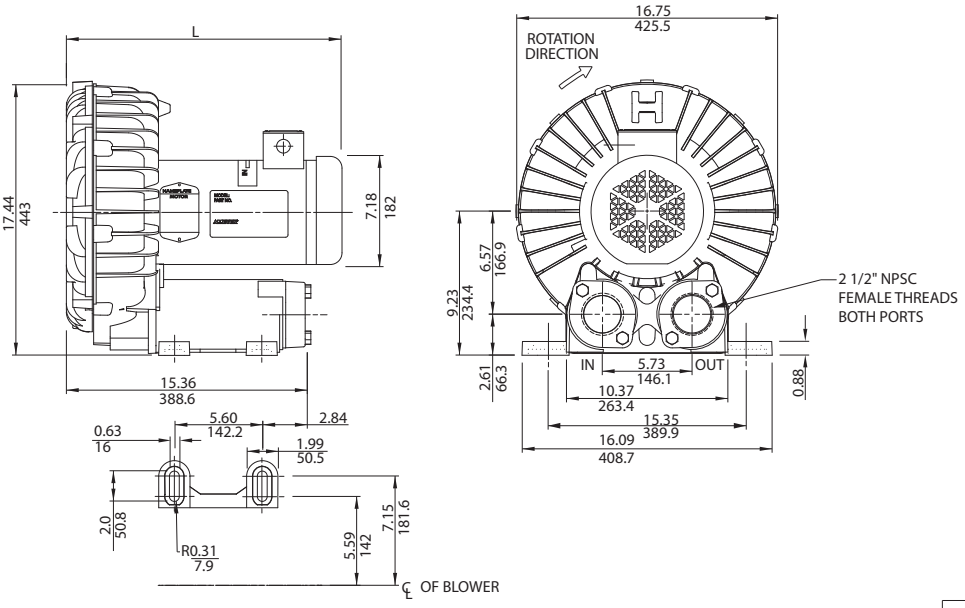
*As needed **Viewed looking at inlet/outlet ports

## Environmental / Chemical Processing Blowers

# ROTRON®

## EN 757 & CP 757

3.0 / 5.0 HP Sealed Regenerative w/Explosion-Proof Motor




IN
MM

NOTES
1. TERMINAL BOX CONNECTOR HOLE .75 NPT.
2. DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
3. CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

| MODEL | L (IN/MM) |
|---|---|
| EN757M72XL | 19.72/500.9 |
| EN757F72XL | 21.00/533.4 |

| | | Part/ Model Number | | | | |
|---|---|---|---|---|---|---|
| | | EN757M72XL | EN757M86XL | EN757F72XL | CP757FW72XLR | CP757FU72XLR |
| Specification | Units | 081176 | 081177 | 081174 | 081180 | 081181 |
| Motor Enclosure - Shaft Mtl. | - | XP-CS | XP-CS | XP-CS | Chem XP-SS | Chem XP-SS |
| Horsepower | - | 3.0 | 3.0 | 5.0 | XP-CS | 3 |
| Voltage | AC | 208-230/460 | 575 | 208-230/460 | 208-230/460 | 208-230/460 |
| Phase - Frequency | - | Three-60 Hz | Three-60 Hz | Three - 60 Hz | Three-60 Hz | Three - 60 Hz |
| Insulation Class | - | B | B | B | B | B |
| NEMA Rated Motor Amps | Amps (A) | 7.2/3.6 | 3.0 | 14/7 | 14/7 | 7.2/3.6 |
| Service Factor | - | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Maximum Blower Amps | Amps (A) | 10/5 | 4.0 | 15/7.5 | 15/7.5 | 10/5 |
| Locked Rotor Amps | Amps (A) | 54/47 | 22 | 152/76 | 152/76 | 54/27 |
| NEMA Starter Size | - | 0/0 | 0 | 1/1 | 1/1 | 0/0 |
| Shipping Weight | Lbs | 158 | 158 | 158 | 158 | 158 |
| | Kg | 71.7 | 71.7 | 71.7 | 71.7 | 71.7 |

**Voltage** - 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.

**Operating Temperatures** - 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.

**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.

**XP Motor Class - Group** - See Explosive Atmosphere Classification Chart in Section I

*This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.*

**AMETEK TECHNICAL & INDUSTRIAL PRODUCTS**
**75 North Street, Saugerties, NY 12477**
**USA: +1 215-256-6601 - Europe: +44 (0) 845 366 9664 - Asia: +86 21 5763 1258**
**Customer Service Fax: +1 215.256.1338**
**www.ametektip.com**



AMETEK® TECHNICAL & INDUSTRIAL PRODUCTS

## Environmental / Chemical Processing Blowers

# EN 757 & CP 757

# ROTRON®

3.0 / 5.0 HP Sealed Regenerative w/Explosion-Proof Motor

## FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- Maximum flow: 310 SCFM
- Maximum pressure: 80 IWG
- Maximum vacuum: 75 IWG
- Standard motor: 5.0 HP, explosion-proof
- Cast aluminum blower housing, impeller , cover & 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

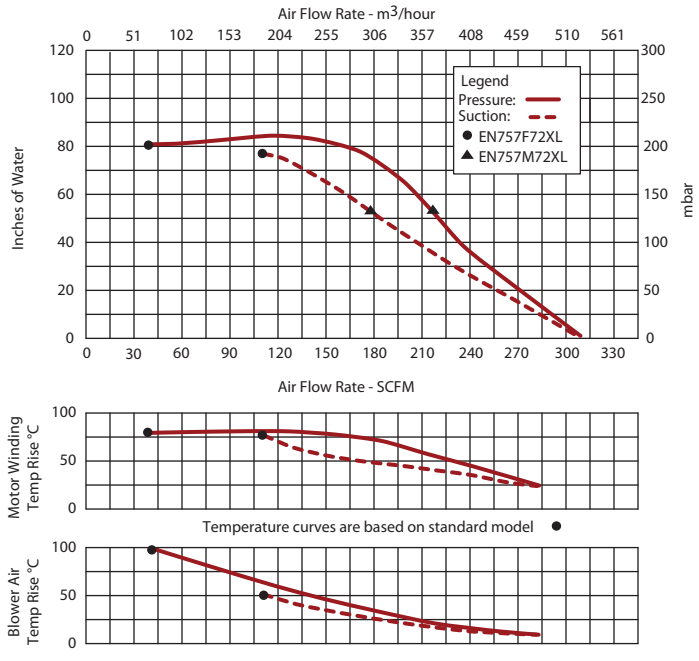
## ACCESSORIES

- 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

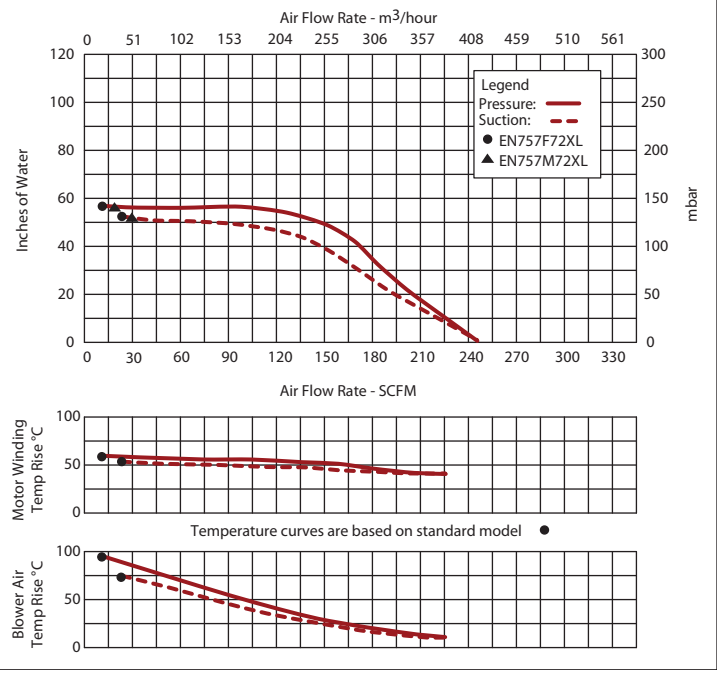



## Blower Performance at Standard Conditions

### 60 Hz




### 50 Hz




*This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.*

**AMETEK TECHNICAL & INDUSTRIAL PRODUCTS**
**75 North Street, Saugerties, NY 12477**
**USA: +1 215-256-6601 - Europe: +44 (0) 845 366 9664 - Asia: +86 21 5763 1258**
**Customer Service Fax: +1 215.256.1338**
**www.ametektip.com**



AMETEK®
TECHNICAL & INDUSTRIAL PRODUCTS

# Small Compact Filter Silencers
## w/ Standard Filter Design
"FS" Series 1/2" - 3" MPT



## APPLICATIONS & EQUIPMENT

- Industrial & Severe Duty
- Piston Compressors
- Screw Compressors
- Blowers - Side Channel & P.D.
- Hydraulic Breathers – fine filtration
- Engines
- Construction\Contractor Industry
- Workshop
- Medical\Dental Industry
- Pneumatic Conveying
- Waste Water Aeration
- Nailers and Staplers
- Vacuum Vent Breathers

## FEATURES & SPECIFICATIONS

- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron
- Fully drawn weatherhood - no welds to rust or vibrate apart
- Tubular silencing design - tube is positioned to maximize attenuation and air flow while minimizing pressure drop
- Durable carbon steel construction with baked enamel finish and powder coated weatherhood
- Interchangeable media: Polyester, Paper, HEPA
- Several element sizes available per given connection (safety factor)
- Temp (continuous): min -15°F (-26°C ) max 220°F (104°C )
- Filter change out differential: 10"-15" $H_2O$ over initial delta P
- Pressure drop graphs available upon request

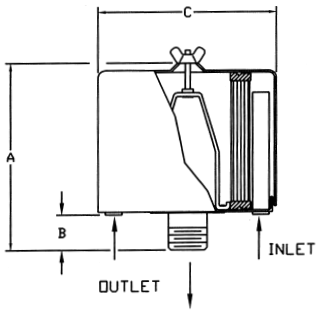
## OPTIONS (Inquiries Encouraged)

- 1/8" tap holes
- Pressure Drop Indicator
- Available in ***Stainless Steel***
- Epoxy coated housings
- Various media available
- Special connections, BSPT

## CONFIGURATION

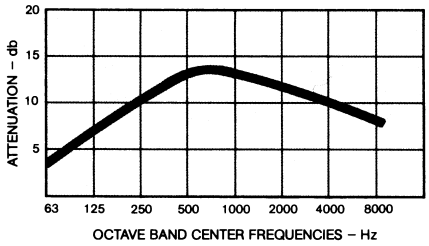


## DRAWING




Dimension tolerance ± 1/4"

**TYPICAL NOISE ATTENUATION – FS SERIES**




- Noise attenuation may vary due to the wide range of applications and machines

**I = Industrial Duty S = Severe Duty**

| | with Polyester Element | with Paper Element | MPT Outlet | DIMENSIONS - inches A | B | C | Rated Flow SCFM Piston | Screw, Blower, Fan | Element Rating | No. of Silencing Tubes | Approx. Wt. lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I | FS-15-050 | FS-14-050 | 1/2" | 4 | 1 1/2 | 6 | 10 | 10 | 35 | 1 | 2 |
| I | FS-15-075 | FS-14-075 | 3/4" | 4 | 1 1/2 | 6 | 20 | 25 | 35 | 2 | 2 |
| I | FS-15-100 | FS-14-100 | 1" | 4 | 1 1/2 | 6 | 25 | 35 | 35 | 3 | 2 |
| S | FS-19P-100 | FS-18P-100 | 1" | 6 5/8 | 1 5/8 | 6 | 35 | 55 | 100 | 3 | 3 |
| I | FS-19P-125 | FS-18P-125 | 1 1/4" | 6 5/8 | 1 5/8 | 6 | 55 | 70 | 100 | 5 | 3 |
| I | FS-19P-150 | FS-18P-150 | 1 1/2" | 6 5/8 | 1 5/8 | 6 | 70 | 85 | 100 | 5 | 4 |
| I | FS-31P-200 | FS-30P-200 | 2" | 7 1/4 | 2 1/4 | 10 | 85 | 135 | 195 | 5 | 8 |
| S | FS-231P-200 | FS-230P-200 | 2" | 12 1/4 | 2 1/4 | 10 | 135 | 135 | 300 | 5 | 14 |
| S | FS-231P-250 | FS-230P-250 | 2 1/2" | 12 1/2 | 2 1/2 | 10 | 195 | 195 | 300 | 9 | 15 |
| I | FS-231P-300 | FS-230P-300 | 3" | 13 | 3 | 10 | 200 | 300 | 300 | 9 | 15 |

Note: Model offerings and design parameters may change without notice.

1151 Ardmore Ave. • Itasca, IL 60143 USA
Sales/Service: 630.773.1363 • Fax: 630.773.0727
E-mail: sales@solbergmfg.com • Web Site: www.solbergmfg.com

# COMPACT "T" STYLE VACUUM FILTERS
## "CT Series" 2" - 6" FPT

SOLBERG®



- **Compact Design**
- **Multi-Stage Filtration**
- **Quick Change Out**
- **Vacuum Tested**

## BENEFITS

- **Compact** design for space restrictions; **Minimal** service area needed
- **Integrated Inlet Baffle**
- Inlet is above the element to **Extend** element life and maintenance intervals
- "T" style design **Minimizes** piping requirements
- "Drop-Down" housing for easy servicing and containment of particles
- Cast aluminum head **Resists** corrosion
- Pressure differential ports standard for monitoring
- Casting has 4 unthreaded tap holes for mounting bracket
- **Vacuum level**: Typically $1x10^{-3}$ mmHg ($1.3x10^{-3}$ mbar)
- Swing Bolts on 5" & 6" sizes for additional strength

## OPTIONS (Inquires Encouraged)

- Various media alternatives
- **See Through Bottom for Visual Inspection Now available for 3" and 4" housings!**
- Swing Bolts for 2" - 4" Sizes



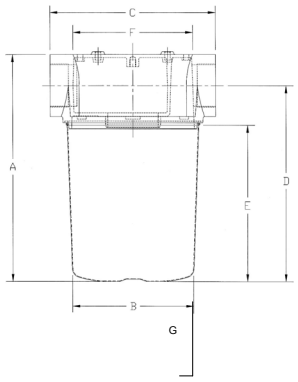
CT-851/850
2" & 2 1/2" FPT



CT-235P/234P
3" & 4" FPT



CT-275P/274P
5" & 6" FPT




Dimension tolerance ± 1/4"

**I = Industrial Duty  S = Severe Duty  E = Extreme Duty**

| | with Polyester Element | with Paper Element | FPT Inlet & Outlet | DIMENSIONS - inches A | B | C | D | E | Rated Flow SCFM Nominal Rating | Element Rating | Approx. Wt. lbs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I | CT-851-200C | CT-850-200C | 2" | 13 | 10 7/8 | 9 | 9 | 18 | 175 | 290 | 16 |
| I | CT-851-250C | CT-850-250C | 2-1/2" | 13 | 10 7/8 | 9 | 9 | 18 | 210 | 290 | 15 |
| I | CT-235P-300C | CT-234P-300C | 3" | 18 7/8 | 16 1/8 | 13 1/2 | 13 | 25 | 300 | 570 | 30 |
| I | CT-235P-400C | CT-234P-400C | 4" | 18 7/8 | 16 1/8 | 13 1/2 | 13 | 25 | 520 | 570 | 26 |
| S | CT-275P-500C | CT-274P-500C | 5" | 18 1/4 | 14 3/8 | 19 | 9 7/8 | 20 | 800 | 1100 | 50 |
| I | CT-275P-600C | CT-274P-600C | 6" | 18 1/4 | 14 3/8 | 19 | 9 7/8 | 20 | 1100 | 1100 | 45 |

1151 Ardmore Ave. • Itasca, IL 60143 USA
Tel: 630/773 1363 • Fax: 630/773 2643
E-mail: sales@solbergmfg.com • Web Site: www.solbergmfg.com

*Solberg – Discover the Possibilities*

BALDOR
A MEMBER OF THE ABB GROUP

BALDOR • RELIANCE

# Product Information Packet

# L3403

## .25HP,1725RPM,1PH,60HZ,48,3411L,TEFC,F1

Copyright © All product information within this document is subject to Baldor Electric Company copyright © protection, unless otherwise noted.

## Part Detail

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Revision:** | Y | **Status:** | PRD/A | **Change #:** | | **Proprietary:** | No |
| **Type:** | AC | **Prod. Type:** | 3411L | **Elec. Spec:** | 34WG5506 | **CD Diagram:** | |
| **Enclosure:** | TEFC | **Mfg Plant:** | | **Mech. Spec:** | 34C051 | **Layout:** | |
| **Frame:** | 48 | **Mounting:** | F1 | **Poles:** | 04 | **Created Date:** | |
| **Base:** | RG | **Rotation:** | R | **Insulation:** | B | **Eff. Date:** | 10-02-2012 |
| **Leads:** | 6#18 | **Literature:** | | **Elec. Diagram:** | | **Replaced By:** | |

## Nameplate NP1256L

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **CAT.NO.** | L3403 | | | | | | |
| **SPEC.** | 34C51-5506 | | | | | | |
| **HP** | .25 | | | | | | |
| **VOLTS** | 115/230 | | | | | | |
| **AMP** | 5/2.5 | | | | | | |
| **RPM** | 1725 | | | | | | |
| **FRAME** | 48 | **HZ** | 60 | **PH** | 1 | | |
| **SER.F.** | 1.35 | **CODE** | L | **DES** | N | **CLASS** | B |
| **NEMA-NOM-EFF** | 55 | **PF** | 57 | | | | |
| **RATING** | 40C AMB-CONT | | | | | | |
| **CC** | | **USABLE AT 208V** | 3 | | | | |
| **DE** | 6203 | **ODE** | 6203 | | | | |
| **ENCL** | TEFC | **SN** | | | | | |
| | SFA 5.6/2.8 | | | | | | |



BALDOR A MEMBER OF THE ABB GROUP

## Parts List

| Part Number | Description | Quantity |
|---|---|---|
| SA008575 | SA 34C51-5506 | 1.000 EA |
| RA005022 | RA 34C51-5506 | 1.000 EA |
| EC1161A02 | BMI 091A161B125AD2A ELEC CAP 115V 1.4 X | 1.000 EA |
| NS2512A01 | INSULATOR, CONDUIT BOX X | 1.000 EA |
| 34CB3002A | CB CAST W/.88 DIA HOLE | 1.000 EA |
| 34GS1029A01 | GASKET, CONDUIT BOX | 1.000 EA |
| 51XB1016A07 | 10-16 X 7/16 HXWSSLD SERTYB | 2.000 EA |
| 11XW1032G06 | 10-32 X .38, TAPTITE II, HEX WSHR SLTD U | 1.000 EA |
| 51XW0832A07 | 8-32 X .44, TAPTITE II, HEX WSHR SLTD SE | 2.000 EA |
| 34EP3102A01SP | FR ENDPLATE, MACH | 1.000 EA |
| NS2500A01 | INSULATOR, AUTO THER PROT | 1.000 EA |
| WD1000A03 | 41531 AMP FLG.TERM,4M/REEL(2.5MIL) | 1.000 EA |
| 34CB4800SP | CAPACITOR COVER, STAMPED | 1.000 EA |
| 34GS3000SP | GASKET, CAPACITOR BOX | 1.000 EA |
| 51XB1016A05 | 10-16X5/16HX WA SL SR TYB (F/S) | 2.000 EA |
| HW5100A03SP | WAVY WASHER (W1543-017) | 1.000 EA |
| 34EP3102A02SP | FR/PU ENDPLATE, MACH | 1.000 EA |
| XY1032A02 | 10-32 HEX NUT DIRECTIONAL SERRATION | 4.000 EA |
| 34FN3002A01SP | EXTERNAL FAN, PLASTIC, .637/.639 HUB W/ | 1.000 EA |
| 34FH4002A01 | IEC FH NO GREASER | 1.000 EA |
| 51XW1032A06 | 10-32 X .38, TAPTITE II, HEX WSHR SLTD S | 3.000 EA |
| 34CB4517 | CB LID 4 MTG HOLES .22 DIA STAMPED, FOR | 1.000 EA |
| 34GS1031A01 | GASKET, FLAT CONDUIT BOX LID (LEXIDE) | 1.000 EA |
| 51XW0832A07 | 8-32 X .44, TAPTITE II, HEX WSHR SLTD SE | 4.000 EA |

## Parts List (continued)

| Part Number | Description | Quantity |
|---|---|---|
| MG1000G27 | PAINT- S9282E CHARCOAL GREY | 0.014 GA |
| 10XF0440S02 | 04-40 X 1/8 TYPE F HEX HD STAINLESS STIC | 2.000 EA |
| SP5056A24 | MODEL 34 TYPE L STATIONARY SWITCH WITH L | 1.000 EA |
| HA3100A12 | THRUBOLT 10-32 X 7.375 | 4.000 EA |
| LB1125C01 | STD (STOCK) CARTON LABEL BALDOR WITH FLA | 1.000 EA |
| LC0001A01 | CONN LABEL / WARNING LABEL (LC0001 / LB1 | 1.000 EA |
| NP1256L | ALUM UL CSA CC | 1.000 EA |
| 34PA1002 | PACKING GROUP, BALDOR | 1.000 EA |
| LB1506 | LABEL "AMERICAN MADE" 1.50 X 1.00 | 1.000 EA |



BALDOR
A MEMBER OF THE ABB GROUP

## Accessories

| Part Number | Description | Multiplier |
|---|---|---|
| 34-3900T | C-FACE KIT | A8 |



BALDOR
A MEMBER OF THE ABB GROUP

| Performance Data at 230V, 60Hz, 0.25HP (Typical performance - Not guaranteed values) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **General Characteristics** | | | | | | | |
| **Full Load Torque:** | 0.75 LB-FT | | | **Start Configuration:** | | DOL | |
| **No-Load Current:** | 2.2 Amps | | | **Break-Down Torque:** | | 2.13 LB-FT | |
| **Line-line Res. @ 25°C.:** | 8.88 Ohms A Ph / 7.06 Ohms B Ph | | | **Pull-Up Torque:** | | 1.88 LB-FT | |
| **Temp. Rise @ Rated Load:** | 57 C | | | **Locked-Rotor Torque:** | | 2.48 LB-FT | |
| **Temp. Rise @ S.F. Load:** | 70 C | | | **Starting Current:** | | 9.95 Amps | |
| **Load Characteristics** | | | | | | | |
| **% of Rated Load** | **25** | **50** | **75** | **100** | **125** | **150** | **S.F.** |
| **Power Factor:** | 32.0 | 40.0 | 49.0 | 57.0 | 63.0 | 69.0 | 67.0 |
| **Efficiency:** | 28.0 | 40.0 | 50.0 | 55.0 | 58.0 | 59.0 | 59.0 |
| **Speed:** | 1779.0 | 1763.0 | 1740.0 | 1720.0 | 1700.0 | 1670.0 | 1680.0 |
| **Line Amperes:** | 2.2 | 2.3 | 2.4 | 2.5 | 2.7 | 2.9 | 2.8 |

Performance Graph at 230V, 60Hz, 0.25HP Typical performance - Not guaranteed values

BALDOR ELECTRIC COMPANY

WINDING # 10WGY538

30 HP 3 PH 60 HZ 1760 RPM 460 V 1056M

TORQUES(LB-FT): PO=330 PU=142 LR=178 LRA=270

Typical performance - not guaranteed values.

%EFF
%PF

TORQUE
(LB-FT)

RPM

KW

AMPS



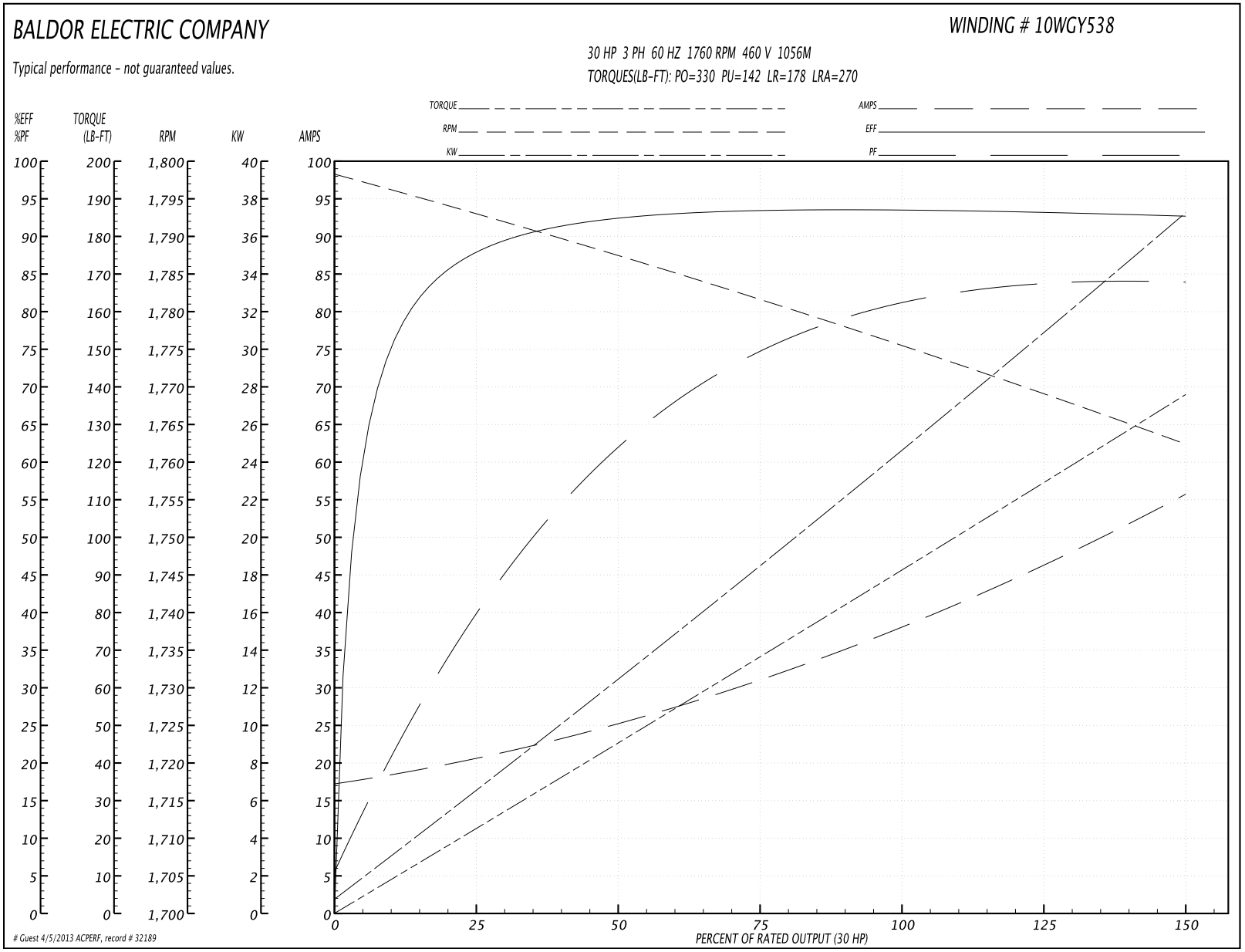

# Guest 4/5/2013 ACPERF, record # 32189



BALDOR
A MEMBER OF THE ABB GROUP

| Performance Data at 115V, 60Hz, 0.25HP (Typical performance - Not guaranteed values) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **General Characteristics** | | | | | | | |
| **Full Load Torque:** | 0.75 LB-FT | | | **Start Configuration:** | | DOL | |
| **No-Load Current:** | 4.4 Amps | | | **Break-Down Torque:** | | 2.13 LB-FT | |
| **Line-line Res. @ 25°C.:** | 2.22 Ohms A Ph / 7.06 Ohms B Ph | | | **Pull-Up Torque:** | | 1.88 LB-FT | |
| **Temp. Rise @ Rated Load:** | 42 C | | | **Locked-Rotor Torque:** | | 2.48 LB-FT | |
| **Temp. Rise @ S.F. Load:** | 50 C | | | **Starting Current:** | | 19.9 Amps | |
| **Load Characteristics** | | | | | | | |
| **% of Rated Load** | **25** | **50** | **75** | **100** | **125** | **150** | **S.F.** |
| **Power Factor:** | 31.0 | 40.0 | 49.0 | 57.0 | 63.0 | 69.0 | 67.0 |
| **Efficiency:** | 27.0 | 42.0 | 51.0 | 55.0 | 58.0 | 59.0 | 59.0 |
| **Speed:** | 1779.0 | 1763.0 | 1745.0 | 1725.0 | 1705.0 | 1680.0 | 1690.0 |
| **Line Amperes:** | 4.4 | 4.6 | 4.8 | 5.0 | 5.4 | 5.8 | 5.6 |

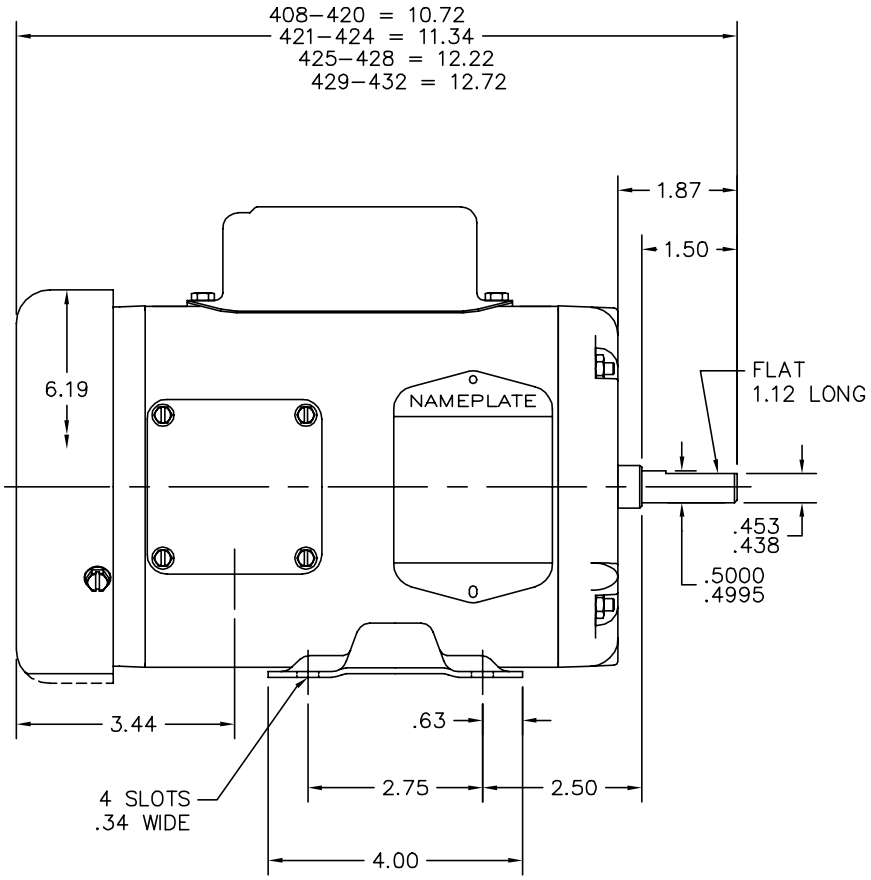
Performance Graph at 115V, 60Hz, 0.25HP Typical performance - Not guaranteed values

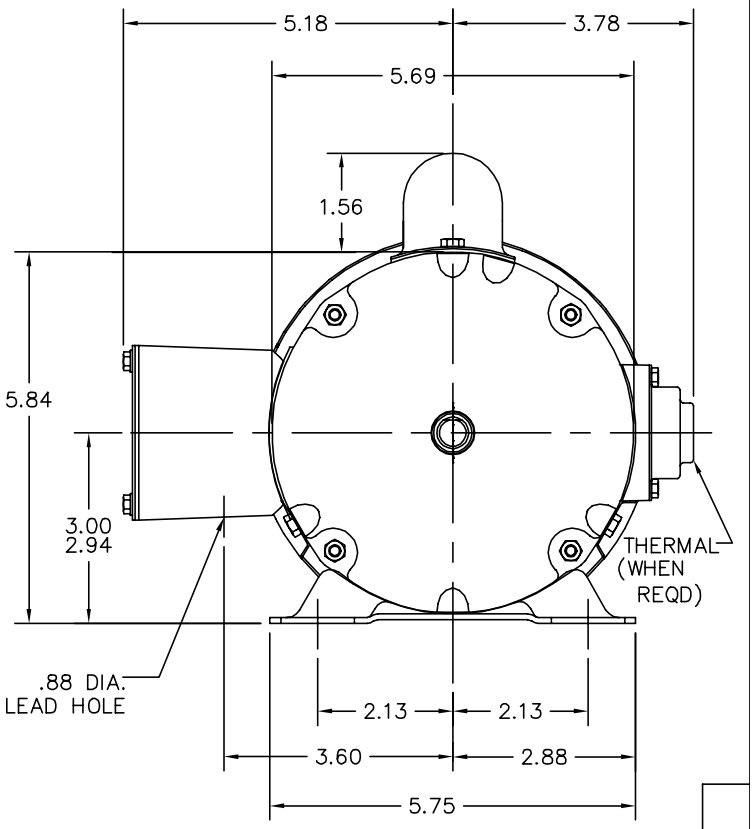





BALDOR
A MEMBER OF THE ABB GROUP

34LYC051




34LYC051

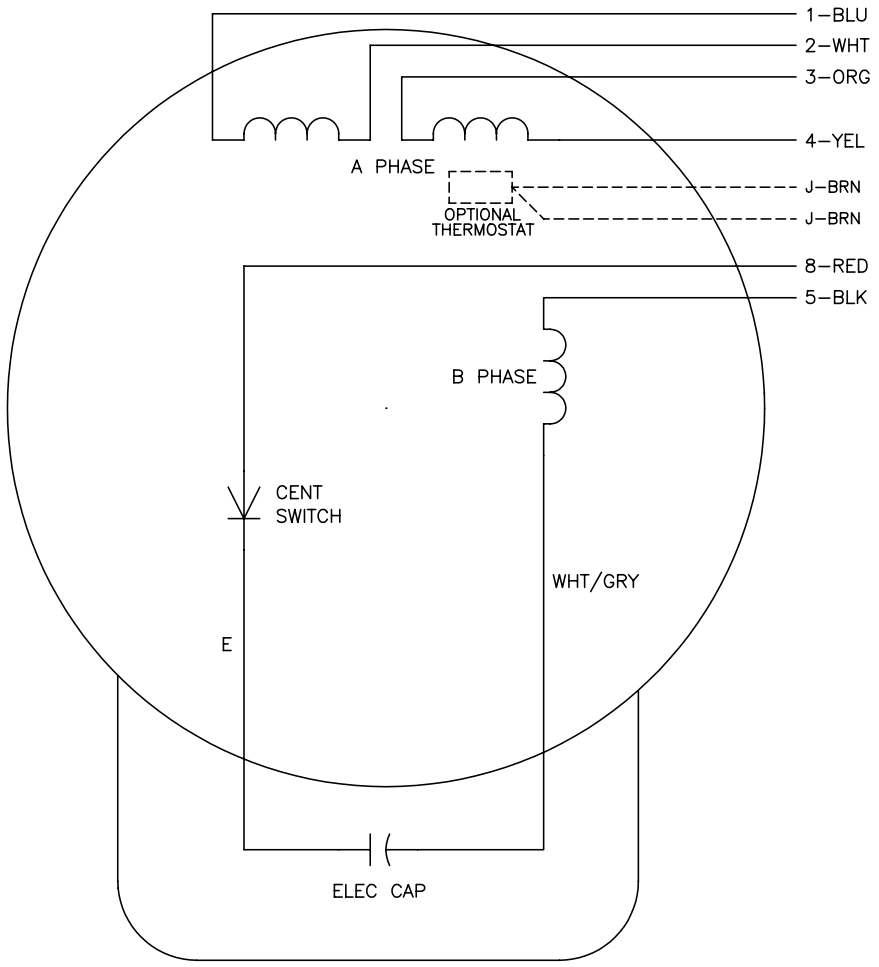
CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT BALDOR'S PRODUCT WILL PERFORM SUITABLY IN THE INTENDED APPLICATION.

| | | | |
|---|---|---|---|
| REV. DESC: UPDATE OVERALL LENGTHS | | | BALDOR |
| REV. LTR: L | VERSION: 04 | TDR: 000000767401 | |
| FILE: \AAA\00025\908 | | REVISED: 09:00:29 10/02/2012 | STD HORZ MODEL 34L NEMA 48 TEFC |
| MTL: – | | BY: ENBUCF0 | SH 1 of 1 |



BALDOR
A MEMBER OF THE ABB GROUP

CD0001




| | LINE A | LINE B | JOIN |
|---|---|---|---|
| HIGH STD | 1 | 4,5 | 2,3,8 |
| HIGH OPP | 1 | 4,8 | 2,3,5 |
| LOW STD | 1,3,8 | 2,4,5 | – |
| LOW OPP | 1,3,5 | 2,4,8 | – |

NOTES:

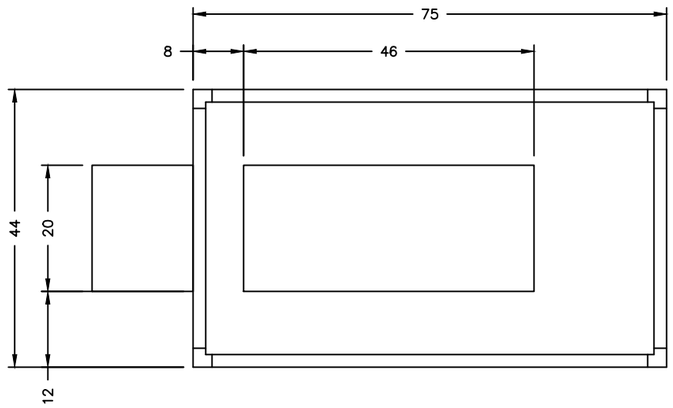
1. STANDARD ROTATION IS CCW FACING END OPPOSITE SHAFT EXTENSION.
2. OPTIONAL THERMOSTAT IS PROVIDED WHEN SPECIFIED.
3. MULTIPLE CAPACITORS ARE CONNECTED IN PARALLEL UNLESS OTHERWISE SPECIFIED.
4. LEAD COLORS ARE OPTIONAL. LEADS MUST ALWAYS BE NUMBERED AS SHOWN.

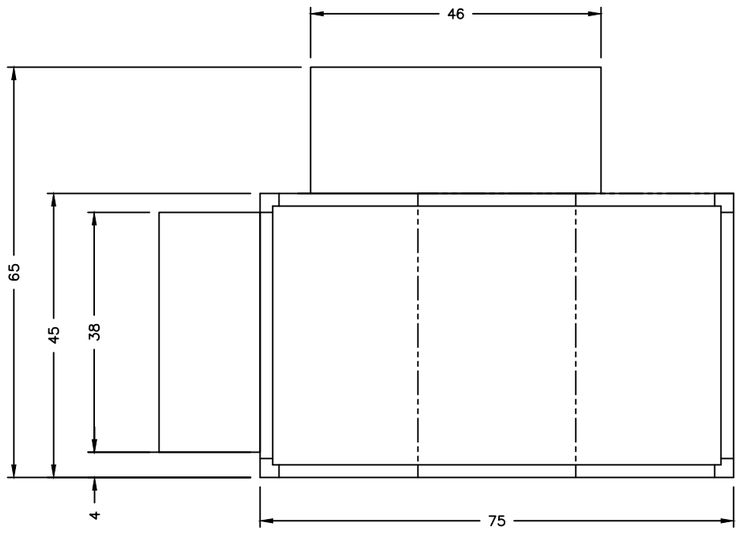
| | | | |
|---|---|---|---|
| REV. DESC: REVISE TO SHOW OPTIONAL COLORS | | | BALDOR ELECTRIC Co. |
| REV. LTR: D | BY: JLP | REVISED: 04/08/99 1:16 | TDR: 0178636 |
| CD0001 | | FILE: AAA00007405 | MDL: – |
| | | MTL: – | TYPE L, DV, REV, 6 LEADS |

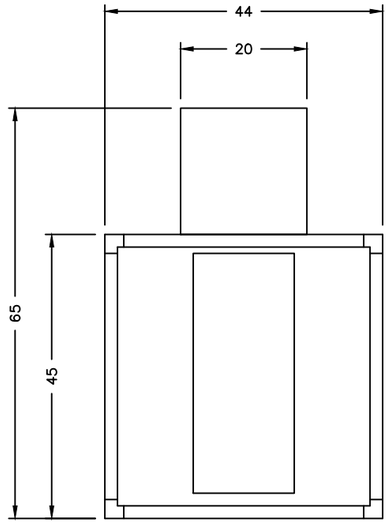
CD0001



BALDOR A MEMBER OF THE ABB GROUP




| REV. | DATE | DESCRIPTION |
|---|---|---|

ARTUSA INDUSTRIES

CUSTOMER: GASHO & ASSOC

TITLE: ENCLOSURE DRAWING

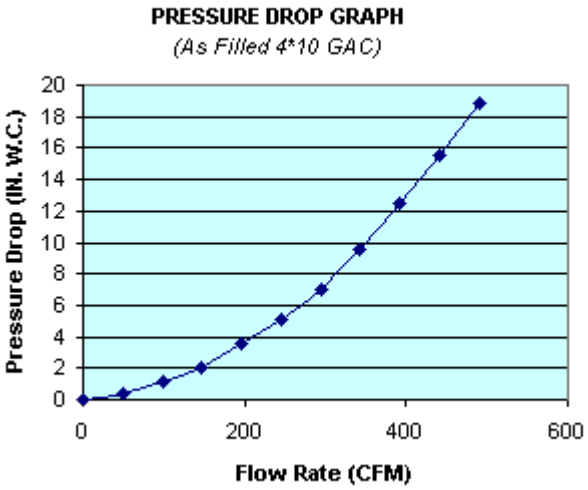
| | | | |
|---|---|---|---|
| DRAWN BY: | CBC | SCALE | 1/2"=1'-0" |
| CHECKED BY: | | DATE | 06/16/15 |
| DRAWING NUMBER | PO: 53142-13834 | REV | 0 |

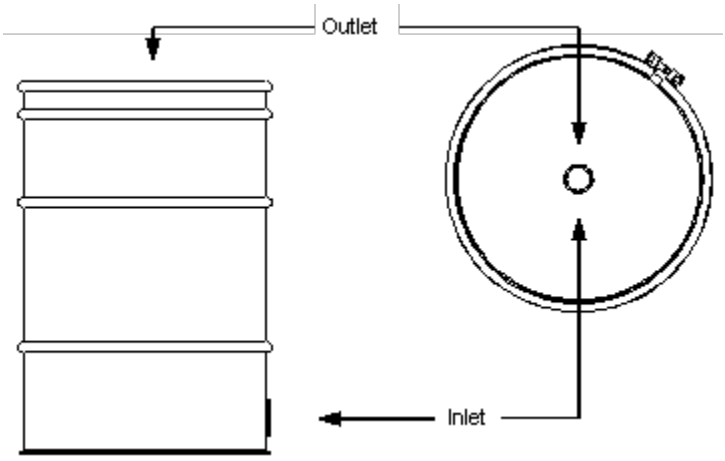
THE INFORMATION CONTAINED HEREON IS PROPRIETARY AND CONFIDENTIAL AND MAY NOT BE COPIED OR DISCLOSED TO A THIRD PARTY WITHOUT WRITTEN AUTHORIZATION FROM R & M EQUIPMENT CO.

501 SOUTH MAIN STREET
SPRING CITY, PA 19475
PHONE: (610) 495-9700
FAX: (610) 495-9710

Enviro-Equipment Inc.
10120 Industrial Drive
Pineville NC 28134

| VFD-110 SPECIFICATIONS | | | |
|---|---|---|---|
| **Overall Height** | 3'7" | **Vessel/Internal Piping Materials** | CS/CS (False Floor) |
| **Diameter** | 32" | **Internal Coating** | Polyamide Epoxy Resin |
| **Inlet / Outlet (FNPT)** | 2" | **External Coating** | Urethane Enamel |
| **Drain / Vent (FNPT)** | OPT | **Maximum Pressure / Temp** | 4 PSIG / 250º F |
| **GAC Fill (lbs)** | 350 | **Cross Sectional Bed Area** | 4.9 $FT^2$ |
| **Shipping / Operational Weight (lbs)** | 450/600 | **Bed Depth/Volume** | 2.6 FT / 12.5 $FT^3$ |



Tetrasolv Filtration

# Operation & Maintenance Manual

## VFD • VFV • VF • VR SERIES

*Liquid & Vapor Filtration*
*Remedial • Industrial • Municipal*

Tetrasolv Filtration Vapor Filters

*CONTENTS*


*1.0 General Description* ..... 1
*2.0 Safety Considerations* ..... 1
*3.0 Installation* ..... 2
*3.1 Shipment* ..... 2
*3.2 Unloading* ..... 2
*3.3 Inspection* ..... 2
*3.4 Set Up* ..... 3
*4.0 Operation* ..... 3
*4.1 Modes of Operation* ..... 3
*4.2 Monitoring* ..... 3
*5.0 Adsorber Servicing* ..... 4
*5.1 Carbon Loading - Bulk Bag* ..... 4
*5.2 Carbon Loading - Vacuum Method* ..... 4
*6.0 Maintenance* ..... 4
*6.1 Extended Shut Down* ..... 4
*6.2 Valve Replacement* ..... 4


## 1.0 GENERAL DESCRIPTION

The liquid series filters utilize fixed bed filtration to treat vapor. The filters employ a variety of medias to remove or catalyze contaminants. Flow through the filter may be either up flow or down flow depending upon the media supplied and the operation parameters. Generally inlet and outlet locations are indicated on the filter and or the filter drawings.

The most common application utilizes activated carbon as the adsorption media. Typically vapor which contains low levels of organic contaminants flows upward through the column of activated carbon where the larger organic molecules adhere to the porous structure of the activated carbon granules. This adsorption begins at the bottom of the "bed" and continues upward as the original adsorptive area becomes saturated.

Complete saturation of the carbon is dependent upon many factors such as contaminant levels, temperature, compounds being adsorbed, humidity, etc. Typically a carbon isotherm has been run on the influent stream to determine the expected rate of consumption of the activated carbon media. When monitoring has determined discharge air no longer meets discharge requirements the carbon will have to be removed and replaced ***(refer to section 5.0)***.

## 2.0 SAFETY CONSIDERATIONS

It is important that the entire O&M manual be read prior to set up and operation of the carbon system. If you have any questions please contact Tetrasolv Filtration at the number listed below or support@tetrasolv.com.

- ***WARNING: Where system pressure may exceed design pressure we strongly recommend the use of a relief device. Exceeding the maximum pressure of the filter could result in catastrophic failure***

COPYRIGHT © 1998 - TETRASOLV, INC. - 484 E. CARMEL DR., SUITE 339 - CARMEL, IN 46032 - PHONE (317) 818-0600

***of the vessel.***

- Always adhere to "lockout/tagout" procedures when servicing the system.

- Wear appropriate safety equipment when operating system.

- ***WARNING: Wet or dry activated carbon preferentially removes oxygen from air. In closed or partially closed containers, oxygen depletion may reach hazardous levels. If workers must enter a container containing carbon, appropriate sampling and work procedures should be followed for potentially low-oxygen spaces - including all applicable federal and state requirements.***

- ***WARNING: High concentrations of certain compounds such as BETX and low concentrations such as ketones, aldehydes, organic acids and sulphur may cause severe temperature rises.***

- Understand the potential hazards of the stream being treated by the system. The activated carbon may contain higher concentrations of the contaminants being adsorbed than is in the influent stream. In addition the carbon may be considered hazardous material and therefore may require specific handling precautions unknown to Tetrasolv Filtration.

## 3.0 INSTALLATION

### 3.1 Shipment

Typically filters are shipped with media installed. However, in certain instances media is shipped to the site to be installed after installation. In very large systems it may be advisable to not install the media until adsorbers have been placed into final position and secured.

### 3.2 Unloading

Refer to the product data sheet for weight information for appropriate sizing information for the equipment to be used.

All components should be lifted either by crane or forklift as designated by the model.

- ***WARNING: Failure to follow the procedures outlined below can result in catastrophic damage to the system.***

**Crane Lift** - If a crane lift is to be used we recommend the following method. A "spreader" equaling 75% of the distance between the opposing lifting eyes on each adsorber should be used to insure proper lifting force direction. Attach an appropriately sized spreader beam and lifting cables to each lift eye of the component. The use of an experienced crane operator and quality equipment is highly recommended.

**Fork-Lift** - When using a forklift we recommend that the fork tubes on the filter be used or a pallet if the unit was shipped on a pallet.

### 3.3 Inspection

Perform the following inspections after un-loading the system. Note any discrepancies and contact TetraSolv immediately.

- Check the vessel exterior for damage which may have occurred during shipment. Inspect the support structures and piping support for damage.

- Inspect the piping system for damage. Insure the valves operate properly. Check installed instruments and instrument installation points for damage.

- If the filters are shipped without carbon visually inspect the interior of the vessel for damaged internals.

- Inspect the carbon discharge, drain and vent valves for damage

### 3.4 Set Up

The filter should be placed on a level concrete pad of appropriate thickness to support the system at it's maximum operational weight. The filter should be secured to the pad using appropriately sized anchor bolts.

Connect the site piping to the filter inlet and outlet connection points. It is important that all piping connected to the filter should be self supported. We also recommend in hard pipe installation that a flexible joint be used to further insulate the filter from vibration and stress.

Connect any gauges and instrumentation shipped

COPYRIGHT © 1998 - TETRASOLV, INC. - 484 E. CARMEL DR., SUITE 339 - CARMEL, IN 46032 - PHONE (317) 818-

loose with the system.

The outlet piping if connected to a stack or vent should be designed to prevent the introduction of water or debris into the adsorber piping. Discharge piping should be sized equal to or greater than the diameter of the system piping or back pressure could occur creating excess pressure drop on the system.

Flowrates greater than 60 cfm / sq ft can produce bed fluidization in vapor phase filters. When this occurs carbon granules can be lifted and propelled out of the carbon bed in up-flow applications. In extreme cases large amounts of carbon can be expelled. If the system will be operating near or greater than the amount stated above please contact Tetrasolv for recommendations.

Carbon filters can be manifold in parallel operation for higher flowrates. Series operation is the preferred method of operation as it provides for the greatest degree of bed utilization.

Vapor conditions such as high humidity and high temperature (> 125° F) can cause inefficient adsorbtion to occur. If these conditions exist contact Tetrasolv for support. Also, any free water or product and debris should be eliminated with a knockout filter prior to the vapor stream entering the system. Many other vapor issues may effect Adsorber operation and we therefore recommend you discuss your specific installation with a representative.

## 4.0 OPERATION

### 4.1 Modes of Operation

With certain applications (2) filters in series flow are utilized. Listed below are typical operational modes.

- Shutdown - Both filters completely off-line and isolated.
- Series Flow - Influent enters primary filter and exits through secondary adsorber (this is the preferred method of operation)
- Isolation Flow - Only one filter is receiving influent. This mode is typically used when the operator is maintaining the off-line filter.
- Parallel Flow - Both filters are receiving the influent as the primary. Flow is split equally between the filters. This mode is used when higher flow rates need to be achieved and contact times are not critical.

### 4.3 Monitoring

Adsorber units only require periodic monitoring if properly installed. The following items may be monitored:

Pressure: Check inlet and outlet pressure. Increase in pressure differential may indicate media breakdown or presence of high moisture. Rapid increase in pressure drop could indicate adsorber failure.

Samples: Inlet and outlet sample points if provided for vapor analysis to determine system performance.

## 5.0 ADSORBER SERVICING

The Adsorber may be serviced on-site using a vacuum removal method. Prior to servicing the unit should be closed off from influent and effluent lines and any electrical devices or connections should be tagged off.

After removal of the spent carbon is complete, it is recommended that the inside of the Adsorber be checked thoroughly and any minor maintenance conducted.

### 5.1 Carbon Loading - Bulk Bag

- ***WARNING - Dry activated carbon generates considerable dust. While activated carbon poses no health risk the dust can cause respiratory irritation and occasional skin rash. Therefore we recommended the use of proper clothing and dust mask during filling operation.***

Hoist the bag over the manway and untie the outer bag exposing the inner chute. Untie the inner chute while clasping it shut. Remain holding the chute and carefully lower the chute into the manway. Un-clasp the chute and allow the carbon to discharge from the sack. The carbon should flow out very quickly and completely. When finished shake the bag and invert the chute into the bag.

If at any time you wish to stop the flow of carbon simply re-grasp the chute up high and cinch. Re-tie the bag.

COPYRIGHT © 1998 - TETRASOLV, INC. - 1200 E. 26TH STREET - ANDERSON, IN 46016 - PHONE (765) 643-3941

### 5.2 Carbon Loading - Vacuum Method

In this method dry-activated carbon will be loaded into to the adsorbers using a vacuum rig. To add the carbon to the filters use the following method:

***WARNING: Due to the low vacuum rating of the VF series adsorbers (< 60" $H_20$) only experienced change-out personnel should attempt this method of re-filling. Exceeding the recommend vacuum rating could lead to failure of the superstructure of the vessel.***

1. Connect a 3" vacuum source to the auxiliary connection of the adsorber to be filled.

2. Install a 16" bolted transfer lid onto the manway opening of the adsorber to be filled.

3. Turn on the vacuum and check for good flow of air through the adsorber. Connect the fill line to the transfer lid and lead enough hose to reach the fresh carbon source (Note: This should be as short of a distance as possible).

4. Begin vacuuming carbon into the adsorber. It is important to note that the loading method is actually conveying and not true vacuum. The hose should contain 1/3 air with the carbon. Closely view the adsorber being filled. If the adsorber is collasping in excessively take less carbon and more air. This is something from experience and cannot be adequately explained here.

5. When transfer is complete the transfer lid should be removed and the carbon in the adsorber should be leveled out to insure even pressure drop across the bed.

6. Close the manway and turn the adsorber back on.

> ***Note: When the system if first started up small amounts of fines may be present in the discharge stream. This is normal and should discontinue within a short period of time.***

## 6.0 MAINTENANCE

### 6.1 Extended Shutdown

If the system is to be shutdown for extended period of time it is recommended that the valve be placed in shutdown mode and the system water drain valve be left open.

Monitor the system closely after extended shutdown for signs of potential problems such as interior manifold failure or leaking valves and gaskets.

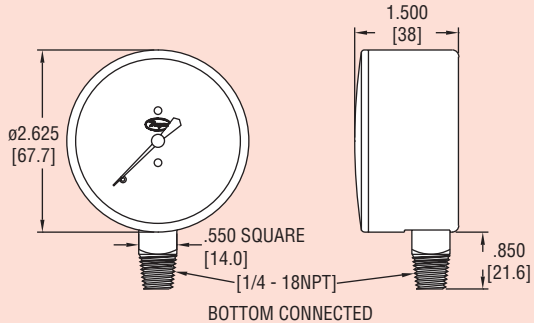
COPYRIGHT © 1998 - TETRASOLV, INC. - 484 E. CARMEL DR., SUITE 339 - CARMEL, IN 46032 - PHONE (317) 818-

Series LPG4

# 2.5" Low Pressure Gage

## 1.5% Full Scale Accuracy in a 2-1/2" Gage






Our **Series LPG4** gages offer top of the line performance and accuracy for pressure and vacuum applications up to and including 160 in w.c. The LPG4 is constructed from a single beryllium-copper diaphragm affixed to a precision-machined brass plate. This innovative design, together with a high-precision, milled-teeth brass movement and nickel-silver pinion and bearing surface, provide the user with a top of the line low pressure instrument.

**SPECIFICATIONS**

**Service:** Compatible gases & liquids.
**Wetted Materials:** Brass and beryllium copper.
**Housing:** Drawn steel, black finish.
**Lens:** Polycarbonate (removable).
**Accuracy:** ±1.5% full scale.
**Pressure Limit:** 100% of range scale.

**Temperature Limits:**
Process: -40 to 160°F (-40 to 70°C);
Ambient: -40 to 140°F (-40 to 60°C).
**Size:** 2.5" (63 mm).
**Process Connections:** 1/4" male NPT.
**Enclosure Rating:** NEMA 3 (IP55).
**Weight:** 7.3 oz (0.21 kg).

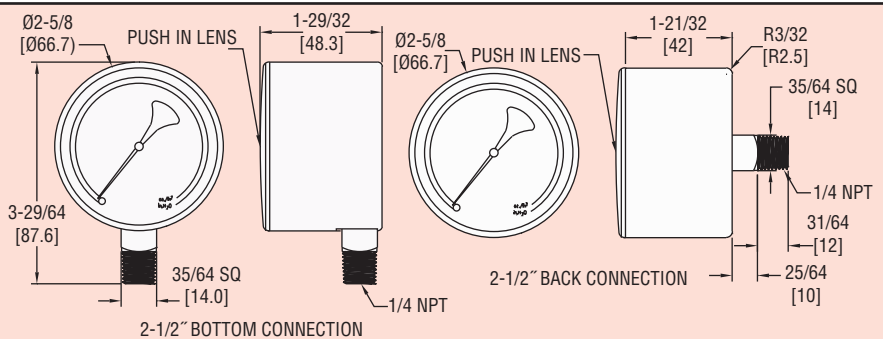
| Model | Range | Model | Range |
|---|---|---|---|
| **LPG4-D7122N** | -10-0 in. w.c. (-2.5-0 kPa) | **LPG4-D8322N** | 0-40 in. w.c. (0-10 kPa) |
| **LPG4-D7222N** | -16-0 in. w.c. (-4-0 kPa) | **LPG4-D8422N** | 0-60 in. w.c. (0-15 kPa) |
| **LPG4-D7322N** | -25-0 in. w.c. (-6-0 kPa) | **LPG4-D8522N** | 0-80 in. w.c. (0-20 kPa) |
| **LPG4-D7422N** | -40-0 in. w.c. (-10-0 kPa) | **LPG4-D8622N** | 0-100 in. w.c. (0-25 kPa) |
| **LPG4-D7522N** | -60-0 in. w.c. (-15-0 kPa) | **LPG4-D8722N** | 0-160 in. w.c. (0-40 kPa) |
| **LPG4-D7622N** | -80-0 in. w.c. (-20-0 kPa) | **LPG4-D8922N** | -4-0-6 in. w.c. (-1-0-1.5 kPa) |
| **LPG4-D7722N** | -100-0 in. w.c. (-25-0 kPa) | **LPG4-D9022N** | -6-0-10 in. w.c. (-1.5-0-2.5 kPa) |
| **LPG4-D7822N** | -160-0 in. w.c. (-40-0 kPa) | **LPG4-D9122N** | -8-0-16 in. w.c. (-2-0-4 kPa) |
| **LPG4-D7922N** | -235-0 in. w.c. (-60-0 kPa) | **LPG4-D9222N** | -16-0-24 in. w.c. (-4-0-6 kPa) |
| **LPG4-D8022N** | 0-10 in. w.c. (0-2.5 kPa) | **LPG4-D9322N** | -24-0-40 in. w.c. (-6-0-10 kPa) |
| **LPG4-D8122N** | 0-15 in. w.c. (0-3.75 kPa) | **LPG4-D9422N** | -30-0-50 in. w.c. (-7.5-0-14.5 kPa) |
| **LPG4-D8222N** | 0-25 in. w.c. (0-6 kPa) | **LPG4-D9522N** | -40-0-60 in. w.c. (-10-0-0.15 kPa) |

Series LPG3

# Low Pressure Gage

## 1% Full Scale Accuracy in a 2-1/2″ Gage






**Series LPG3 Low Pressure Gages** are designed to be especially sensitive with an elastic element that expands and contracts with very small changes in pressure for ASME Grade 1A accuracy. This series is meant for the measurement of low pressures of gases and liquids and is ideal for air flow indicators, liquid level indicators and draft gages. Our new low pressure gages are available in 2-1/2″ dial with either a bottom or back connection option.

| Model<br>Bottom | Range<br>in w.c./oz/in² | Model<br>Back | Range<br>in w.c./oz/in² |
|---|---|---|---|
| LPG3-D8122N | 0-15 (0-8.6 oz/in²) | LPG3-D8142N | 0-15 (0-8.6 oz/in²) |
| LPG3-D8222N | 0-32 (0-18.5 oz/in²) | LPG3-D8242N | 0-32 (0-18.5 oz/in²) |
| LPG3-D8422N | 0-55 (0-32.0 oz/in²) | LPG3-D8442N | 0-55 (0-32.0 oz/in²) |
| LPG3-D8622N | 0-100 (0-58.0 oz/in²) | LPG3-D8642N | 0-100 (0-58.0 oz/in²) |
| LPG3-D8822N | 0-200 (0-116 oz/in²) | LPG3-D8842N | 0-200 (0-116 oz/in²) |
| | **Range psi/kPa** | | **Range psi/kPa** |
| LPG3-D9922N | 0-5 (0-35 kPa) | LPG3-D9942N | 0-5 (0-35 kPa) |
| LPG3-D0022N | 0-10 (0-70 kPa) | LPG3-D0042N | 0-10 (0-70 kPa) |

**SPECIFICATIONS**

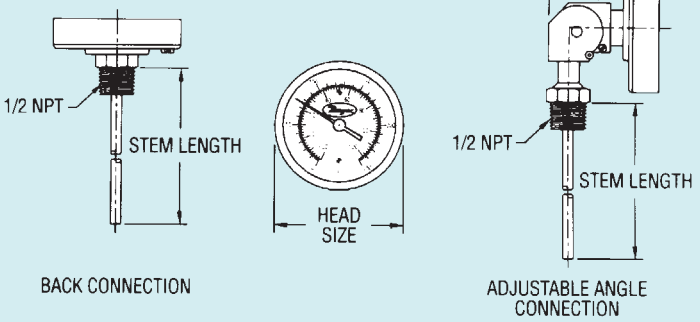
**Service:** Compatible gases and liquids.
**Wetted Materials:** Brass.
**Housing Materials:** Steel with black finish.
**Lens:** Polycarbonate.
**Accuracy:** 1% full scale; ANSI B40.1 Grade 1A.
**Pressure Limit:** 110%.
**Temperature Limits:** -40 to 150°F (-40 to 65°C).
**Size:** 2-1/2″ (63 mm).
**Process Connections:** 1/4″ NPT, bottom or back.
**Weight**: 6.5 oz (184 g).

Series BT

# Bimetal Thermometers

## 2″, 3″ or 5″ Dial, Dual Scale, ±1% FS Accuracy, External Reset




**Series BT Bimetal Thermometers** offer accurate, reliable service even in the toughest environments. These corrosion resistant units are constructed from stainless steel and are hermetically sealed to prevent crystal fogging. The bimetal element directly drives pointer, eliminating gears and linkage. An external reset screw allows field calibration and easy-to-read aluminum dial minimizes parallax error. Choose back connection, lower connection or adjustable angle for easy viewing and installation. Adjustable models can be rotated a full 360° and tilted over a 180° arc. NOTE: When using in pressurized applications, use a suitable thermowell. Bimetal thermometers are commonly used to measure water temperature on chillers and boilers.

**SPECIFICATIONS**
**Wetted Materials:** 304 SS.
**Housing Material:** Series 300SS.
**Lens:** Glass.
**Accuracy:** ±1% full scale.
**Response Time:** ≤ 40 seconds.
**Temperature Limits:** Head: 200°F (93°C); Stem: Not to exceed 50% over-range or 1000°F (538°C) or 800°F (427°C) continuously.
**Process Connection:** 1/4″ NPT on 2″ dial size; 1/2″ NPT on 3″ or 5″ dial size.
**Stem Diameter:** 1/4″ O.D.
**Immersion Depth:** Minimum 2″ in liquids, 4″ in gas.

| Model | Dial Size, Stem Length | Temperature Range, °F(°C) | Degree Div., °F(°C) |
|---|---|---|---|
| **Back Connection** | | | |
| **BTB22551*** | 2″, 2-1/2″ | 0/250 | 2 |
| **BTB2405D** | 2″, 4″ | 0/250 (-20/120) | 2 (2) |
| **BTB2409D** | 2″, 4″ | 200/1000 (100/550) | 10 (5) |
| **BTB32510D** | 3″, 2-1/2″ | 0/200 (-20/100) | 2 (2) |
| **BTB3255D** | 3″, 2-1/2″ | 0/250 (-20/120) | 2 (2) |
| **BTB3257D** | 3″, 2-1/2″ | 50/550 (10/290) | 5 (5) |
| **BTB34010D** | 3″, 4″ | 0/200 (-20/100) | 2 (2) |
| **BTB3405D** | 3″, 4″ | 0/250 (-20/120) | 2 (2) |
| **BTB3407D** | 3″, 4″ | 50/550 (10/290) | 5 (5) |
| **BTB3605D** | 3″, 6″ | 0/250 (-20/120) | 2 (2) |

| Model | Dial Size, Stem Length | Temperature Range, °F(°C) | Degree Div., °F(°C) |
|---|---|---|---|
| **Adjustable Angle Connection** | | | |
| **BTA54010D** | 5″, 4″ | 0/200 (-20/100) | 2 (2) |
| **BTA5405D** | 5″, 4″ | 0/250 (-20/120) | 2 (2) |
| **BTA5407D** | 5″, 4″ | 50/550 (10/290) | 5 (5) |
| **BTA56010D** | 5″, 6″ | 0/200 (-20/100) | 2 (2) |
| **BTA5605D** | 5″, 6″ | 0/250 (-20/120) | 2 (2) |
| **BTA5607D** | 5″, 6″ | 50/550 (10/290) | 5 (5) |
| **Lower Connection** | | | |
| **BTC3255D** | 3″, 2.5″ | 0/250(-20/120) | 2 (2) |

*Model offered in Fahrenheit scale only.

# Measurement - Air Flow Meter

# ROTRON®

## FEATURES

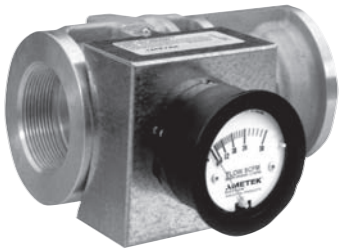
- Direct reading in SCFM
- Low pressure drop (2-4" typical) across the ow meter
- Non-clogging, low impedance air stream
- Light weight aluminum
- No moving parts
- Large easy-to-read dial
- Accurate within 2% at standard conditions
- Good repeatability
- Available in 2", 3" and 4" sizes
- Factory con gured for quick installation
- .048" Allen key supplied for gauge adjustment

## OPTIONS

- Corrosion-resistant version with Chem-Tough ™ or in stainless steel
- FDA-approved Food Tough™ surface conversion

## BENEFITS

- OPTIMIZE SYSTEM EFFICIENCY
  Measuring the correct air ow can assist you in ne-tuning to your system's optimal e ciency.
- BALANCE MULTI-PIPING SYSTEMS
  When evacuating CFM from more than one pipe, di erent run lengths or end system impedance can cause one pipe to handle more CFM than the other. With an accurate CFM reading, piping can be balanced by bleeding air in/out or by creating an extra impedance.
- DETECT CHANNELING OR PLUGGING
  For systems in which channeling or plugging can occur, a change in the CFM measured can help indicate the unseen changes in your system.



| | | Part/Model Number | | | | | |
|---|---|---|---|---|---|---|---|
| | | FM20C030Q | FM20C045Q | FM20C065Q | FM20C125Q | FM20C175Q | FM20C225Q |
| Specification | Units | 550599 | 550600 | 550601 | 550602 | 550603 | 550604 |
| Flow Rate | CFM | 2 | 2 | 2 | 2 | 2 | 2 |
| | m3/hr | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Threads B | - | 6-30 | 9-45 | 13-65 | 25-125 | 35-175 | 45-225 |
| Dimension C | Inches | 7.18 | 7.18 | 7.18 | 7.18 | 7.18 | 7.18 |
| | mm | 182.4 | 182.4 | 182.4 | 182.4 | 182.4 | 182.4 |
| Dimension D | Inches | 7.0 | 7.0 | 7.0 | 5.8 | 5.8 | 5.8 |
| | mm | 177.8 | 177.8 | 177.8 | 147.3 | 147.3 | 147.3 |
| Dimension E | Inches | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| | mm | 50.8 | 50.8 | 50.8 | 50.8 | 50.8 | 50.8 |
| Dimension F | Inches | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 |
| | mm | 95.3 | 95.3 | 95.3 | 95.3 | 95.3 | 95.3 |

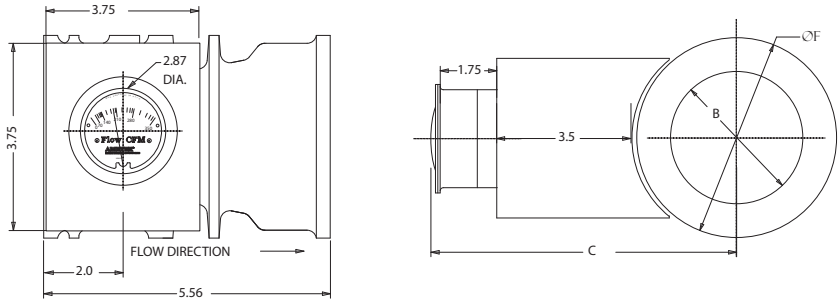
| | | Part/Model Number | | | | | |
|---|---|---|---|---|---|---|---|
| | | FM30C250Q | FM30C350Q | FM30C475Q | FM40C450Q | FM40C600Q | FM40C850Q |
| Specification | Units | 550605 | 550606 | 550607 | 550608 | 550609 | 550610 |
| Flow Rate | CFM | 2 | 2 | 2 | 2 | 2 | 2 |
| | m3/hr | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Threads B | - | 50-250 | 70-350 | 95-475 | 90-450 | 120-600 | 170-850 |
| Dimension C | Inches | 7.18 | 7.18 | 7.18 | 7.18 | 7.18 | 7.18 |
| | mm | 182.4 | 182.4 | 182.4 | 182.4 | 182.4 | 182.4 |
| Dimension D | Inches | 7.0 | 7.0 | 7.0 | 5.8 | 5.8 | 5.8 |
| | mm | 177.8 | 177.8 | 177.8 | 147.3 | 147.3 | 147.3 |
| Dimension E | Inches | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| | mm | 50.8 | 50.8 | 50.8 | 50.8 | 50.8 | 50.8 |
| Dimension F | Inches | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 |
| | mm | 95.3 | 95.3 | 95.3 | 95.3 | 95.3 | 95.3 |

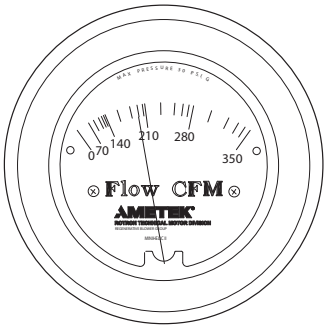
*This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.*

**AMETEK TECHNICAL & INDUSTRIAL PRODUCTS**
**75 North Street, Saugerties, NY 12477**
**USA: +1 215-256-6601 - Europe: +44 (0) 845 366 9664 - Asia: +86 21 5763 1258**
**Customer Service Fax: +1 215.256.1338**
**www.ametektip.com**

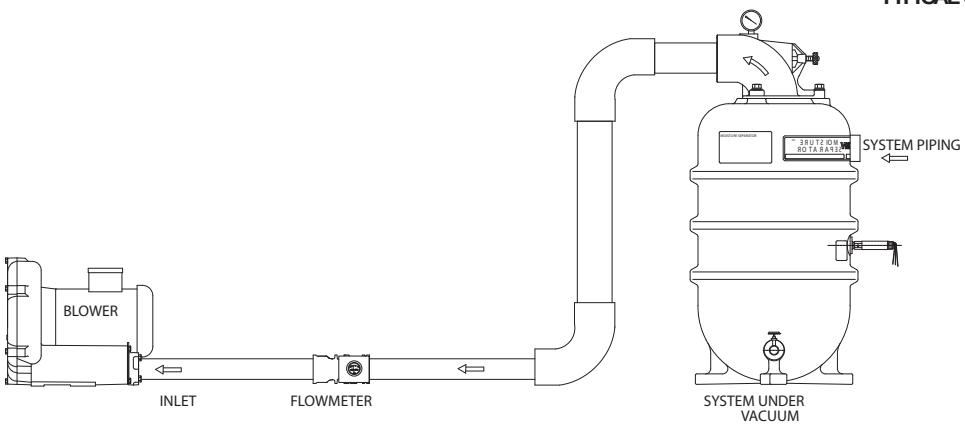
# ROTRON®

## TYPICAL FLOW METER ARRANGEMENT




**TYPICAL GAUGE FACE**




## HIGH TEMPERATURE/PRESSURE CORRECTION

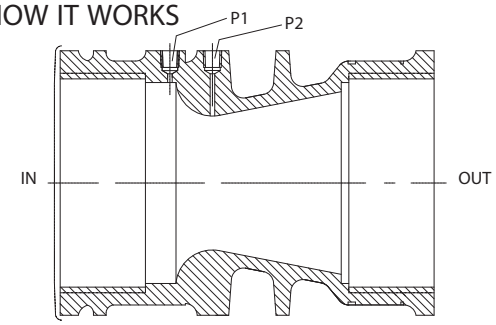
$$SCFM_2 = \frac{SCFM_1}{\sqrt{\left(\frac{14.7}{Pf_2}\right) \times \left(\frac{530}{Tf_2 + 460}\right)}}$$

$Pf_2$ = Absolute Pressure in PSIA

$Tf_2$ = Temperature in °F

- Use on inlet to limit need to correct for high pressure or elevated outlet temperature
- Standard model limits = 140°F and 30 PSIG

## HOW IT WORKS




ROTRON'S ow meter is a venturi style design. After air enters the inlet, the pressure is measured in the P1 tap. The second tap, P2, measures the pressure at the throat. The di erential between P1 and P2 registers across a special calibrated CFM gauge to provide accurate readings. The throat is then expanded back to the original size to keep pressure loss to under 2-4 IWG.

*This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.*

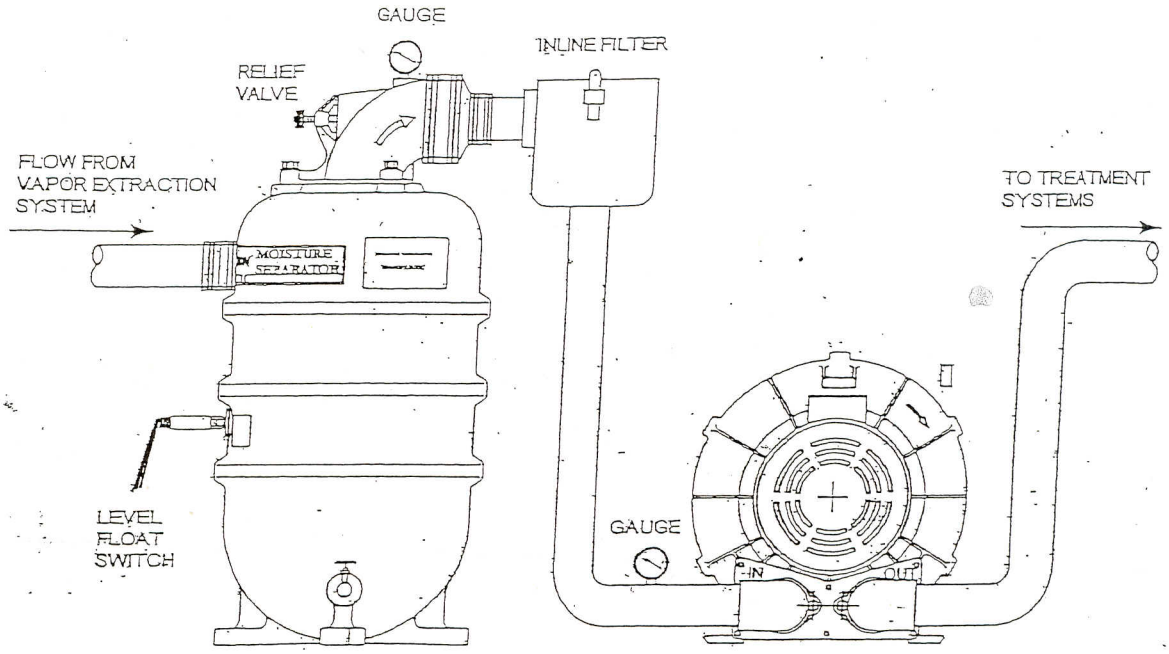
**AMETEK TECHNICAL & INDUSTRIAL PRODUCTS**
**75 North Street, Saugerties, NY 12477**
**USA: +1 215-256-6601 - Europe: +44 (0) 845 366 9664 - Asia: +86 21 5763 1258**
**Customer Service Fax: +1 215.256.1338**
**www.ametektip.com**



AMETEK® TECHNICAL & INDUSTRIAL PRODUCTS

Note: A moisture separator is not a substitute for an inline air filter. A Rotron inline filter should be used to remove particles that pass through the separator.

## *Typical Vapor Extraction System*




## *Operation*

Moisture-laden air enters the separator through the tangential inlet. Cyclonic action removes free moisture from the air stream and allows the air to discharge through the top of the separator. When the separator is full, the float valve shuts off the air flow through the separator, and the relief valve opens to limit the vacuum of the blower.

To drain the separator, turn off the blower and open the drain valve at the bottom of the separator. Caution: The liquid contained in the separator should be analyzed before it is released back into the environment. It may be considered hazardous waste in certain geographical areas and require special treatment/disposal. Once the liquid is drained, the unit can be reset by turning the blower back on.

Automatic draining options are at the discretion of the customer.

## *Maintenance*

This MS series moisture separator has been designed to require minimal maintenance. During normal operation a layer of sludge may build up on the bottom of the separator. As necessary, the top assembly of the moisture separator should be removed and the inside cleaned out with water. Keeping the inside clean will prevent the valve from becoming clogged with sediment. The relief valve should be inspected upon emptying the separator and readjusted (per installation instruction 5) upon restart.

If you have any questions regarding this product, contact your local sales representative or our Application Engineering Department at the factory.

SENSAPHONE®

# *Model 400*

## *User's Manual*

Version 1.3

Every effort has been made to ensure that the information in this document is complete, accurate and up-to-date. PHONETICS, Inc. assumes no responsibility for the results of errors beyond its control. PHONETICS, Inc. also cannot guarantee that changes in equipment made by other manufacturers, and referred to in this manual, will not affect the applicability of the information in this manual.

Copyright © 2006 by Phonetics, Inc., d.b.a. Sensaphone®

First Edition, version 1.3, April, 2010

Written and produced by Sensaphone.

Please address all comments on this publication to:

SENSAPHONE

901 Tryens Road

Aston, PA 19014

www.sensaphone.com

Sensaphone® is a registered trademark of Phonetics, Inc.

Touch-Tone™ is a registered trademark of AT&T.

## IMPORTANT SAFETY INSTRUCTIONS

Your Model 400 has been carefully designed to give you years of safe, reliable performance. As with all electrical equipment, however, there are a few basic precautions you should take to avoid hurting yourself or damaging the unit:

- Read the installation and operating instructions in this manual carefully. Be sure to save it for future reference.
- Read and follow all warning and instruction labels on the product itself.
- To protect the Model 400 from overheating, make sure all openings on the unit are not blocked. Do not place on or near a heat source, such as a radiator or heat register.
- Do not use your Model 400 near water, or spill liquid of any kind into it.
- Be certain that your power source matches the rating listed on the AC power transformer. If you're not sure of the type of power supply to your facility, consult your dealer or local power company.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- Do not overload wall outlets and extension cords, as this can result in the risk of fire or electric shock.
- Never push objects of any kind into this product through ventilation holes as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock.
- To reduce the risk of electric shock, do not disassemble this product, but return it to Sensaphone Customer Service, or other approved repair facility, when any service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the unit is subsequently used.
- If anything happens that indicates that your Model 400 is not working properly or has been damaged, unplug it immediately and follow the procedures in Appendix F for having it serviced. Return the unit for servicing under the following conditions:

1. The power cord or plug is frayed or damaged.
2. Liquid has been spilled into the product or it has been exposed to water.
3. The unit has been dropped, or the cabinet is damaged.
4. The unit doesn't function normally when you're following the operating instructions.

- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

## CAUTION

To Reduce the Risk of Fire or Injury to Persons, Read and Follow these Instructions:

1. Use only the following type and size batteries:
   Alkaline, size C.
2. Do not dispose of the batteries in a fire. The cell may explode. Check with local codes for possible special disposal instructions.
3. Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
4. Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
5. Do not mix old and new batteries in this product.

## FCC Requirements

Part 68: The Sensaphone® Model 400 complies with Part 68 of the FCC rules. On the back of the unit there is a label that contains, among other information, the FCC Registration Number and the Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your local telephone company.

The REN is useful to determine the quantity of devices that you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the RENs of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices that you may connect to your line, you may want to contact your local telephone company to determine the maximum REN for your calling area.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Should the Model 400 cause harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, the telephone company may temporarily discontinue service without notice and you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC. The telephone company may make changes in its facilities, equipment, operations, or procedures where

such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of the FCC that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this equipment, or you need information on obtaining service or repairs, please contact:

PHONETICS, INC.

901 Tryens Road, Aston, PA 19014

610-558-2700  Fax: 610-558-0222

The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

Part 15: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

## Canadian Department of Communications Statement

Notice: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, where the company's inside wiring is associated with a single line, individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100. For the Sensaphone® Model 400, the Load Number is 0.3.

# 1 YEAR LIMITED WARRANTY

PLEASE READ THIS WARRANTY CAREFULLY BEFORE USING THE PRODUCT.

THIS LIMITED WARRANTY CONTAINS SENSAPHONE'S STANDARD TERMS AND CONDITIONS. WHERE PERMITTED BY THE APPLICABLE LAW, BY KEEPING YOUR SENSAPHONE PRODUCT BEYOND THIRTY (30) DAYS AFTER THE DATE OF DELIVERY, YOU FULLY ACCEPT THE TERMS AND CONDITIONS SET FORTH IN THIS LIMITED WARRANTY.

IN ADDITION, WHERE PERMITTED BY THE APPLICABLE LAW, YOUR INSTALLATION AND/OR USE OF THE PRODUCT CONSTITUTES FULL ACCEPTANCE OF THE TERMS AND CONDITIONS OF THIS LIMITED WARRANTY (HEREINAFTER REFERRED TO AS "LIMITED WARRANTY OR WARRANTY"). IF YOU DO NOT AGREE TO THE TERMS AND CONDITIONS THIS WARRANTY, INCLUDING ANY LIMITATIONS OF WARRANTY, INDEMNIFICATION TERMS OR LIMITATION OF LIABILITY, THEN YOU SHOULD NOT USE THE PRODUCT AND SHOULD RETURN IT TO THE SELLER FOR A REFUND OF THE PURCHASE PRICE. THE LAW MAY VARY BY JURISDICTION AS TO THE APPLICABILITY OF YOUR INSTALLATION OR USE ACTUALLY CONSTITUTING ACCEPTANCE OF THE TERMS AND CONDITIONS HEREIN AND AS TO THE APPLICABILITY OF ANY LIMITATION OF WARRANTY, INDEMNIFICATION TERMS OR LIMITATIONS OF LIABILITY.

1. **WARRANTOR**: In this Warranty, Warrantor shall mean "Dealer, Distributor, and/or Manufacturer."

2. **ELEMENTS OF WARRANTY**: This Product is warranted to be free from defects in materials and craftsmanship with only the limitations and exclusions set out below.

3. **WARRANTY AND REMEDY**: One-Year Warranty — In the event that the Product does not conform to this warranty at any time during the time of one year from original purchase, warrantor will repair the defect and return it to you at no charge.

This warranty shall terminate and be of no further effect at the time the product is: (1) damaged by extraneous cause such as fire, water, lightning, etc. or not maintained as reasonable and necessary; or (2) modified; or (3) improperly installed; or (4) misused; or (5) repaired or serviced by someone other than Warrantors' authorized personnel or someone expressly authorized by Warrantor's to make such service or repairs; (6) used in a manner or purpose for which the product was not intended; or (7) sold by original purchaser.

LIMITED WARRANTY, LIMITATION OF DAMAGES AND DISCLAIMER OF LIABILITY FOR DAMAGES: THE WARRANTOR'S OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT, AT THE WARRANTOR'S OPTION AS TO REPAIR OR REPLACEMENT. IN NO EVENT SHALL WARRANTORS BE LIABLE OR

RESPONSIBLE FOR PAYMENT OF ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL AND/OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING BUT NOT LIMITED TO ANY LABOR COSTS, PRODUCT COSTS, LOST REVENUE, BUSINESS INTERRUPTION LOSSES, LOST PROFITS, LOSS OF BUSINESS, LOSS OF DATA OR INFORMATION, OR FINANCIAL LOSS, FOR CLAIMS OF ANY NATURE, INCLUDING BUT NOT LIMITED TO CLAIMS IN CONTRACT, BREACH OF WARRANTY OR TORT, AND WHETHER OR NOT CAUSED BY WARRANTORS' NEGLIGENCE. IN THE EVENT THAT IT IS DETERMINED IN ANY ADJUDICATION THAT THE LIMITED WARRANTIES OF REPAIR OR REPLACEMENT ARE INAPPLICABLE, THEN THE PURCHASER'S SOLE REMEDY SHALL BE PAYMENT TO THE PURCHASER OF THE ORIGINAL COST OF THE PRODUCT, AND IN NO EVENT SHALL WARRANTORS BE LIABLE OR RESPONSIBLE FOR PAYMENT OF ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL AND/OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING BUT NOT LIMITED TO ANY LOST REVENUE, BUSINESS INTERRUPTION LOSSES, LOST PROFITS, LOSS OF BUSINESS, LOSS OF DATA OR INFORMATION, OR FINANCIAL LOSS, FOR CLAIMS OF ANY NATURE, INCLUDING BUT NOT LIMITED TO CLAIMS IN CONTRACT, BREACH OF WARRANTY OR TORT, AND WHETHER OR NOT CAUSED BY WARRANTORS' NEGLIGENCE.

WITHOUT WAIVING ANY PROVISION IN THIS LIMITED WARRANTY, IF A CIRCUMSTANCE ARISES WHERE WARRANTORS ARE FOUND TO BE LIABLE FOR ANY LOSS OR DAMAGE ARISING OUT OF MISTAKES, NEGLIGENCE, OMISSIONS, INTERRUPTIONS, DELAYS, ERRORS OR DEFECTS IN WARRANTORS' PRODUCTS OR SERVICES, SUCH LIABILITY SHALL NOT EXCEED THE TOTAL AMOUNT PAID BY THE CUSTOMER FOR WARRANTORS' PRODUCT AND SERVICES OR $250.00, WHICHEVER IS GREATER. YOU HEREBY RELEASE WARRANTORS FROM ANY AND ALL OBLIGATIONS, LIABILITIES AND CLAIMS IN EXCESS OF THIS LIMITATION.

INDEMNIFICATION AND COVENANT NOT TO SUE: YOU WILL INDEMNIFY, DEFEND AND HOLD HARMLESS WARRANTORS, THEIR OWNERS, DIRECTORS, OFFICERS, EMPLOYEES, AGENTS, SUPPLIERS OR AFFILIATED COMPANIES, AGAINST ANY AND ALL CLAIMS, DEMANDS OR ACTIONS BASED UPON ANY LOSSES, LIABILITIES, DAMAGES OR COSTS, INCLUDING BUT NOT LIMITED TO DAMAGES THAT ARE DIRECT OR INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL, AND INCLUDING ATTORNEYS FEES AND LEGAL COSTS, THAT MAY RESULT FROM THE INSTALLATION, OPERATION, USE OF, OR INABILITY TO USE WARRANTORS' PRODUCTS AND SERVICES, OR FROM THE FAILURE OF THE WARRANTORS' SYSTEM TO REPORT A GIVEN EVENT OR CONDITION, WHETHER OR NOT CAUSED BY WARRANTORS' NEGLIGENCE.

YOU AGREE TO RELEASE, WAIVE, DISCHARGE AND COVENANT NOT TO SUE WARRANTORS, THEIR OWNERS, DIRECTORS, OFFICERS, EMPLOYEES, AGENTS, SUPPLIERS OR AFFILIATED COMPANIES, FOR ANY AND ALL LIABILITIES POTENTIALLY ARISING FROM ANY CLAIM, DEMAND OR ACTION BASED UPON ANY LOSSES, LIABILITIES, DAMAGES

OR COSTS, INCLUDING BUT NOT LIMITED TO DAMAGES THAT ARE DIRECT OR INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL, AND INCLUDING ATTORNEYS FEES AND LEGAL COSTS, THAT MAY RESULT FROM THE INSTALLATION, OPERATION, USE OF, OR INABILITY TO USE WARRANTORS' PRODUCTS AND SERVICES, OR FROM THE FAILURE OF THE WARRANTORS' SYSTEM TO REPORT A GIVEN EVENT OR CONDITION, WHETHER OR NOT CAUSED BY WARRANTORS' NEGLIGENCE, EXCEPT AS NECESSARY TO ENFORCE THE EXPRESS TERMS OF THIS LIMITED WARRANTY.

EXCLUSIVE WARRANTY: THE LIMITED WARRANTY OR WARRANTIES DESCRIBED HEREIN CONSTITUTE THE SOLE WARRANTY OR WARRANTIES TO THE PURCHASER. ALL IMPLIED WARRANTIES ARE EXPRESSLY DISCLAIMED, INCLUDING: THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR USE AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND THE WARRANTY OF NON-INFRINGEMENT AND/OR ANY WARRANTY ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

It must be clear that the Warrantors are not insuring your premises or business or guaranteeing that there will not be damage to your person or property or business if you use this Product. You should maintain insurance coverage sufficient to provide compensation for any loss, damage, or expense that may arise in connection with the use of products or services, even if caused by Warrantors' negligence. The warrantors assume no liability for installation of the Product and/or interruptions of the service due to strikes, riots, floods, fire, and/or any cause beyond Seller's control, further subject to the limitations expressed in any License Agreement or other Agreement provided by Warrantors to purchaser.

The agreement between the Warrantors and the Purchaser, including but not limited to the terms and conditions herein shall not be governed by the Convention for the International Sale of Goods. Where applicable, the Uniform Commercial Code as adopted by the State of Delaware shall apply.

4. **PROCEDURE FOR OBTAINING PERFORMANCE OF WARRANTY**: In the event that the Product does not conform to this warranty, the Product should be shipped or delivered freight prepaid to a Warrantor with evidence of original purchase.

5. **LEGAL REMEDIES AND DISCLAIMER**: Some jurisdictions may not allow, or may place limits upon, the exclusion and/or limitation of implied warranties, incidental damages and/or consequential damages for some types of goods or products sold to consumers and/or the use of indemnification terms. Thus, the exclusions, indemnification terms and limitations set out above may not apply, or may be limited in their application, to you. If the implied warranties can not be excluded, and the applicable law permits limiting the duration of implied warranties, then the implied warranties herein are to be limited to the same duration as the applicable written warranty or warranties herein. The warranty or warranties

herein may give you specific legal rights that will depend upon the applicable law. You may also have other legal rights depending upon the law in your jurisdiction.

6. **CHOICE OF FORUM AND CHOICE OF LAW**: In the event that a dispute arises out of or in connection with this Limited Warranty, then any claims or suits of any kind concerning such disputes shall only and exclusively be brought in either the Court of Common Pleas of Delaware County, Pennsylvania or the United States District Court for the Eastern District of Pennsylvania.

Regardless of the place of contracting or performance, this Limited Warranty and all questions relating to its validity, interpretation, performance and enforcement shall be governed by and construed in accordance with the laws of the State of Delaware, without regard to the principles of conflicts of law.

Effective date 05/01/2004
PHONETICS, INC. d.b.a. SENSAPHONE
901 Tryens Road
Aston, PA 19014
Phone: 610.558.2700 Fax: 610.558.0222
www.sensaphone.com

# *TABLE OF CONTENTS*


**CHAPTER 1: INTRODUCTION . . . . . .17**
**FEATURE SUMMARY . . . . . .18**
**ABOUT THIS MANUAL . . . . . .18**
**LAYOUT . . . . . .19**
**LED INDICATORS . . . . . .19**
**TECHNICAL SUPPORT . . . . . .20**

**CHAPTER 2: INSTALLATION . . . . . .21**
**2.1 OPERATING ENVIRONMENT . . . . . .21**
**2.2 MOUNTING . . . . . .21**
**2.3 POWER SURGE PROTECTION . . . . . .21**
**2.4 POWER SUPPLY AND BATTERY BACKUP . . . . . .22**
**2.5 STARTING THE MODEL 400. . . . . .22**
**2.6 RUN MODE AND STANDBY MODE . . . . . .22**
**2.7 TELEPHONE LINE . . . . . .23**
**2.8 THE MICROPHONE . . . . . .25**
**2.9 ALERT ZONES. . . . . .25**
**2.10 INSTALLING THE SENSOR . . . . . .26**
**2.11 MULTIPLE SENSORS . . . . . .27**
**2.12 OUTDOOR WIRING . . . . . .28**
**2.13 DISCONNECTING THE MODEL 400 FOR STORAGE OR SEASONAL USE. . . . . .29**

**CHAPTER 3: QUICK START . . . . . .31**
**3.1 THE LOCAL KEYPAD . . . . . .31**
**3.2 PREPARATION FOR PROGRAMMING. . . . . .31**
**3.3 QUICK-START PROGRAMMING STEPS . . . . . .32**
**3.4 SUMMARY OF THE ALARM DIAL-OUT PROCESS . . . . . .36**

**CHAPTER 4: COMMUNICATIONS PROGRAMMING . . . . . .39**
**4.1 VOICE MESSAGES. . . . . .39**
**4.2 THE UNIT ID NUMBER. . . . . .42**
4.2.1 Programming the ID Number. . . . . 42
4.2.2 Interrogating the ID Number . . . . . 43

**4.3 DIAL-OUT TELEPHONE NUMBERS . . . . . .43**
4.3.1 Programming Dial-out Telephone Numbers . . . . . 44
4.3.2 Interrogating a Dial-out Telephone Number . . . . . 44
4.3.3 Erasing a Telephone Number . . . . . 45
**4.4 DIAL-OUT TEST MODE. . . . . .46**
4.4.1 To test a dialout phone number:. . . . . 46
4.4.2 Manually Dial a Telephone Number . . . . . 46
**4.5 TONE OR PULSE DIALING . . . . . .47**
**4.6 SPECIAL DIALING . . . . . .47**
4.6.1 Special Dialing Keys . . . . . 48
4.6.2 Incorporating a Pause . . . . . 49
4.6.3 Incorporating a Pound (#) or Star (*). . . . . 51
4.6.4 Special Dialing to a Beeper or Pager . . . . . 52
**4.7 RINGS UNTIL ANSWER. . . . . .53**
4.7.1 Programming Rings Until Answer . . . . . 53
4.7.2 Interrogating Rings Until Answer. . . . . 53
**4.8 TAD (TELEPHONE ANSWERING DEVICE). . . . . .54**
4.8.1 TAD Enable/Disable . . . . . 54
4.8.2 Using the TAD Feature. . . . . 54
4.8.3 No TAD In Use . . . . . 55
**4.9 LISTEN-IN TIME . . . . . .55**
4.9.1 Programming the Listen-in Time. . . . . 55
4.9.2 Interrogating the Listen-in Time. . . . . 56
**4.10 CALL DELAY . . . . . .56**
4.10.1 Programming the Call Delay. . . . . 57
4.10.2 Interrogating Call Delay. . . . . 57
**4.11 LOCAL VOICE MUTE . . . . . .58**
4.11.1 Enable/Disable Local Voice Mute . . . . . 58
**4.12 VOICE REPETITIONS . . . . . .59**
4.12.1 Programming Voice Repetitions. . . . . 59
4.12.2 Interrogating Voice Repetitions . . . . . 60
**4.13 INTERCALL TIME . . . . . .60**
4.13.1 Programming Intercall Time. . . . . 60
4.13.2 Interrogating Intercall Time . . . . . 61
**4.14 MAXIMUM NUMBER OF CALLS (MAX CALLS). . . . . .62**
4.14.1 Programming Max Calls . . . . . 62
4.14.2 Interrogating Max Calls . . . . . 63

**4.15 THE CLOCK . . . . . .63**
4.15.1 Setting the Clock . . . . . 63
4.15.2 Interrogating for the Current Time . . . . . 64
**4.16 THE SECURITY CODE . . . . . .64**
4.16.1 Locking the Keypad . . . . . 65
4.16.2 Unlocking the Keypad . . . . . 65

**CHAPTER 5: ALARM PROGRAMMING . . . .67**
**5.1 ZONE CONFIGURATION . . . . . .67**
5.1.1 Programming Zone Configuration. . . . . 68
5.1.2 Interrogating Zone Configuration . . . . . 69
**5.2 ENABLE/DISABLE ZONES . . . . . .69**
5.2.1 Changing Enabled/Disabled Zone Status . . . . . 69
5.2.2 Verifying Enabled/Disabled Zone Status . . . . . 70
**5.3 ZONE RECOGNITION TIME . . . . . .70**
5.3.1 Programming Zone Recognition Time . . . . . 71
5.3.2 Interrogating Zone Recognition Time . . . . . 72
**5.4 ESTABLISHING HIGH AND LOW TEMPERATURE LIMITS .72**
5.4.1 Programming Temperature Limits for a Selected Zone . . . . . .72
5.4.2 Disabling Alarm Response to High or Low Temperature . 74
5.4.3 Interrogating High and Low Temperature Limits . . . . . 74
**5.5 TEMPERATURE SCALE . . . . . .75**
**5.6 TEMPERATURE CALIBRATION. . . . . .75**
5.6.1 Programming Temperature Calibration. . . . . 75
5.6.2 Interrogating Temperature Calibration . . . . . 76
**5.7 OBTAINING CURRENT TEMPERATURE . . . . . .77**
**5.8 AC POWER MONITORING ENABLE/DISABLE . . . . . .77**
5.8.1 Enabling/Disabling the AC Power Alarm . . . . . 77
**5.9 AC POWER FAILURE RECOGNITION TIME. . . . . .78**
5.9.1 Programming Power Failure Recognition Time. . . . . 78
5.9.2 Interrogating Power Failure Recognition Time . . . . . 79
**5.10 SOUND ALARM MONITORING . . . . . .79**
5.10.1 Programming Sound Alarm Sensitivity. . . . . 80
5.10.2 Interrogating Sound Sensitivity. . . . . 80
5.10.3 Programming High Sound Alarm Recognition Time . . . . . .81
5.10.4 Interrogating High Sound Alarm Recognition Time . . . . . .82
**5.11 HIGH SOUND ALARM ENABLE/DISABLE . . . . . .82**
5.11.1 Changing Enabled/Disabled High Sound Alarm . . . . . 82
**5.12 EXIT DELAY . . . . . .83**
**5.13 DESIGNATING A ZONE AS UNUSED . . . . . .83**

**CHAPTER 6: ACKNOWLEDGMENT, STATUS REPORT & REMOTE ACCESS . . . . . .85**
**6.1 ALARM ACKNOWLEDGMENT . . . . . .85**
6.1.1 Local Acknowledgment . . . . . 85
6.1.2 Touch-Tone™ Acknowledgment . . . . . 85
6.1.3 Callback Acknowledgment . . . . . 86
**6.2 STATUS REPORT . . . . . .87**
6.2.1 Example: Status Report, No Alarms . . . . . 88
6.2.2 Example: Status Report, Existing Alarms . . . . . 88
6.2.3 Example: Status Report, Disabled Zones . . . . . 89
6.2.4 Battery Condition . . . . . 90
6.2.5 Remote Access by Touch-Tone™ Telephone . . . . . 90

**CHAPTER 7: OPERATION . . . . . .95**
**7.1 ALARM DETECTION, DIAL-OUT AND ACKNOWLEDGMENT . . . . . .95**
**7.2 EXAMPLE: A DIAL-OUT TELEPHONE CALL. . . . . .99**

**CHAPTER 8: CONTROLLING THE OUTPUT 101**
**8.1 OUTPUT MODES. . . . . .101**
8.1.1 To program the Output Mode: . . . . . 102
8.1.2 To play back the programmed Output Mode:. . . . . 103
**8.2 SWITCHING THE OUTPUT USING THE KEYPAD. . . . . .103**
8.2.1 Switching the Output Over the Phone . . . . . 103
**8.3 TYPICAL APPLICATIONS . . . . . .104**
8.3.1 Single Thermostat Control . . . . . 104
8.3.2 Dual Thermostat Control . . . . . 106
**8.3.3 CONTROLLING LIGHTS OR OTHER DEVICES . . . . . .108**

**APPENDIX A: WEEKLY TESTING PROCEDURE . . . . . .109**

**APPENDIX B: TROUBLESHOOTING . . . . .111**
Error Messages . . . . . 111
Communications / Dial Out . . . . . 111
Temperature Monitoring . . . . . 114
Sound Level Monitoring . . . . . 115
Other monitoring . . . . . 116

**APPENDIX C: 400 QUICK REFERENCE . . . 119**

**APPENDIX D: ACCESSORIES . . . . . 123**

**APPENDIX E: SPECIFICATIONS . . . . . 125**

Alert Zones . . . . . 125
Microphone . . . . . 125
Phone Interface . . . . . 125
LED Indicator . . . . . 125
Relay Output . . . . . 125
Power Supply . . . . . 126
Environmental . . . . . 126
Physical . . . . . 126

**APPENDIX F: RETURNING THE UNIT FOR REPAIR . . . . . 127**

**APPENDIX G: TEST LOG . . . . . 129**

# CHAPTER 1: INTRODUCTION

The Sensaphone® Model 400 is a fully-programmable, environmental monitoring system that offers extensive on-site and remote monitoring capability to small businesses, private homes, farms, greenhouses, computer rooms, and remote facilities. Designed for desktop or wall mounting, the Model 400 is simple to install, program and operate; no changes to standard electrical or telephone service are required. When connected to a telephone line, it will respond to an alarm by dialing up to four separate telephone numbers. When the call is answered, an "Alert Condition" message is delivered in user recordable voice.

The Model 400 features built-in sensors to monitor a variety of conditions:

- High sound level
- AC electric power failure
- Battery backup
- Temperature*

  ***Note:** While technically not a "built-in" sensor, temperature is factory installed on zone 1.

The 400 is equipped with 4 alert zones. Additional sensors* can be added to extend monitoring capabilities to include:

- Intrusion or unauthorized entry
- Water leaks and seepage
- Temperature
- Humidity
- Equipment operation
- Many other conditions that may require unique monitoring solutions

* Refer to Appendix D for information on additional sensors (available separately from Sensaphone) best suited to your application.

The status of each monitored condition is readily obtained at the unit's installation site, or remotely by telephone. At the close of every Status Report, time is provided for listening to on-site sounds.

To ensure reliable operation, the Model 400 features power backup capability; in the event of AC power failure, six C-cell alkaline batteries (not included) will continue to power the unit for approximately 24 hours.

## FEATURE SUMMARY

The Sensaphone 400 includes the following features:

- Four zones configurable as temperature or dry contact
- Each zone can be individually enabled or disabled
- Fully automatic input configuration
- Temperature sensor included on zone #1
- Calibration for each zone
- Power monitor
- High sound-level monitor
- User-recordable voice messages
- Dial out to four telephone numbers
- Alarm dial out via voice and numeric pager
- Microphone for onsite listen-in
- Built-in line seizure
- Relay output (manual or automatic control)
- Four status LEDs
- Surge protection on all zones, telephone line, and power supply
- 24 hour battery backup (batteries not included)
- Wall or desktop installation

## ABOUT THIS MANUAL

This manual comprises the instructions and commands for installing and operating the Model 400. The Quick Start chapter is included to speed understanding of programming and operation. Communication and Alarm Programming chapters demonstrate step-by-step methods for utilizing the full range of available features. The Troubleshooting chapter provides assistance in the event that problems are encountered.

## LAYOUT




1. Programming Keypad
2. Power Jack
3. Phone Extension Jack
4. Phone Line Jack
5. Speaker
6. Built in Microphone
7. System on LED
8. Phone-in-use LED
9. Alarm LED
10. Battery OK LED
11. Battery Compartment
12. Input/Output Wiring Door

## LED INDICATORS

The LEDs provide on-site alarm and status information. Listed below are descriptions of how the LEDs work.

**System On**

LED Off: Unit is off

LED On: Unit is in Run mode

LED Blinking: Unit is in Standby mode

**Phone-In-Use**

LED On: The unit or some other device is communicating on the phone line

LED Off: Phone line is not in use

LED Blinking: No telephone service detected

**Alarm**

LED Off: No alarms exist

LED Blinking: Unacknowledged alarm exists

LED On: Acknowledged alarm exists

**Battery OK**

LED On: Battery condition good

LED Blinking: Battery condition low

LED Off: No battery/critically low battery condition

## TECHNICAL SUPPORT

If any questions arise upon installation or operation of the Model 400, please contact the Sensaphone Technical Service Department at the number shown below, and have the following information:

- Date of Purchase _____
- Serial number of your Model 400 _____

Technical Support is available from 8:00am to 5:00pm EST.

You may also e-mail us at support@sensaphone.com.

SENSAPHONE
901 Tryens Road
Aston, PA 19014

Phone: 610-558-2700
Fax: 610-558-0222

www.sensaphone.com

# CHAPTER 2: INSTALLATION

Correctly installing the Model 400 will ensure proper functioning of the unit. Please read the entire chapter before starting the installation process.

Within the packaging will be a Warranty Registration Card. Please take the time to fill this out and mail. The One Year Limited Warranty is explained in the front of this manual.

## 2.1 OPERATING ENVIRONMENT

The Model 400 should be installed and operated in a clean, dry area that provides space for wiring sensors to the screw terminals, near an AC power source and telephone line. Operating temperature ranges from 32° Fahrenheit (0° Celsius) to +122° Fahrenheit (+50° Celsius).

> **NOTE:** The Model 400 is a sensitive electronic device. Do not install the Model 400 near strong electrostatic, electromagnetic or radioactive fields. Do not expose to humid environments, fumes, or corrosive vapors.

## 2.2 MOUNTING

Flat Mount: Place the Model 400 on top of a desk or other horizontal surface. Wall Mount: Mount on a wall with two flathead screws using the keyholes on the back panel of the unit. Place the flathead screws or bolts 4” apart at the desired height from the floor. Hook the unit over the screws and toward the floor. Refer to Figure 2-1.

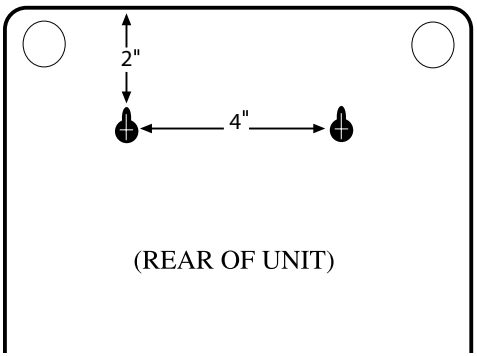



Figure 2-1. Wall Mount

## 2.3 POWER SURGE PROTECTION

The Model 400 can be damaged by power surges and lightning through the telephone line and the 120 VAC power supply. Although the Model 400 has built-in surge protection, we recommend that additional protection be obtained for the unit and for any electronic equipment that is attached

to your power supply and telephone lines. Power surge protection is especially important if you live in a lightning-prone area. The ISOTEL Surge Protector Model IB-4 is available through Sensaphone. See Appendix D.

## 2.4 POWER SUPPLY AND BATTERY BACKUP

The Model 400 is provided with a DC power transformer that will plug into any standard 120 VAC outlet and a battery backup (batteries not included) that enables the unit to continue functioning if AC power is removed (due to electric power disruption or failure). The Model 400 uses six, C-cell alkaline batteries. Do not use rechargeable batteries. Connect the DC power transformer into the jack on the back of the unit and plug the adapator into a 120VAC outlet

**NOTE:** Be sure that the DC transformer is plugged into an outlet before installing batteries.

To install the batteries, remove the battery compartment door located on the front of the unit below the keypad. Press down and slide the door away from the unit, align batteries according to the diagram shown in Figure 2-2, and replace the hatch.

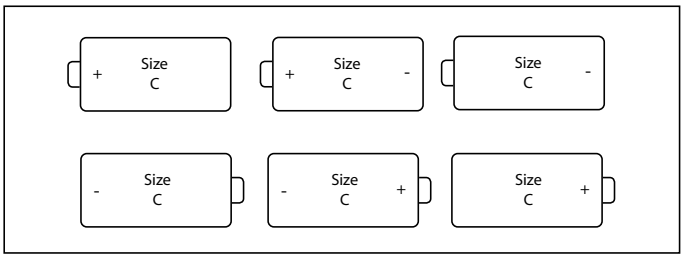



Figure 2-2. Battery Installation

## 2.5 STARTING THE MODEL 400

When the DC power transformer is first plugged into the electrical outlet, the Model 400 automatically starts in RUN mode. The System On light will begin to glow. The unit will respond with,"Hello, this is Sensaphone 400."

## 2.6 RUN MODE AND STANDBY MODE

Pressing the RUN/STANDBY key on the Model 400 keypad will alternately activate or deactivate the unit. If the unit is activated and in RUN mode, the system on light glows steadily. In STANDBY mode, the system on light goes out, but will blink every few seconds to indicate that power is still supplied to the unit.

In RUN mode, the Model 400 is able to receive incoming calls and to dial out automatically in the event of an alarm on one of the monitored conditions. To enter STANDBY mode, press RUN/STANDBY.

As soon as the Model 400 enters STANDBY mode, it responds with "Goodbye." The system on light immediately goes out and then resumes with a blink every few seconds. While in STANDBY mode, all functions are disabled, but programmed memory is preserved. Upon exiting STANDBY mode, any currently existing alarms will be announced.

> **NOTE:** STANDBY mode is not equivalent to "power off"—an electrical source, such as the 120 VAC, or the battery backup, continues to provide full power to the unit. If the unit is placed in STANDBY mode, unplugged from the 120 VAC outlet, and placed in storage, the batteries will continue to power the Model 400, discharging until they fail. Consequently, batteries should always be removed from the unit following disconnection from any 120 VAC outlet, prior to storage.

Press the RUN/STANDBY key again to return to RUN mode.




Figure 2-3. The RUN/STANDBY Key

## 2.7 TELEPHONE LINE

The Model 400 will operate with all standard analog telephone lines that accept pulse or tone dialing. The Model 400 cannot be used on an extension line to dial its own telephone number. Also, it may not be installed on a party line, pay telephone line, or digital telephone system.

Certain private telephone systems and public switching equipment may not accept the Model 400 dialing or may generate an unacceptable ring signal. In those cases, a dedicated line may be required. Consult the supplier of your telephone system if you encounter problems.

If you do not have a modular telephone extension at the Model 400's location, you must contact your local telephone company to have one installed (there is a charge for this service). If you have four-pin jacks, adapters are available to convert them to the modular plugs. Contact your local telephone company or electronics parts store.

> **CAUTION:** Never install telephone wiring during a lightning storm. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines.

To install the telephone line, plug one end of the modular cord into the "line" jack on the back of the model 400 (as shown) and plug the other end into any standard RJ11 phone outlet.

Refer to Figure 2-4.

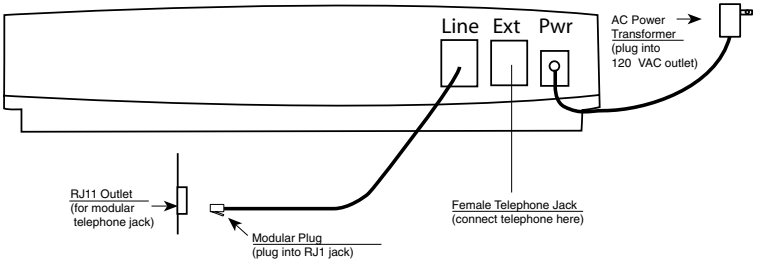
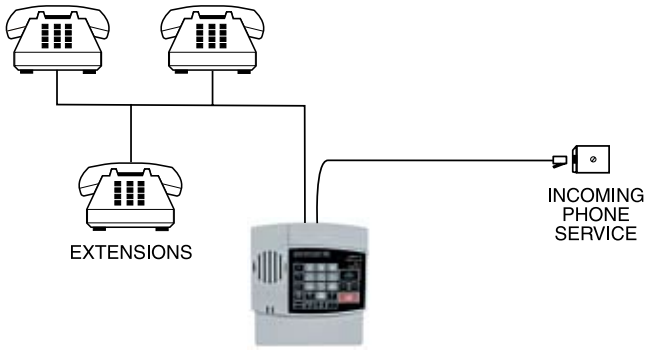



Figure 2-4. Installing the Telephone Line

On the back of the Model 400 is an extra female telephone jack labeled "EXT". This is provided so that a telephone or other answering device may be used on the same line as the unit. (It is not necessary to hook up a telephone for the Model 400 to operate.) This extension jack features Line Seizure which means that it will disconnect the extension jack when the Model 400 needs to make a telephone call. To ensure that the unit has priority over any other device on the line, you must connect all extensions to this jack. (see figure)

On the unit there are two RJ11C phone jacks:

- The RJ11C jack labeled "LINE"is to be connected to the incoming line of your phone service, ahead of all other phones or telephone extensions.
- The RJ11C telephone jack labeled "EXT" is to be connected to all extensions.



## 2.8 THE MICROPHONE

The Model 400 is provided with a built-in microphone which is used to monitor high sound levels produced near the installation site. The sensitivity of the microphone is configurable and will detect a continuous as well as a pulsating alarm. Note that beeping alarms that have a half second or more of silence between beeps will not be detected.

Other programming options that apply to the microphone include setting the length of time before a high sound causes an alarm.

If this sound level exists for 8 consecutive seconds (default) or for the programmed length of time, the Model 400 will dial out with an alarm message.

> **NOTE:** The proximity of the audible alarm to the microphone is extremely important.

Normally, the Model 400 and the audible alarm must be in the same room. The maximum distance can vary considerably depending on the alarm, the acoustics, and the size of the room.

During an alarm dial-out, the microphone allows four-second intervals to listen-in to sounds at the Model 400's location.

When calling for a Status Report, the microphone permits listening to on-site sounds for a programmed time interval.

## 2.9 ALERT ZONES

Open the input/output wiring door located above the keypad.The Model 400 can monitor up to 4 zones (represented by the numbered terminal screws shown in Figure 2-5, below).

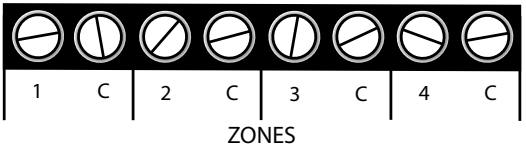



Figure 2-5 Alert Zones

Zones are configured as either dry contact or temperature. A zone configured as dry contact can be used with any normally open (N.O.) or normally closed (N.C.) device. "Open" refers to an opened circuit path; if conditions cause the circuit to close, an alert condition occurs. "Closed" refers to a continuous circuit path; if a closed circuit is opened, an alert condition occurs. The Model 400 determines the way zones are configured by the type of sensor connected to each alert zone (refer to Chapter 5.)

A zone configured as "temperature" is designed to evaluate a range of settings. The Model 400 will read the temperature at the sensor's loca-

tion and compare that value to programmed high and low temperature limits. Temperature zones must be used with Sensaphone's 2.8K Remote Temperature Sensor or weatherproof sensor.

> **NOTE:** Before wiring, it is advisable to disable the zones to prevent accidentally tripping an alarm. See Chapter 5.

**Important Note regarding Ultra-Low temperature freezers:**
If you are connecting the Sensaphone to an ultra low temperature freezer (-80° C) and the freezer is equipped with alarm terminals/contacts you can connect these directly to one of the zones on your Sensaphone (refer to your freezer owner's manual for proper connection).

## 2.10 INSTALLING THE SENSOR

After you have selected the sensor, loosen the screw of the alert zone and its corresponding common (c). Two wire leads are used to connect any monitoring sensor. Fasten one lead to the numbered screw and the other lead to C. Tighten both screws. If the zone was not disabled, the Model 400 may recite its "Alarm Exists" message as you connect the sensor. If it does, just press ALARM CANCEL to stop it. Re-enable the zone after wiring. Refer to Figures 2-6 and 2-7 for connecting a sensor to an alert zone.

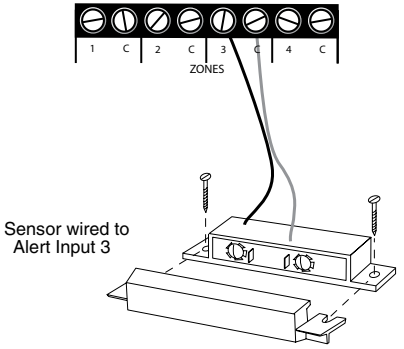



Figure 2-6. Sensor Connected to an Alert Zone

Any sensor can be attached to the Model 400 using 18-26-gauge wire (#22 recommended). The sensor can be several hundred feet from the unit, as long as the total resistance of the circuit is not greater than 50 ohms. Use wire appropriate for the application.

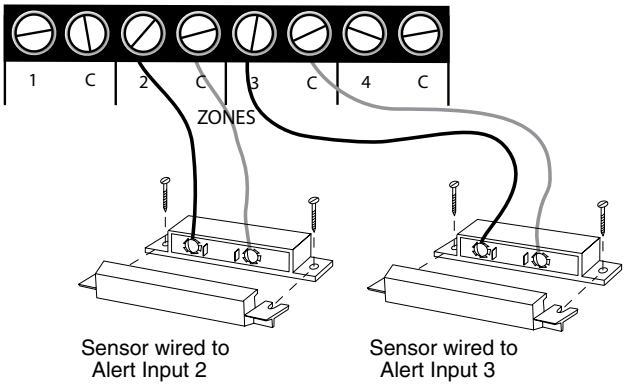



Figure 2-7 Two Sensors Wired to Adjacent Zones

**NOTE:** Do not use sensors, switches, or relays that supply any voltage or current to the Model 400. Be aware of proximity to other electrical wires or components when placing wires that lead from the sensors to the unit. Avoid running the wires near electrical devices that use high voltage or current, such as motors, heavy machinery, etc. This voltage may be inductively coupled into the sensor wiring and could result in damage to the the Model 400's circuitry. Try to place wires at least 6 inches from other electrical wiring or devices.

## 2.11 MULTIPLE SENSORS

The Model 400 may have more than one sensor connected to the same alert zone, as long as the normal condition for each sensor on the same alert zone is identical (either all N.O. or all N.C.). However, only one remote temperature sensor can be used on each zone.

When wiring several normally closed sensors on one zone, they must be connected in series. Connect one lead from the first sensor to the numbered screw of the alert zone. Next, take the other lead from the first sensor and connect it to one lead from the next sensor. Continue connecting sensors end-to-end until you have connected all of your sensors. Take the second lead from the last sensor and connect it to the common screw on the Model 400. See Figure 2-8. Multiple N.C. sensors are typically magnetic reed switches to monitor the security of windows and doors.

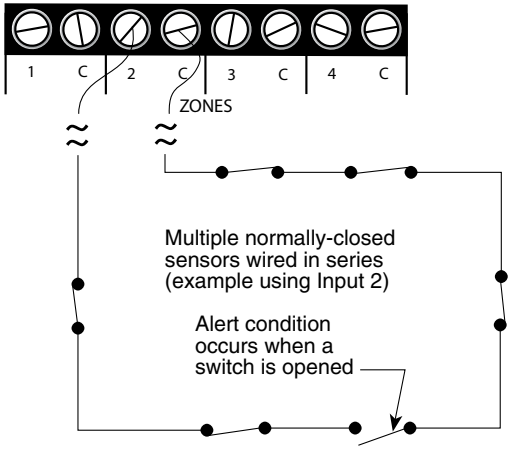



Figure 2-8. Multiple Normally Closed Sensors

To wire several normally open sensors to one alert zone, connect them in parallel. To do this, take one lead from each sensor and attach it to the numbered terminal. Then, take the second lead from each sensor and attach each to the corresponding common screw. Refer to Figure 2-9.

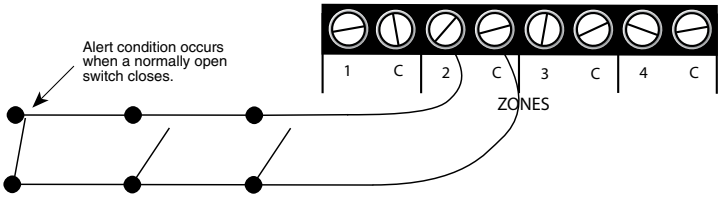



Figure 2-9 Multiple Normally Open Sensors

## 2.12 OUTDOOR WIRING

When wiring sensors outdoors, DO NOT allow exposed wires to run freely in open air; under such conditions, the Model 400 is susceptible to serious damage during a lightning storm. Depending upon the distance outdoor wiring must travel, consideration should be given to the use of shielded wire inside a metal conduit. Both shield and conduit should be connected to an earth ground. This prevents stray voltage from entering the unit.

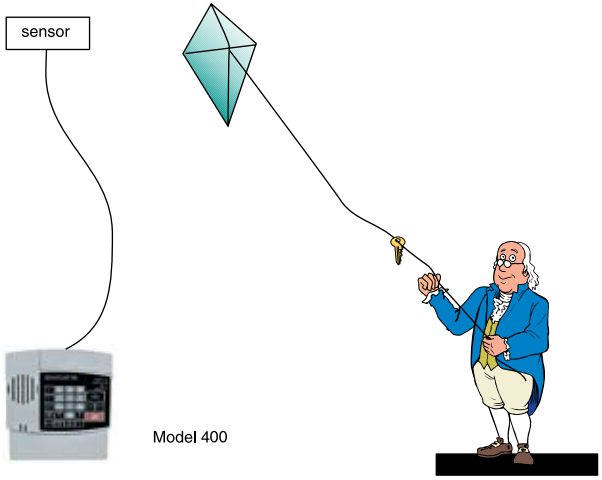



Figure 2-10. Potential Sensor Damage from Stray Electrical Noise

## 2.13 DISCONNECTING THE MODEL 400 FOR STORAGE OR SEASONAL USE.

If you plan to employ the Model 400 as a seasonal "watchdog" for a few months during the year, you must disconnect all wires from the unit completely to avoid damage to the circuitry when the unit is not in use. If the unit is unplugged but left in place with all the sensors still connected, the wires act as antennae that draw in any stray "electrical noise" from such devices as fans, blowers, microwaves, etc.

Additionally, it is important to remove the batteries, or they will discharge until they fail.

Preserve your Model 400 during the off-season, or when not in use:

- Remove the sensor wires at the screw terminals
- Remove the batteries
- Unplug the unit and store in a safe place

# CHAPTER 3: QUICK START

This section presents a useful guide for first-time programming of the Model 400. Follow instructions for installation before attempting to program the Model 400. Refer to Chapter 2: Installation.

## 3.1 THE LOCAL KEYPAD

Programming is accomplished using the local keypad (shown below, Figure 3-1). Notice that a single key has several functions assigned to it; programming results are determined by the order in which keys are pressed.

Individual keystrokes are illustrated to show programming steps in the correct order. If you make a mistake by entering the wrong key, do not press another key until you hear the message "Error 1." Then, start over with the first key in the programming sequence.

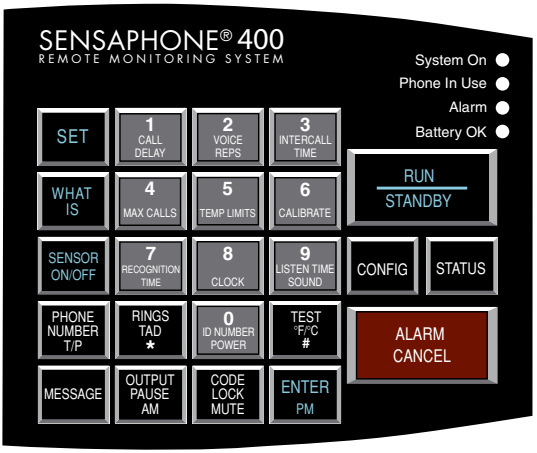



Figure 3-1. The Model 400 Keypad

## 3.2 PREPARATION FOR PROGRAMMING

Read complete instructions in Chapter 2: Installation, and make sure to follow these three steps first:

1. Plug the AC adapter into the 120 VAC outlet.

2. Install the batteries.

3. Connect the Model 400 to a telephone line.

When these steps are completed, the Model 400 is fully operational and able to monitor temperature, high sound, AC power failure and battery backup condition; it can also be called on the telephone for a Status Report or be used for listening to on-site sounds from any remote location. Now, the unit is ready for programming.

## 3.3 QUICK-START PROGRAMMING STEPS

**STEP 1: SET CONFIGURATION OF ZONES**

The Model 400 will scan the 4 external zones and determine if they are N.O. (normally open), N.C. (normally closed), or Temperature. If external sensors are added, make sure they are in their normal positions before proceeding—refer to Chapter 5, Section 5.1.

1. Press STANDBY to place the Model 400 in Standby mode.




2. If you have external sensors available, wire the sensors to the zones on the back of the Model 400 (see Chapter 2, Section 2.10). Otherwise, skip this step and move to step 3.
3. Press RUN. The System On light glows when the Model 400 returns to Run mode.




4. Press SET.




5. Press CONFIGURE.




6. The Model 400 will audibly recite the new configuration for each of the four zones, responding with "normally open", "normally closed", or "Temperature." If a zone is unused, it is treated as normally open.

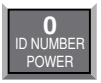
**STEP 2: SET THE ID NUMBER**

It is recommended that you set the ID number to reflect the telephone number on which the Model 400 is installed.

1. Press SET




2. Press ID NUMBER.



3. Using the number keys, enter the digits (up to 16 are permitted) for the ID number. The Model 400 will recite the digits as they are pressed.




4. Press ENTER. The 400 will respond: "Okay."




**STEP 3: SET DIAL-OUT TELEPHONE NUMBERS**

To program dial-out telephone numbers:

1. Press SET.




2. Press PHONE NUMBER.




3. Select which telephone number to program. Press any unassigned number key (from 1 to 8) to represent the new telephone number entry. Model 400 will respond: "Enter number."



4. Enter the complete telephone number using the number keys.

The Model 400 will recite the digits as they are pressed.




5. Press ENTER. The unit will respond: "Okay."




6. Repeat above procedure to program up to four separate telephone numbers.

**STEP 4: SET TEMPERATURE LIMITS**

High and low temperature limits can be separately programmed for each zone that is configured as temperature. Limits can range from –20° to +150°F, or from –30° to 65°C. Default settings are: 10° F for low temperature and 100° F for high temperature. Do not set temperature limits too close to normal room temperature, since minor fluctuations could result in frequent and unnecessary alarm dialouts.

1. Press SET.




2. Press TEMP LIMITS.




3. Using the number keys, press a number (from 1 to 4) that corresponds to the temperature zone being programmed.



The Model 400 responds: “Enter low temperature limit.”

4. Using the number keys, enter a value for low temperature limit. The Model 400 will recite the digits as they are pressed. If a negative number is required, first press *, then enter the number.




5. Press ENTER.




The Model 400 responds: “Enter high temperature limit.”

6. Using the number keys, enter the value for high temperature limit. The Model 400 will recite the digits as they are pressed.




7. Press ENTER. The Model 400 responds: “Enter.”




This concludes minimum programming to achieve normal operation of the Model 400. In addition to the programming just accomplished, default settings for many more features take effect when the unit is first powered. You will be able to reprogram most of these factory-set defaults to suit your application.

For a complete explanation of each feature (with illustrations of key-strokes), refer to Chapter 4: Communications Programming and Chapter 5: Alarm Programming.

To gain a basic understanding of how the alarm dial-out feature works, refer to this chapter, Section 3-4. For extended information regarding dial-out and related programmable parameters, refer to Chapter 7: Operation.

## 3.4 SUMMARY OF THE ALARM DIAL-OUT PROCESS

| Action—Response | Programmable Feature |
|---|---|
| **1. THE MODEL 400 DETECTS AN ALERT CONDITION**<br>An alert condition is not the same as a valid alarm—the condition must continue for the programmed time period, or ***Recognition Time***, before it is recognized as a valid alarm. | • **Recognition Time**<br>This is the programmed waiting period to determine if an alert condition has persisted long enough to be considered a valid alarm. If the sensor returns to normal within recognition time, then no alarm will occur. |
| **2. A VALID ALARM IS CONFIRMED**<br>An audible, on-site alarm message begins and continues until the alarm is acknowledged. (If the Mute feature is turned on, there is no on-site message.) ***Call Delay*** is activated. | • **Call Delay**<br>This is the programmed waiting period, before the first telephone number is called, to report an alarm. |
| **3. DIAL-OUT BEGINS**<br>Dial-out begins by calling telephone number 1 to report an alarm.<br>If there is no acknowledgment, the Model 400 waits the programmed ***Intercall Time*** before dialing subsequent telephone numbers. Dial-out continues in this manner, cycling through the remaining telephone numbers, for the programmed ***Max Calls***. | • **Intercall Time**<br>This is the programmed waiting period, in between sequential dialing of telephone numbers, to report an alarm. |

| | |
|---|---|
| **4. THE ALARM IS ACKNOWLEDGED**<br>When the alarm is acknowledged, the dial-out process is cancelled and the audible, on-site alarm message stops. | • **Max Calls**<br>This is the total number of telephone calls that will be dialed in response to any valid alarm. Telephone numbers are dialed sequentially, and continue to cycle until the maximum number of calls is reached. If no acknowledgment occurs, then at the completion of Max Calls, all alarms are automatically acknowledged. |

# CHAPTER 4: COMMUNICATIONS PROGRAMMING

This chapter explains the keypad commands for communications programming of the Model 400, including interrogation and resetting of the following:

- Voice Messages
- The Unit ID Number
- Dial-out Telephone Numbers
- Tone or Pulse Dialing
- Special Dialing with Pagers, Beepers and Access Numbers.
- Dial-out test mode
- Rings Until Answer
- Telephone Answering Device Compatibility
- Listen-in Time
- Call Delay
- Local Voice Mute
- Voice Repetitions
- Intercall Time
- Maximum Number of Calls
- The Clock
- Security Code

## 4.1 VOICE MESSAGES

The 400's digital speech recording feature allows you to record custom messages for each of the four Zones and an ID Message. This means that when the 400 calls you during an alarm, you will hear a personalized Voice Message identifying the unit and telling you exactly what alarm condition exists. You can record a separate message for each of the four Zones. The message can run a maximum of 5 seconds. The ID Message can be a maximum of 8 seconds. You can shorten the message length by pressing the ENTER key after reciting the message.

The **ID Message** is used to identify the unit. This could be a particular building name, its location (address or city), or some other identifier.

### To program the ID Message:

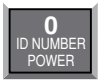
1. Press the SET key.




2. Press the MESSAGE key. The 400 will say "Enter Message Number."




3. Press the ID key (number 0 key).




4. When the unit beeps, begin speaking your message into the microphone. The unit will say "OK," when the recording time has elapsed; then it will play back your recorded message.

### To play back the ID Message:

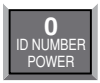
1. Press the WHAT IS key.




2. Press the MESSAGE key.




3. Press the ID key (number 0 key).




The 400 will play back your recorded message.

The Zone Messages are used to identify the device or condition being monitored such as temperature, humidity, equipment alarms, security alarms, etc.

### To program the Voice Message for a Zone:

1. Press the SET key.



2. Press the MESSAGE key. The 400 will say, "Enter Message Number."




3. Press the number key for the corresponding Zone.




4. When the unit beeps, begin speaking your message into the microphone. The unit will say "OK," when the recording time has elapsed; then it will play back your recorded message.

## To play back the message for a Zone:

1. Press the WHAT IS key.




2. Press the MESSAGE key.



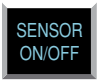

3. Press the corresponding Zone number key.




The 400 will play back your recorded message.

### To erase a Zone or ID message:

1. Press the SENSOR ON/OFF key.




2. Press the MESSAGE key.




The 400 will say "Enter message number."

3. Press the Zone Number or ID key.




The 400 will say, "Message erased."

## 4.2 THE UNIT ID NUMBER

The Unit ID Number is the identification number of the Model 400. This number is typically the telephone number where the unit is installed, or it may be designated using any number that best suits your application.

The purpose of the Unit ID Number is to immediately provide the source of any alarm, especially when using multiple Model 400 units in a complex monitoring system. When the Model 400 is called from a remote location, it always begins its message with the identification number:

"Hello, this is (Unit ID Number)."

### 4.2.1 PROGRAMMING THE ID NUMBER

### To program the ID Number:

1. Press SET.




2. Press ID NUMBER.



3. Using the number keys, enter up to 16 digits for the ID number. The Model 400 will recite the digits as they are pressed.




4. Press ENTER. The Model 400 will respond: "Okay."




### 4.2.2 INTERROGATING THE ID NUMBER

#### To interrogate the ID numbers:

1. Press WHAT IS.




2. Press ID NUMBER. The Model 400 will recite the Unit ID Number programmed.




## 4.3 DIAL-OUT TELEPHONE NUMBERS

The Model 400 can store up to four 48-digit phone numbers. These are the numbers that will be called during alarm dial-out. In the event of an alarm, the numbers are dialed sequentially, 1 through 4. Begin programming the first telephone number by assigning it to the key labeled with the number 1 on the keypad, and continue to assign any other telephone numbers in numerical order. A pause, pound or star can be added to an individual phone number to access different phone and beeper systems. See Special Dialing, Section 4.5.

### 4.3.1 PROGRAMMING DIAL-OUT TELEPHONE NUMBERS

#### To program dial-out telephone numbers:

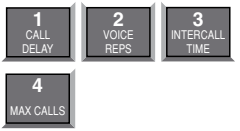
1. Press SET.




2. Press PHONE NUMBER.




3. Select which telephone number to program. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. The Model 400 will respond: "Enter number."




4. Enter the complete telephone number using the number keys.




5. Press ENTER. The unit will respond with "Okay."




6. Repeat above procedure to program up to four separate telephone numbers.

### 4.3.2 INTERROGATING A DIAL-OUT TELEPHONE NUMBER

#### To interrogate dial-out telephone numbers:

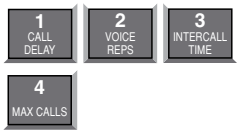
1. Press WHAT IS.



2. Press PHONE NUMBER.




3. Press a number key (from 1 to 4).




Model 400 will recite the corresponding telephone number. If there is no number programmed for a particular key, the unit will respond: "No number."

### 4.3.3 ERASING A TELEPHONE NUMBER

#### To erase a telephone number:

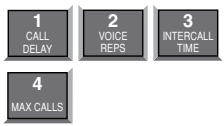
1. Press SET.




2. Press PHONE NUMBER.




3. Press the number key (from 1 to 4) representing the telephone number you want to erase.




4. Press ENTER. The Model 400 will say "Number # erased."



## 4.4 DIAL-OUT TEST MODE

The 400 allows you to test your telephone programming by simulating an alarm dialout to any programmed telephone number. This can be a valuable tool for insuring that your programming is correct and also for troubleshooting dialing problems. In this mode all signals on the telephone line are audible through the local speaker.

### 4.4.1 TO TEST A DIALOUT PHONE NUMBER:

1. Press the SET key.




2. Press the TEST key.




The 400 will say "Enter Number."

3. Press a number key (1–4) corresponding to the phone number entry you wish to test, and press ENTER.




The 400 will dial the number and announce the date and time for voice calls, or send its ID number for pager calls.

### 4.4.2 MANUALLY DIAL A TELEPHONE NUMBER

1. Press the SET key.




2. Press the TEST key.




The 400 will say "Enter number."

3. Press 0 then ENTER to enter manual dialing mode. The 400 will go off-hook and you should hear a dial tone through the speaker. Press any number keys to dial a telephone number.




4. Press ALARM CANCEL to hang up and exit the test.

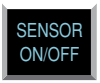



## 4.5 TONE OR PULSE DIALING

The Model 400 can dial out in pulse or Touch Tone™. Select the type of dialing, in either pulse or tone, depending upon the type of service provided by your telephone company. The default is tone.

### To program for either pulse or tone:

1. Press the SENSOR ON/OFF key.




2. Press PHONE NUMBER T/P.




The Model 400 will respond: "Tone" to indicate that tone dialing is enabled, or "Pulse" to indicate that pulse dialing is on and enabled.

3. Repeat key sequence to switch between settings.

## 4.6 SPECIAL DIALING

The Model 400 has provisions for special dialing sequences. Special dialing sequences allow:

- Dialing that requires an access number to connect with an outside line.
- Dialing that requires the pound (#) or star (*).
- Dialing to a beeper or pager.

### 4.6.1 SPECIAL DIALING KEYS

The following designated keys represent special functions when used with PHONE NUMBER entries:

1. Pause




PAUSE represents a two-second pause in dialing. It can be used when an access number is required before dialing to an outside line. (For example, in some cases a "9" or other number, must be dialed first, in order to get a dial tone for an outside line.)

2. Pound (#)




A pound may be required when calling some phone or beeper systems.

3. Star (*)




A star may be required when calling some phone or beeper systems.

4. Code




The CODE key can be used to perform special functions during the dialing sequence. These include: Pager dialing, Wait for Answer, and Switch to Touch-tones. These functions enable the Sensaphone to send a numeric page, or dial a telephone number + office extension, or combine pulse & touch-tone dialing in the same telephone number. Multiple codes can be used during telephone number programming if required. See section 4.5.4 for special instructions on dialing to a beeper or pager.

**Code 1 Pager**

When CODE + 1 is inserted as the first digit of the telephone number, the Model 400 will make a pager call. This means that the unit will expect the call to be answered by a paging service provider, then it will send its ID number (using touch-tones), followed by the digits that identify the zone(s) in alarm. The unit will hang-up after it completes the call. See section 4.5.4 for specific programming examples for dialing a pager.

**Code 2 Wait-For-Answer**

You can force your Sensaphone to Wait-For-Answer in the middle of dialing a telephone number. This is useful when calling a telephone extension that is initially answered by an auto-attendant. By inserting the wait-for-answer code you can instruct your Sensaphone to call the main number, then wait for an answer by the auto-attendant, then dial the extension. The Sensaphone will not speak it's voice message until the telephone is answered at the extension.

Example:

SET + PHONE NUMBER + any unassigned number key 1-4

+ telephone number + CODE + 2 + extension number + ENTER

**Code 3 Switch to Touch-tone**

This command allows you to change from pulse dialing to touch-tone dialing in the middle of dialing a telephone number. This is useful when your telephone service only supports pulse dialing, but you need to send touch-ones after connecting – such as when dialing a numeric pager or navigating a voice menu.

Example:

In this example a telephone number is dialed, the Sensaphone waits for the call to be answered, then changes to touch-tones to dial an extension.

SET + PHONE NUMBER + any unassigned number key 1-4 +

telephone number + CODE + 2 + CODE + 3 +

extension number + ENTER

## 4.6.2 INCORPORATING A PAUSE

### Incorporate PAUSE to access an outside telephone line:

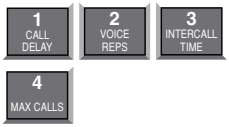
1. Press SET.




2. Press PHONE NUMBER.



3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 400 will respond: "Enter number."




4. From the number keys, enter the access digit (i.e., 9). The Model 400 will recite the digit.




5. Press PAUSE. The Model 400 will "pause."




6. Enter the complete telephone number using the number keys. The Model 400 will recite the digits as they are pressed.




7. Press ENTER. The Model 400 will say "Okay."



### 4.6.3 INCORPORATING A POUND (#) OR STAR (*)

**Incorporate a pound or star if it is normally included in telephone number:**

1. Press SET.



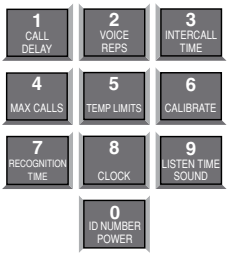

2. Press PHONE NUMBER.



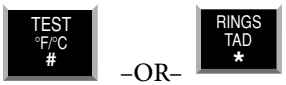

3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 400 will respond: "Enter number."




4. Enter the telephone number using the number keys. The Model 400 will recite the digits as they are pressed.




5. Position the pound (#) or star (*) within the telephone number where required by pressing the designated keys. The Model 400 will say "pound" or "star" each time the key is pressed.




6. Enter any remaining digits of the telephone number.

7. Press ENTER. The Model 400 will say "Enter."



### 4.6.4 SPECIAL DIALING TO A BEEPER OR PAGER

Your Sensaphone can be programmed to send an alarm message to a numeric beeper/pager. The message will include the Sensaphone's telephone number (ID number) and the Zone numbers that are in alarm. For example, if zones 1 and 4 are in alarm, the message on your pager would be: 8882227777-1-4, where 8882227777 is the unit's ID number. A Sound alarm will appear as alarm -9 and a Power alarm will appear as alarm -0. To program a telephone number for Pager dialout, you must enter Code 1 at the beginning of the telephone number. The Sensaphone will say "Code one, Pager" when you enter the command.

Follow the key sequence below to dial a numeric pager:

SET + PHONE NUMBER + any unassigned number key 1-4 +

CODE + 1 + pager telephone number + ENTER

To check your programming:

WHAT IS + PHONE NUMBER + assigned # 1-4

The Sensaphone will say "Pager", followed by the programmed telephone number.

To send a test page:

SET + TEST + assigned # key 1-4 + ENTER

The Sensaphone will let you listen to the dialout sequence through its speaker and send you a message that includes the Sensaphone's telephone number (ID number).

**Voice Prompted Paging Systems**

If your paging provider is answered by a voice prompt which requires you to enter one or more touch-tones to send a message, then use the wait-for-answer code (4.5.1) in combination with the Pause key and other number keys to navigate the voice menu until you reach the message entry point. The Sensaphone will automatically send it's telephone number, Zone numbers, and a pound (#) tone at the end of the number. For assistance contact Sensaphone Technical Support at 1(877)373-2700.

## 4.7 RINGS UNTIL ANSWER

Rings Until Answer is the programmed number of times the telephone rings before the Model 400 will answer an incoming call. This can be set from 1 to 15 rings. The default value is 4.

### 4.7.1 PROGRAMMING RINGS UNTIL ANSWER

#### To program Rings Until Answer:

1. Press SET.




2. Press RINGS/TAD. The Model 400 will respond: “Enter number.”




3. Using the number keys, enter a value.




4. Press ENTER. The Model 400 will respond: “Okay.”




### 4.7.2 INTERROGATING RINGS UNTIL ANSWER

#### To interrogate Rings Until Answer:

1. Press WHAT IS.




2. Press RINGS/TAD.



## 4.8 TAD (TELEPHONE ANSWERING DEVICE)

The TAD feature is especially useful because it integrates the operation of the Model 400 with your telephone answering device (e.g. answering machine) in a way that retains the full flexibility of each system. This allows you to have on-demand telephone access to the Model 400, for obtaining a Status Report, or for issuing call-in commands, while your telephone answering device is set to receive outside calls. Programming for use with a telephone answering device (TAD) is always used in conjunction with Rings Until Answer, detailed in section 4.6.

**NOTE:** The TAD feature only applies to answering devices connected to the same telephone line as the Model 400.

### 4.8.1 TAD ENABLE/DISABLE

#### To enable/disable the TAD feature:

1. Press SENSOR ON/OFF.




2. Press RINGS/TAD.




The Model 400 will respond: "TAD On." (If the Model 400 says "TAD Off," repeat steps 1 and 2 to reactivate TAD.)

### 4.8.2 USING THE TAD FEATURE

1. Make sure the TAD feature is enabled on the Model 400. (The default setting is disabled, so you must enable it first.)
2. Determine the number of rings your telephone answering device uses to answer the telephone. (Most answering devices require 4 rings; others are selectable.)
3. On the Model 400, program Rings Until Answer to a greater number than the number of rings set on your answering machine.

**Example:**

Telephone answering device, rings = 4

Model 400, Rings Until Answer = 6

Using the procedure just outlined, all incoming calls will be answered by the telephone answering device, allowing it to operate normally. With the programming just accomplished, the Model 400 can be accessed remotely, by telephone, to obtain the Status Report.

1. Dial the telephone number of the Model 400.

2. Let the telephone ring once and then hang up.

3. Wait approximately ten seconds

4. Call the Model 400 back.

It will answer the telephone on the first ring.

Explanation: The pattern of one ring, followed by a second call (within 30 seconds), signals the Model 400 to answer your incoming call, bypassing the telephone answering device.

> **NOTE:** Special Case: If the Model 400 shares the same line with a telephone answering device, and during certain time periods, frequent, incoming calls are expected on that line, then you may want to temporarily disable the TAD feature. If you leave the TAD enabled, it will not adversely affect normal operation, but if two outside telephone calls are received within the same 30-second time window, the Model 400 will interpret this pattern as a signal to answer the telephone. If this occurs, press any key on the Model 400 to hang up.

### 4.8.3 NO TAD IN USE

If a telephone answering device is not used on the same telephone line as the Model 400, make sure that the TAD feature is disabled, or turned off. Only Rings Until Answer programming will determine how incoming calls are answered. For example, if you program Rings Until Answer to 3, incoming calls will be answered in 3 rings.

## 4.9 LISTEN-IN TIME

The Listen-in Time is the amount of time you can listen to sounds from the Model 400's built-in microphone at its installation site. When you call in for a Status Report, the Model 400 announces Listen-in Time at the end of its first round of status readings, saying, "Listen for (programmed time entered)." The programmable range is from 0 to 255 seconds (or up to 4.17 minutes). The default value is 15 seconds.

> **NOTE:** The microphone is also used to monitor high sound level. See Chapter 5, Section 5.10 through Section 5.11.1.

### 4.9.1 PROGRAMMING THE LISTEN-IN TIME

#### To program the Listen-in Time:

1. Press SET.



2. Press LISTEN TIME. The Model 400 will respond: "Enter seconds."




3. Using the number keys, enter the seconds. The Model 400 will recite the digits as they are pressed.




4. Press ENTER. The Model 400 will respond: "Okay."




### 4.9.2 INTERROGATING THE LISTEN-IN TIME

#### To interrogate the Listen-in Time:

1. Press WHAT IS.




2. Press LISTEN TIME. The Model 400 will recite the listen-in time.




## 4.10 CALL DELAY

Call Delay is the programmed length of time the Model 400 waits, following detection of an alarm, before it begins the dial-out sequence. This applies only to the first call. (Delay time between calls is also programmable: refer to Intercall Time, Section 4-12.)

The purpose for Call Delay is to allow time for personnel at the Model 400's installation site to respond to and cancel an alarm before dial-out begins. During this time, the Model 400 will audibly repeat its "alarm" message (unless the Local Voice Mute feature has been activated—refer to Section 4.10). The default for Call Delay is 30 seconds. Call Delay can be programmed from 0 seconds to 60 minutes (1 hour).

### 4.10.1 PROGRAMMING THE CALL DELAY

To program the Call Delay:

1. Press SET.




2. Press CALL DELAY.




The Model 400 will respond: “Enter minutes.”

3. Using the number keys, enter the minutes.




The Model 400 recites the digits as they are pressed.

4. Press ENTER. The Model 400 responds: “Enter seconds.”




5. Using the number keys, enter the seconds. The Model 400 recites the digits as you press them.

6. Press ENTER. The Model 400 responds: “Okay.”




### 4.10.2 INTERROGATING CALL DELAY

#### To interrogate Call Delay:

1. Press WHAT IS.



2. Press CALL DELAY.




The Model 400 will recite the programmed Call Delay.

## 4.11 LOCAL VOICE MUTE

When the Model 400 dials out to report an alarm, it also audibly recites the alarm message through it's speaker. The Local Voice Mute command allows you to turn off the speaker at the Model 400's site during alarm dialouts and status call-ins. This feature is used to prevent intruders or unauthorized persons from hearing the alarm dial-out message or from hearing the Status Report during an off-site call.

### 4.11.1 ENABLE/DISABLE LOCAL VOICE MUTE

#### To enable/disable Local Voice Mute:

1. Press SENSOR ON/OFF.




2. Press MUTE.




The Model 400 will say "Mute On" to indicate that Local Voice Mute is enabled, or "Mute Off" to indicate that it is disabled.

3. Repeat key sequence to switch between enabled or disabled Local Voice Mute.

## 4.12 VOICE REPETITIONS

The Voice Repetitions feature allows programming of the number of times the alarm message is repeated per phone call during alarm dial-out.

The maximum repetitions may be set to 10; the default is 3 repetitions.

### 4.12.1 PROGRAMMING VOICE REPETITIONS

To program Voice Repetitions:

1. Press SET.

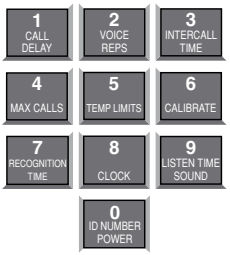



2. Press VOICE REPS.




The Model 400 will respond: "Enter number."

3. Using the number keys, enter a value from 1 to 10.




4. Press ENTER. The Model 400 will respond: "Okay."




### 4.12.2 INTERROGATING VOICE REPETITIONS

To interrogate Voice Repetitions:

1. Press WHAT IS.




2. Press VOICE REPS.




The Model 400 will recite the number programmed.

## 4.13 INTERCALL TIME

The Intercall Time is the programmable period of time the Model 400 waits in calling subsequent telephone numbers. Intercall Time is activated only after alarm dial-out to the first telephone number fails to be acknowledged. This period can be programmed from 10 seconds to 60 minutes. The default intercall time is 1 minute.

If an incoming telephone call is made to the Model 400 during Intercall Time (in between its dialing of subsequent telephone numbers to report an alarm), it will answer the incoming call and immediately report any existing alarms.

### 4.13.1 PROGRAMMING INTERCALL TIME

To program Intercall Time:

1. Press SET.




2. Press INTERCALL TIME.




The Model 400 will respond: "Enter minutes."

3. Using the number keys, enter the minutes.




The Model 400 recites the digits as you press them.

4. Press ENTER. The Model 400 will respond: "Enter seconds."



5. Using the number keys, enter the seconds. The Model 400 recites the digits as you press them.




6. Press ENTER. The Model 400 responds: "Okay."




### 4.13.2 INTERROGATING INTERCALL TIME

To interrogate Intercall Time:

1. Press WHAT IS.




2. Press INTERCALL TIME.




The Model 400 will recite the programmed Intercall Time.

## 4.14 MAXIMUM NUMBER OF CALLS (MAX CALLS)

The Max Calls feature controls the total number of repeated calling attempts by the Model 400 in the event of an alarm. When an alarm occurs, the dial-out process begins, and continues to cycle through your programmed telephone numbers until the alarm is acknowledged or until the maximum number of calls is reached. The Max Calls setting regulates the number of calls that will be made as a result of any alarms; if more than one alarm is detected at once, or if a second alarm occurs during dial-out on the first alarm, the Max Calls setting will start the calling process from zero, until the programmed number of calling attempts are completed.

The default setting for Max Calls is 100, but it may be programmed from 1 to 255 calls. Max Calls is cancelled when an alarm is acknowledged. If the maximum number of calls is completed and no alarm acknowledgement has occurred, the Model 400 will automatically acknowledge any alarm and stop the dial-out.

> **NOTE:** If only one telephone number is programmed, the Model 400 will dial out a maximum of 15 times to report an alarm in accordance with FCC rules.

### 4.14.1 PROGRAMMING MAX CALLS

To program Max Calls:

1. Press SET.




2. Press MAX CALLS.




The Model 400 will respond: "Enter number."

3. Using the number keys, enter a value. The Model 400 will recite the digits as you press them.



4. Press ENTER. The Model 400 responds: “Okay.”




### 4.14.2 INTERROGATING MAX CALLS

To interrogate Max Calls:

1. Press WHAT IS.




2. Press MAX CALLS.




The Model 400 will recite the value set for Max Calls.

## 4.15 THE CLOCK

The Model 400 has a built-in clock. The power-up time is 12 am. The clock will keep time from 12 am until you program the current time. It will then keep time from your programmed time. If the AC power fails, the clock will continue to keep time until the battery back-up fails. It will then reset to 12 am when power is restored. An incorrect time is a good indication that the power has failed and the batteries have been expended.

### 4.15.1 SETTING THE CLOCK

To set the clock:

1. Press SET.




2. Press CLOCK.



3. Using the number keys, enter the correct time. The Model 400 will recite the digits as they are pressed.




4. If the time is AM, press the AM key. The Model 400 will say "am" If the time is PM , press the PM key. The Model 400 will say "pm."







Example: You want to set the clock to 9:45 am. Press the following keys in the order shown:

SET + CLOCK + 9 + 4 + 5 + AM

### 4.15.2 INTERROGATING FOR THE CURRENT TIME

To interrogate the Model 400 for the current time:

1. Press WHAT IS.




2. Press CLOCK. The Model 400 will recite the current time.




## 4.16 THE SECURITY CODE

The Security Code is the last step after setting all other programming parameters for the Model 400. The code consists of a 4-digit number you select and will effectively prevent unauthorized changes to the Model 400's programming. When the Security Code is activated, all keyboard programming is locked. The Model 400 may be interrogated using the WHAT IS key, but the keyboard must be unlocked, via the Security Code, before any programming changes are possible.

### 4.16.1 LOCKING THE KEYPAD

#### To program the Security Code:

1. Press SET.




2. Press CODE.




The Model 400 will say "Enter security code."

3. Using the number keys, enter 4 digits.




4. Press ENTER.




The Model 400 says, "OK." The keyboard is now locked.

If unauthorized persons attempt to set a parameter, an error message, "Error 2," is returned. Whenever any operation except WHAT IS takes place without entering the security code first, this error message occurs.

### 4.16.2 UNLOCKING THE KEYPAD

#### To unlock the keyboard:

1. Press WHAT IS.




2. Press CODE.




The Model 400 will say "Enter Security Code."

3. Using the number keys, enter the digits for the code.




4. Press ENTER.




If the correct code is entered, the Model 400 will say "OK." If the wrong code is entered, the Model 400 will say "Error 2."

# CHAPTER 5: ALARM PROGRAMMING

This chapter explains the alarm programming and monitoring capabilities of the Model 400, with specific instructions for the following features:

- Configure zones as dry contact or temperature
- Enable/disable zones
- Program alarm Recognition Time for each zone
- Program high and low temperature limits
- Disable alarm response to high or low temperature
- Program temperature in Fahrenheit or Celsius scale
- Calibrate temperature
- Obtain current temperature
- Program AC power-failure Recognition Time
- Enable/disable AC power monitoring
- Program sound level sensitivity
- Program high sound Recognition Time
- Disable alarm response to high sound
- Use Exit Delay via Status Report

## 5.1 ZONE CONFIGURATION

In preparing the Model 400 to sense an alert condition, the zones must be configured as dry contact (either open or closed) or as temperature zones. The default setting for zone 1 is temperature; for zones 2-4, the default is dry contact and open. To configure zone normality, sensors are first wired to the terminal strip at the back of the unit. (Refer to Chapter 2, Section 2.9–2.12, for an explanation on wiring zones.)

The configuration process directs the Model 400 to initialize the 4 zones and establish normal settings. Any change in the status of a zone (for example, from a normally open contact to a suddenly closed contact) is recognized as an alert condition. In the case of a temperature zone, an alert condition is recognized when established temperature limits are exceeded.

> **NOTE:** Before starting keyboard commands to configure zone normality on the Model 400, it is very important to check that the sensors you have wired to the unit are set in their normal, non-alarm positions. For example, if a magnetic reed switch (a normally-closed sensor used to detect unauthorized entry) has been wired to the Model 400, make sure that the door or window to be monitored is shut before configuring the zone. If a motion-detector is wired to the unit, it is advisable to block all sources of motion from the sensor before and during configuration.

### 5.1.1 PROGRAMMING ZONE CONFIGURATION

1. Press STANDBY to place the Model 400 in Standby mode.




2. Wire sensors to the zones to the back of the Model 400 (see Chapter 2, Section 2.10).
3. Press RUN. The red light glows when the Model 400 returns to Run mode.




4. Press SET.




5. Press CONFIG.




6. The Model 400 audibly recites the configuration for each of the four zones:

- If the zone is open, the Model 400 recites the number of the zone and says "normally open."
- If the zone is closed, the Model 400 recites the number of the zone, and says "*normally closed*."
- If the zone is configured as temperature, the Model 400 recites the number of the zone, followed by "Temperature."

### 5.1.2 INTERROGATING ZONE CONFIGURATION

1. Press WHAT IS.




2. Press CONFIG.




The Model 400 will audibly recite the configuration of each zone.

## 5.2 ENABLE/DISABLE ZONES

This function allows you to enable or disable a zone's response to an alert condition. An enabled zone will respond to an alert condition and allow dial-out. A disabled zone will cause dial-out to be suppressed, but any existing alert conditions will be revealed during the Status Report. Enable/disable programming is useful during wiring of zones (see Chapter 2) or when a condition needs to be monitored, but is not critical enough to be programmed for dial-out reporting. It is important to verify zone status after performing any task that requires disabling. The default setting for all zones is enabled (ON).

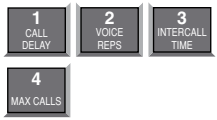
If an alert condition exists when zones are re-enabled, Recognition Time will restart—refer to Section 5.3.

### 5.2.1 CHANGING ENABLED/DISABLED ZONE STATUS

1. Press SENSOR ON/OFF.




2. Press the number (1 to 4) of the selected zone to enable/disable. The Model 400 says "Alarm Disabled" to indicate disabled or "Alarm Enabled" to indicate enabled.




### 5.2.2 VERIFYING ENABLED/DISABLED ZONE STATUS

1. Press WHAT IS.




2. Press STATUS.




The Model 400 audibly recites the current status of every zone. In a Status Report, each zone is first identified by its zone number, followed by a report that specifies parameters currently affecting that zone. If a zone is disabled, the word "Alarm Disabled" immediately follows the number recited for that zone.

For example, zone 3 is configured as a normally open, dry contact zone. During the Status Report:

- If disabled, the Model 400 recites:

"Zone 3, the Alarm is Disabled" for zone 3.

- If enabled, the Model 400 recites:

"Zone 3—OK," for zone 3.

In another example, zone 2 is configured as a temperature zone. The current temperature is 76 degrees. During a Status Report:

- If disabled, the Model 400 recites:

"Zone 2, the alarm is disabled, it is now 76 degrees fahrenheit—OK"

- If enabled, the Model 400 recites:

"Zone 2—76 degrees fahrenheit—OK."

## 5.3 ZONE RECOGNITION TIME

The Zone Recognition Time is the length of time an alert condition must be present before a valid alarm exists and dial-out is activated. This time period is programmable, from 0 minutes, 0 seconds (for immediate response) up to a period of 540 minutes, 0 seconds. If an alert condition begins and then clears within the established Recognition Time, no dial-out will occur. When an alert condition continues beyond the programmed Recognition Time, the Model 400 initiates dial-out. The default setting for Zone Recognition Time is 0 minutes, 3 seconds.

### 5.3.1 PROGRAMMING ZONE RECOGNITION TIME

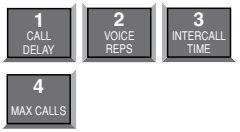
1. Press SET.




2. Press RECOGNITION TIME.




3. Press the number (1 to 4) of the selected zone to be programmed.




The Model 400 responds: "Enter minutes."

4. Using the number keys, enter the minutes. For example, to set a Recognition Time of five minutes, simply press "5" on the keypad. The Model 400 recites the digits as they are pressed.




5. Press ENTER. The Model 400 responds: "Enter seconds."




6. Using the number keys, enter the seconds. The Model 400 recites the digits as they are pressed.




7. Press ENTER. The Model 400 responds: "Okay."




### 5.3.2 INTERROGATING ZONE RECOGNITION TIME

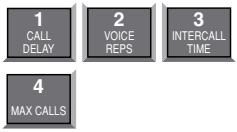
1. Press WHAT IS.




2. Press RECOGNITION TIME.



3. Press the corresponding zone key (1 to 4).




The Model 400 recites the programmed Recognition Time for that zone.

## 5.4 ESTABLISHING HIGH AND LOW TEMPERATURE LIMITS

High and low temperature limits can be separately programmed for each zone configured as temperature. Limits can range from –20° to +150° Fahrenheit, or from –30° to 65° Celsius.

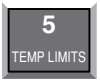
When temperature limits exceed high or low settings, the Model 400 will dial out with an alarm message. Default settings are: 10° F for low temperature and 100° F for high temperature.

### 5.4.1 PROGRAMMING TEMPERATURE LIMITS FOR A SELECTED ZONE

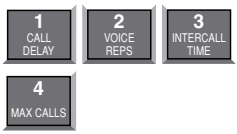
1. Press SET.




2. Press TEMP LIMITS.




3. From the number keys, press a number (from 1 to 4) that corresponds to the temperature zone being programmed.




The Model 400 responds: "Enter low temperature limit."

4. Using the number keys, enter a value for low temperature limit. The Model 400 will recite the digits as they are pressed. If a negative number is required, first press *, then enter the number.




5. Press ENTER.




The Model 400 responds: “Enter high temperature limit.”

6. Using the number keys, enter the value for high temperature limit. The Model 400 recites the digits as they are pressed.




7. Press ENTER. The Model 400 responds: “Enter.”




**NOTE:** Do not set temperature limits too close to normal room temperature. Minor temperature fluctuations could result in frequent and unnecessary alarm dialouts.

### 5.4.2 DISABLING ALARM RESPONSE TO HIGH OR LOW TEMPERATURE

To disable alarm response to either high or low temperature settings exclusively, enter the following temperature limit when programming the selected zone. (The Model 400 will not respond to temperatures encountered at maximum settings or beyond.) Begin by following the key sequence shown in Section 5.4.1, and when prompted to enter the high or low temperature value:

- Set high temperature to either +150º F or +65º C (high temperature limit) to prevent the Model 400 from responding to a high temperature alarm.
- Set low temperature to either -20° F or -30° C to prevent the Model 400 from responding to a low temperature alarm.

### 5.4.3 INTERROGATING HIGH AND LOW TEMPERATURE LIMITS

1. Press WHAT IS.




2. Press TEMP LIMITS.




3. Press the number key corresponding to the selected temperature zone.



## 5.5 TEMPERATURE SCALE

Temperature zones may be set in either Fahrenheit or Celsius degrees. The default temperature scale is Fahrenheit. To change to Celsius:

1. Press SENSOR ON/OFF.




2. Press °F / °C. The Model 400 responds: “Degrees Celsius” indicating Celsius scale has replaced Fahrenheit scale.




3. To return to Fahrenheit scale, repeat the key sequence. The Model 400 responds: “Degrees Fahrenheit” indicating Fahrenheit scale is in effect.

**NOTE:** When switching from Fahrenheit to Celsius, or vice versa, the change applies to all zones configured to read temperature. When switching temperature scales it is important to reset high and low temperature limits on all temperature zones. Refer to Section 5.4.1 to reset temperature limits.

## 5.6 TEMPERATURE CALIBRATION

To compensate for minor variances in sensor accuracy, an offset may be programmed for each temperature zone. The amount of offset is measured in degrees Fahrenheit or degrees Celsius. Adjustments are possible within a range from -10 degrees to +10 degrees. For example, if zone 3 is sensing temperature and is reading 1 degree too high, then the calibration for zone 3 is set at -1 to obtain an accurate reading.

### 5.6.1 PROGRAMMING TEMPERATURE CALIBRATION

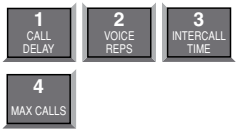
1. Press SET.




2. Press CALIBRATE.



3. Press the number (1 to 4) of the selected temperature zone to be calibrated.




4. Enter the number required to offset the current temperature reading so a correct reading is obtained.

- To program a positive offset number (up to +10 degrees), enter the number on the keypad. The Model 400 recites the digits as they are pressed.
- To program a negative offset number (up to –10 degrees), first press *. The unit responds with "negative." Next, enter the number on the keypad. The unit recites the digits as they are pressed.




5. Press ENTER. The Model 400 responds:"Okay."




**NOTE:** If you find that your calibration offset exceeds more than + 5 or –5 degrees, other complicating factors could be affecting normal operation of the Model 400. Call Sensaphone for technical assistance.

### 5.6.2 INTERROGATING TEMPERATURE CALIBRATION

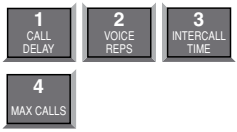
1. Press WHAT IS.




2. Press CALIBRATE.



3. Press the number key corresponding to the selected temperature zone.




## 5.7 OBTAINING CURRENT TEMPERATURE

Current temperature readings for each temperature zone may be accessed at any time. The Model 400 recites the zone number, and the actual temperature detected by the attached sensor, for all zones configured as temperature. To obtain current temperature:

1. Press WHAT IS.




2. Press TEST °F/°C.




## 5.8 AC POWER MONITORING ENABLE/DISABLE

The Model 400 monitors AC power failure. This command enables or disables the power failure detection feature.When enabled, the Model 400 will monitor power and dial out when AC power failure exceeds a programmable span of time (refer to AC Power Failure Recognition Time, Section 5.9).

The default setting for AC power monitoring is enabled (on). When disabled, the Model 400 will not dial-out to report power failure.

### 5.8.1 ENABLING/DISABLING THE AC POWER ALARM

1. Press SENSOR ON/OFF.




2. Press POWER.




- The Model 400 will say “Power Alarm Disabled” to indicate that the power alarm is disabled, or
- The Model 400 will say “Power Alarm Enabled” to indicate that the power alarm is enabled.

3. Repeat key sequence to change settings.

## 5.9 AC POWER FAILURE RECOGNITION TIME

The AC Power Failure Recognition Time is the length of time that AC electric power is off before a valid alarm is recognized and dial-out begins. The default setting is 5 minutes, 0 seconds, but is programmable from 0 seconds to a maximum of 540 minutes.

When AC power failure occurs, and throughout the programmed Recognition Time, the Model 400 steadily repeats the message "the power is off" at the unit's installation site. There is no Call Delay programming available for AC power failure. Immediately following Recognition Time, the Model 400 begins the dial-out process to report power failure.

To cancel the power-failure message locally at the keypad (during or after Recognition Time) press the ALARM CANCEL key on the Model 400 keypad. This action also cancels the dial-out process.

### 5.9.1 PROGRAMMING POWER FAILURE RECOGNITION TIME

1. Press SET.




2. Press RECOGNITION TIME.




3. Press POWER. The Model 400 responds: "Enter minutes."




4. Using the number keys, enter the number of minutes. The Model 400 will recite the digits as they are pressed.




5. Press ENTER. The Model 400 responds: "Enter seconds."



6. Using the number keys, enter the number of seconds. The Model 400 will recite the digits as they are pressed.




7. Press ENTER. The Model 400 responds: "OK."




### 5.9.2 INTERROGATING POWER FAILURE RECOGNITION TIME

1. Press WHAT IS.




2. Press RECOGNITION TIME.




3. Press POWER.




The Model 400 will recite the power Recognition Time.

## 5.10 SOUND ALARM MONITORING

This feature allows you to program the level and duration of sound that will cause the Model 400 to respond to an alarm and dial-out. It may be useful to desensitize the Model 400 to sound if it is installed in an area with a relatively high noise level, or where a loud noise occurs frequently but is not associated with an alarm. In some applications, it may be desirable to increase sound sensitivity to low sound levels.

### 5.10.1 PROGRAMMING SOUND ALARM SENSITIVITY

The sensitivity setting for sound alarm monitoring ranges from 1 to 160. A value of 1 makes the microphone the MOST sensitive to changes in sound. The value 160 makes the microphone the LEAST sensitive to sound. The default value is 32.

1. Press SET.




2. Press CALIBRATE.




3. Press SOUND. The Model 400 responds: "Enter number."




4. Using the number keys, enter a value for sound sensitivity.




The Model 400 recites the digits as you press them.

5. Press ENTER. The Model 400 responds: "Okay."



## 5.10.2 INTERROGATING SOUND SENSITIVITY

1. Press WHAT IS.




2. Press CALIBRATE.




3. Press SOUND. The Model 400 recites the programmed sound sensitivity level.




## 5.10.3 PROGRAMMING HIGH SOUND ALARM RECOGNITION TIME

The Recognition Time for sound alarm monitoring ranges from 5 seconds to 60 seconds. The default value is 8 seconds.

1. Press SET.




2. Press RECOGNITION TIME.




3. Press SOUND. The Model 400 responds: “Enter seconds.”




4. Using the number keys, enter the number of seconds. The Model 400 will recite the digits as they are pressed.



5. Press ENTER.




### 5.10.4 INTERROGATING HIGH SOUND ALARM RECOGNITION TIME

The Recognition Time for sound alarm monitoring ranges from 5 seconds to 60 seconds. The default value is 8 seconds.

1. Press SET.




2. Press RECOGNITION TIME.




3. Press SOUND. The Model 400 responds: "Enter seconds."




## 5.11 HIGH SOUND ALARM ENABLE/DISABLE

The Model 400 monitors sound through the built-in microphone. When the sound level suddenly exceeds the programmed high sound limit, the Model 400 will respond with an alert condition. The increased sound level must continue throughout the programmed recognition time. The default for high sound alarm is enabled (on).

> **NOTE:** The microphone is also used for listening to on-site sounds. Refer to Chapter 4, Section 4.8. Disabling the sound alarm does not affect listen-in capability.

### 5.11.1 CHANGING ENABLED/DISABLED HIGH SOUND ALARM

1. Press SENSOR ON/OFF.




2. Press SOUND. The Model 400 will say "Sound Alarm Disabled" to indicate disabled or "Sound Alarm Enabled" to indicate enabled.




3. Repeat key sequence to change settings.

## 5.12 EXIT DELAY

When tripping an alarm is unavoidable, yet a true alert condition has not actually occurred, the alarm response, including dial-out, can be temporarily suppressed.

The Model 400 is able to suppress and then reset its dial-out function automatically through use of the Status Report. This is especially convenient when an alert condition is created upon exiting a monitored door, and there is no way to cancel from the local keypad.

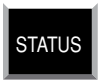
> **Example:** You are planning to exit through a monitored door. Prior to exiting, you initiate a Status Report recitation at the Model 400 keypad by pressing WHAT IS, followed by STATUS, (key sequence shown below). This allows you approximately 40 seconds to exit without activating the Model 400's programmed response to an alarm. At the conclusion of the status report, normal alarm response is reactivated.

To use exit delay, initiate the Status Report.

1. Press WHAT IS.




2. Press STATUS. The Model 400 recites the full Status Report; during this time, you are able to exit the monitored area without tripping an alarm.

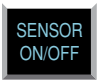


## 5.13 DESIGNATING A ZONE AS UNUSED

This feature allows you to mark selected Zones, Power, or Sound as unused, which will prohibit them from going into alarm and will also leave them out of the status report. Note that programming for the selected Zone will be preserved when the Zone is marked as "unusued" and will not be reconfigured if automatic Zone configuration is activated.

To designate a Zone as unused:

1. Press the SENSOR ON/OFF key.

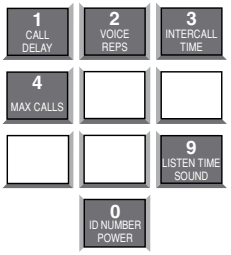



2. Press the SET key.




The 1400 will say "Enter Zone Number."

3. Press the corresponding number of the Zone you wish to mark as unused.




The 1400 will respond by saying Zone 1–4, Power, or Sound "Off/On." Repeat the key sequence to place the Zone back in use.

# CHAPTER 6: ACKNOWLEDGMENT, STATUS REPORT & REMOTE ACCESS

In addition to communication and alarm monitoring capabilities, the Model 400 will also respond to your instructions and provide you with access to information on monitored conditions at all times.

By issuing commands to the unit, either at the installation site or over standard telephone lines, the following features may be activated:

- Acknowledgment of existing alarms
- The Status Report on all monitored conditions.
- Limited programming.

## 6.1 ALARM ACKNOWLEDGMENT

When the Model 400 dials out with an alarm message, it will request acknowledgment before hanging up. Acknowledgment indicates to the unit that the alarm message has been received. Upon acknowledgment, the Model 400 will cancel the dial-out sequence.

There are three ways* that an alarm is acknowledged directly:

- Local Acknowledgment
- Touch-Tone™ Acknowledgment
- Callback Acknowledgment

* A fourth method of alarm acknowledgment is indirect. Refer to Max Calls, Chapter 4, Section 4.13 for an example of automatic alarm acknowledgment.

### 6.1.1 LOCAL ACKNOWLEDGMENT

To acknowledge an alarm locally (directly at the installation site of the Model 400), press the ALARM CANCEL Key.

### 6.1.2 TOUCH-TONE™ ACKNOWLEDGMENT

This method of remote alarm acknowledgment works with a Touch-Tone™ telephone.

> **Example:** You receive a call from the Model 400, reporting that an alarm exists. The message concludes: "*Enter Acknowledgement code*." Now, or at any time during this call, you may acknowledge the alarm with the code "**555**" if you are using a Touch-Tone™ telephone.

- To enter "555," press the number (5) key on the Touch-Tone™ phone keypad three times. The Model 400 will respond: "**Alarm Acknowledged**." The Model 400 will hang up and the dial-out sequence, including any further response to the alarm, will be cancelled.
- If you enter the wrong code or do not enter it within 10 seconds following the conclusion of the message, the Model 400 will respond: "**Error, Enter Acknowledgement code**." If you do not enter the acknowledgement a second time the unit will say "error" then "goodbye" and hang up. The alarm is still not acknowledged until you call back. You have a period equal to the programmed Intercall Time to call the unit back and enter the "555" acknowledgment code. If you are calling from a pulse or rotary telephone, refer to Callback Acknowledgment, Section 6.1.3, below.

### 6.1.3 CALLBACK ACKNOWLEDGMENT

Callback Acknowledgement is a feature that allows you to acknowledge an alarm without entering Touch-Tones™. This feature is disabled by default and must be enabled by entering the key sequence below. When Callback Acknowledgment is enabled, simply call the unit back and allow the line to ring 10 times. The unit will then answer the call, announce the alarm, then say "Alarm Acknowledged." This indicates that the alarm has been acknowledged.

To enable or disable Callback Acknowledgement:

1. Press SENSOR ON/OFF.




2. Press STATUS.




The Model 400 will say "*Callback Acknowledgement Enabled*" to indicate that Callback Acknowledgment is Enabled, or "*Callback Acknowledgement Disabled*" to indicate that Callback Acknowledgement is Disabled. This method of remote alarm acknowledgment works with any telephone: pulse, rotary, or Touch-Tone™.

**Example:** The Model 400 calls you with an alarm message. You answer the call with a rotary or pulse telephone, and do the following:

- You listen to the message and hang up.
- Then you call the Model 400 back on any telephone. You must wait for 10 rings—this signals the Model 400 to answer your telephone call. (Make

sure to call back within the programmed setting for Intercall Time—refer to Chapter 4, Section 4.12.)

When the Model 400 answers your return call, it announces the alarm. Then it says: "*Alarm Acknowledged*." This indicates that the alarm has been acknowledged.

> **NOTE:** If you have the TAD feature ( telephone answering device) enabled, call the unit and let the phone ring once, then hang up. Wait a few seconds then call the unit back a second time. The model 400 will now answer on the first ring. If TAD is disabled, the telephone must be allowed to ring 10 times. This serves as a precaution against a random alarm acknowledgment. Refer to Chapter 4, Section 4.7, for complete information on using the TAD feature.

## 6.2 STATUS REPORT

The Status Report allows access to complete information on all monitored conditions either locally, from the keypad, or by telephone, from any location. The Model 400 will answer an incoming telephone call following the programmed Rings Until Answer (refer to Chapter 4, Section 4.6). Included with the Status Report are messages related to alarm conditions, AC power, battery backup and sound level. It also provides an opportunity for listening to on-site sounds (refer to Listen-in Time, Chapter 4, Section 4.8).

To initiate the Status Report:

1. Press WHAT IS.




2. Press STATUS.




Sections 6.2.1, 6.2.2, and 6.2.3 demonstrate two different Status Report recitations. The Status Report starts with:

*"Hello. This is 555-1234 (or the programmed ID), (Custom ID Message)."*

*"It is now 12:15pm (or the current time)."*

The Model 400 proceeds with a separate report for each zone. Each zone identifies itself by reciting the zone number and it's associated voice message.

### 6.2.1 EXAMPLE: STATUS REPORT, NO ALARMS

Zones 2, 3, and 4 are configured as dry contact and zone 1 is configured as temperature. No alarms exist. The Status Report begins by saying, "*Hello, this is 555-1234, this is building M, third floor; it is now 2:30 pm.*"

Following this introduction, the report continues:

*"Zone 1, room temperature, 74 degrees, OK."*

*"Zone 2, door alarm, OK."*

*"Zone 3, ups alarm, OK."*

*"Zone 4, water sensor, OK."*

*"The sound is OK."*

*"The power is ON."* This refers to AC power.

*"The batteries are OK."* Other possible responses: *"Batteries are low"* or *"Replace batteries."* (Refer to Section 6.2.4 for additional information regarding battery condition.)

*"The output is off."*

*"Listen to the sound for 10 seconds."* In this case, the programmed Listen-in Time is set at 10 seconds. (This feature is not available when obtaining the Status Report on-site, directly at the keypad.)

The Status Report repeats once more and the Model 400 concludes the call, saying: *"Goodbye."* (The Status Report will not repeat if obtained at the keypad; *"Goodbye,"* is also not recited.)

The phrase *"no number"* at the end of a Status Report indicates that no dial-out phone numbers have been programmed.

### 6.2.2 EXAMPLE: STATUS REPORT, EXISTING ALARMS

Zones 2, 3, and 4 are configured as dry contact and zone 1 is configured as temperature. An emergency situation is at hand: a fire in a greenhouse has tripped a smoke alarm and electrical power has been disrupted. In addition to high sound and AC power alarms, separate alarms exist on zones 1, 2, 3, and 4. You happen to call in for the Status Report, which begins with, "*Hello, this is 555-1234; "this is the Sensaphone 400 at ACME Greenhouse, 225 Oak Street"*

*It is now 8:45 PM*

*Zone 1, "Temperature in greenhouse", 110 degrees Fahrenheit, too high, acknowledged alarm exists*

*Zone 2, "Door alarm in greenhouse", not OK, acknowledged alarm exists*

*Zone 3 "Water pressure alarm in greenhouse", not OK, acknowledged alarm exists*

*Zone 4 "Greenhouse control system", not OK, acknowledged alarm exists*

*A High Sound alarm exists, it is now too high*

*The Power is Off.*

*The Batteries are Low.*

*The Output is Off.*

*Listen to the sound for 10 seconds.*

*Goodbye.*

### 6.2.3 EXAMPLE: STATUS REPORT, DISABLED ZONES

If a zone is disabled, the dial-out feature for that zone is deactivated, but all other programmed parameters remain in effect. In the example below, all 4 zones are disabled, although zones 1 and 3 are detecting alarms. AC power and Sound Level are also disabled for dial-out. When you call the Model 400 for a Status Report, you hear the following:

*Hello, this is 555-1234; "this is the Sensaphone 400 at ACME Greenhouse, 225 Oak Street"*

*It is now 8:45 PM*

*Zone 1, "Temperature in greenhouse", the alarm is disabled, it is now 110 degrees Fahrenheit, too high, acknowledged alarm exists*

*Zone 2, "Door alarm in greenhouse", the alarm is disabled, it is not OK.*

*Zone 3 "Water pressure alarm in greenhouse", the alarm is disabled, it is not OK.*

*Zone 4 "Greenhouse control system", the alarm is disabled, it is not OK.*

*The Sound alarm is disabled, it is now too high*

*The Power alarm is disabled, it is now Off.*

*The Batteries are Low.*

*The Output is On.*

*Listen to the sound for 10 seconds.*

*Goodbye.*

The Status Report repeats once more and the Model 400 concludes the call, saying: *"Goodbye."*

### 6.2.4 BATTERY CONDITION

During a Status Report, you may hear one of three possible messages regarding battery power. The Model 400 determines the appropriate message by measuring battery voltage. Depending upon the remaining voltage, it may respond:

- *"The batteries are OK,"* if over 8.2 Volts.
- "*The batteries are low,*" if between 7.2 and 8.2 Volts.
- *"Replace batteries,"* if below 7.2 Volts.

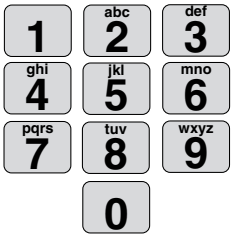
### 6.2.5 REMOTE ACCESS BY TOUCH-TONE™ TELEPHONE

You can issue a number of commands to the 400 remotely using a Touch-Tone™ telephone. This command mode can be entered at any time during the status report. Simply press a Touch-Tone™ and the unit will halt the report and respond with "OK." You are now in Touch-Tone™ command mode. Commands are available to perform the following functions:

- Enable and disable zones, power monitoring, and sound monitoring
- Recite/Set High and Low alarm limits
- Recite/Set telephone numbers
- Record/Play custom voice messages
- Recite/Set the relay output
- Activate the microphone for listen-in
- Recite status report

**Note:** If a security code is enabled, the 400 will prompt you with "Enter security code." Enter the four-digit keypad security code plus "#" to enter touch-tone command mode. If entered correctly, the 400 will respond with "OK" and you can proceed to enter the commands. If entered incorrectly, the unit will give you one more chance. If it is incorrect a second time, the unit will say "Error, goodbye" and hang up.

The commands are put together based on the letters of a touch-tone telephone. See typical telephone keypad layout below.



Many of the commands use three letters that represent an abbreviation of the selected command. For example, to Set a High limit on Zone 1 you would press S + H + 1 (or in numeric form 7 + 4 + 1)

The tables below list all of the touch-tone commands that are supported. Commands are listed in both character and numeric formats. The # key is used as an ENTER key. Use the * key to represent a negative sign or to represent the [CODE] key when programming telephone numbers.

## Enable/Disable Zones

This command will toggle the selected zone between the enabled or disabled state.

| Description | Touch-Tone Command |
|---|---|
| Enable/Disable Zone | * + Z(9) + (zone number) |

## Set and Recite High & Low Alarm Limits

The following commands are used to set or recite the Low Alarm Limit for any Zone.

| Description | Touch-Tone Command |
|---|---|
| Set Zone Low Limit | S(7) + L(5) + (zone #) + (value) + # |
| Description | Touch-Tone Command |
| What Is Zone Low Limit | W(9) + L(5) + (zone #) |

The following commands are used to set or recite the High Alarm Limit for any Zone.

| Description | Touch-Tone Command |
|---|---|
| Set Zone High Limit | S(7) + H(4) + (zone #) + (value)+ # |
| Description | Touch-Tone Command |
| What Is Zone High Limit | W(9) + H(4) + (zone #) |

## Set and Recite Telephone Numbers

The following commands will allow you to program and recite dialout telephone numbers. You may need to use the Special Dialing Codes below.

**Special Dialing Codes Summary**

Code 1: Numeric pager type

Code 2: Wait for answer

Code 3: Change to Touch-Tone

Code 4: Pause

Code 5: Star (*)

Code 6: Pound (#)

| Description | Touch-Tone Command |
|---|---|
| Setting a phone number | S(7) + T(8) + (entry 1–4) + (telephone number) + # |

| Description | Touch-Tone Command |
|---|---|
| Reciting a phone number | W(9) + T(8) + (entry 1–4) |

### Record and Play Custom Voice Messages

The following commands will allow you to record and play back custom voice messages for the ID message (0) and each zone (1–4).

| Description | Touch-Tone Command |
|---|---|
| Record a Message | S(7) + M(6) + (entry 0–4) |

| Description | Touch-Tone Command |
|---|---|
| Play a Message | W(9) + M(6) + (entry 0–4) |

### Control the Relay Output

The following commands will allow you to check the status of the relay output and to toggle the Relay Output On and Off.

| Description | Touch-Tone Command |
|---|---|
| Reciting the Output Status | W(9) + R(7) + O(6) |

| Description | Touch-Tone Command |
|---|---|
| Switching the Output | S(7) + R(7) + O(6) |

### Activate Microphone Listen-in

The following command will allow you to activate the microphone listen-in for the programmed duration.

| Description | Touch-Tone Command |
|---|---|
| Activate Mic Listen-in | M(6) + I(4) + C(2) |

### Request Status Report

The following command will initiate a status report.

| Description | Touch-Tone Command |
|---|---|
| Recite status report | W(9) + S(7) + R(7) |

### Hang-up

The following command will make the 400 hang up the telephone line.

| Description | Touch-Tone Command |
|---|---|
| Hang-up the phone line | B(2) + Y(9) + E(3) |

# CHAPTER 7: OPERATION

After installation and programming is completed, the Model 400 is fully operational. This chapter explains the sequence of events that occur during an alarm dialout to illustrate how the Model 400 operates.

## 7.1 ALARM DETECTION, DIAL-OUT AND ACKNOWLEDGMENT

Generally, an alarm event is structured in the following manner:

I. The Model 400 detects an alert condition due to a change at the sensor.

II. A valid alarm is recognized.

III. Dial-out begins.

IV. The alarm is acknowledged.

Often, an alarm does not proceed through all stages: either an alert condition does not persist long enough to be considered valid, or a valid alarm is cancelled.

The table on the following pages explains the alarm detection, dial-out and acknowledgment features and lists important variable factors affecting their operation.

| **I. Model 400 Detects a Change at the Sensor** | **Variable Factors** |
|---|---|
| Model 400 detects a change in the monitored condition (from the sensor wired to one of the zones). This is considered an alert condition, and does not qualify as a valid alarm at this point.<br><br>The condition continues throughout the programmed Recognition Time. If the condition (or sensor) reverts to its normal state before the Recognition Time is reached, no alarm will occur. | *Zone Type: (1) An open circuit closes, (2) a closed circuit opens, or (3) temperature limits are exceeded.*<br><br>*Recognition Time: Activated* |
| **II. A Valid Alarm is Recognized** | **Variable Factors** |
| The condition must persist long enough to meet or exceed the programmed Recognition Time. When Recognition Time has expired, but the alert condition continues, the Model 400 will determine that a valid alarm exists.<br><br>When a valid alarm is determined, Call Delay is activated, forcing the Model 400 to wait for a programmed period of time before starting the dial-out process. Call Delay applies to the period just prior to dial-out, before the first telephone call is made.<br><br>Call Delay provides the opportunity to cancel a valid alarm at the Model 400's installation site, before dial-out occurs. An audible voice message indicates which of the zones is in alarm. If on-site personnel acknowledge the alarm within the Call Delay time, the Model 400 will not dial out. (Local Voice Mute is disabled, so that alarm messages can be heard at the site.) | *Recognition Time: Expired*<br><br>*Valid Alarm: Exists*<br><br>*Call Delay: Activated*<br><br>*Alarm Message: Audible, On-site Activated*<br><br>*Local Voice Mute: Disabled* |

| **III. Dial Out Begins** | **Variable Factors** |
|---|---|
| The dial-out process is activated as soon as the Call Delay time expires (if the alarm has not been cancelled at the Model 400's installation site.) The dial-out begins with telephone number 1 and proceeds sequentially, through the remaining telephone numbers. | *Call Delay: Expired* |
| If the alarm is not acknowledged with the first dial-out telephone call, the Model 400 waits the duration of Intercall Time before dialing the next telephone number. Intercall Time is the programmed waiting period in between each dial-out telephone call. | *Intercall Time: Activated* |
| When the telephone is answered, the programmed Voice Repetitions determine the number of times per call the Model 400 recites the alarm message. | *Voice Repetitions: Activated* |
| Call Progress, an automatic feature, enables the Model 400 to detect whether or not the telephone call is answered. After 10 rings, or if a busy signal is encountered, the Model 400 will hang up, wait the programmed Intercall Time, and proceed to dial the next telephone number. | *Call Progress: Activated* |
| If no telephone calls are answered, the Model 400 dials out sequentially, through the remaining telephone numbers and continues to cycle until the programmed Maximum Number of Calls is reached. | *Max Calls: Activated* |
| When the telephone is answered, the Model 400 will immediately begin reciting a message that indicates which of the zones is in alarm. At the same time, the alarm message is repeating at the Model 400's installation site. The Model 400 will request acknowledgment, if it has not yet occurred. | *Alarm Messages: By Telephone and On site* |

| IV. The Alarm Is Acknowledged | Variable Factors |
|---|---|
| At any time after a valid alarm is determined, the alarm may be acknowledged at the Model 400's installation site, by pressing ALARM CANCEL key. | *Local, On-site Acknowledgment* |
| When the Model 400 dials out and the call is answered via Touch-Tone telephone, any alarm may be instantly acknowledged by pressing "555." | |
| If the alarm message repeats for the number of programmed Voice Repetitions, and "555" has not been entered, the Model 400 will say: | *Touch-Tone Acknowledgment: Fast Code 555* |
| *"Enter acknowledgement code."* | |
| The Model 400 waits 10 seconds for the Touch-Tone code "555" to be entered. If the code is entered within 10 seconds, it responds: | |
| *"Alarm acknowledged."* | *Touch-Tone Acknowledgment: Normal Code 555* |
| The alarm is considered acknowledged and the dialout concludes. | |
| If the Model 400 does not receive the Touch-Tone code within 10 seconds, it recites the following: | |
| *"Error, enter acknowledgement code."* | *Tone or Pulse Callback Acknowledgment: Within Intercall Time* |
| If the Model 400 does not receive the acknowledgement code a second time, it says "error, goodbye" and hangs up. The recipient of this message must call the Model 400 back within the period programmed for Intercall Time, in order to acknowledge the alarm. If Local Voice Mute is off, the unit will beep at the installation site while waiting for this call. | |
| Callback Acknowledgement: If enabled, the Model 400 waits 10 rings before answering to guard against random acknowledgment. If an answering device is connected to the same line as the Model 400 (and TAD is enabled), you must call the unit and let the line ring once, then hang up, wait ten seconds and call back again within 30 seconds. The Model 400 will answer on the first ring. It will recite any unacknowledged alarms, then say: | |
| *"Alarm acknowledged, goodbye."* | |

| | Variable Factors |
|---|---|
| When the Model 400 hangs up, the alarm is acknowledged and dial-out stops.<br>If calls remain unanswered, or if they are received by an answering machine or FAX, the Model 400 continues the dialout sequence; it waits the Intercall Time and proceeds to dial the next telephone number. Telephone numbers are dialed sequentially, and this cycle continues for the number of Max Calls programmed. If no acknowledgment occurs, then at the completion of Max Calls, the alarm is automatically acknowledged and the dial-out process is terminated. | *Tone or Pulse*<br>*Callback Acknowledgment: TAD Enabled*<br>*Max Calls Acknowledgment* |

**NOTE:** Acknowledging the alarm does not correct the situation! The alarm condition will still exist until the sensor is restored to its normal state.

## 7.2 EXAMPLE: A DIAL-OUT TELEPHONE CALL

The following parameters are selected for demonstration purposes:

- Model 400 Unit ID Number is set to 555-5674. It is currently installed at your place of business.
- Dial-out Telephone Number 1 is programmed to 555-1234, your home telephone number.
- Voice Repetitions are set to 4.

The Model 400 is detecting an alarm on zone 2.

The telephone rings at 555-1234, your home number.

You answer the telephone and hear the following message:

*"Hello, this is 555-5674. This is the Sensaphone 400 at John's Printing Express. It is now 12:30 Am. Zone two, back door security sensor, alarm exists, it is not okay."*

(4-seconds to hear on-site sound from unit's microphone.)

*"Hello, this is 555-5674. This is the Sensaphone 400 at John's Printing Express. It is now 12:30 Am. Zone two, back door security sensor, alarm exists, it is not okay."*

(4-seconds to hear on-site sound from unit's microphone.)

*"Hello, this is 555-5674. This is the Sensaphone 400 at John's Printing Express. It is now 12:30 Am. Zone two, back door security sensor, alarm exists, it is not okay."*

(4-seconds to hear on-site sound from unit's microphone.)

*"Hello, this is 555-5674. This is the Sensaphone 400 at John's Printing Express. It is now 12:30 Am. Zone two, back door security sensor, alarm exists, it is not okay."*

(4-seconds to hear on-site sound from unit's microphone.)

*"Enter acknowledgement code."*

**NOTE:** It is important that your dial-out telephone numbers be answered by you or other authorized personnel in order to ensure adequate response to an alarm.

# CHAPTER 8: CONTROLLING THE OUTPUT

The Sensaphone 400 includes a relay output that can be used to control a light, siren, or other device. The output is a Form-C Normally Open/ Normally Closed mechanical relay and is rated for up to 30VAC/VDC 1A. A sample wiring diagram is shown below:

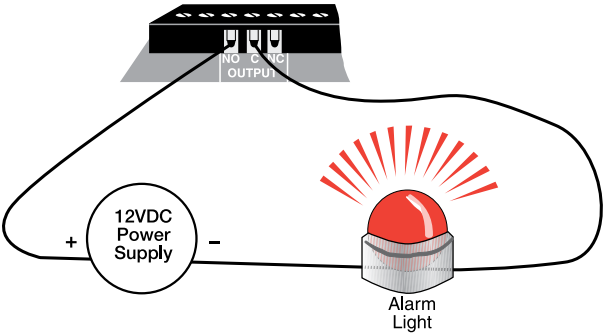



Figure 1: Relay output connected to alarm

The output can be programmed to operate in one of 9 automatic modes or it can operate in manual mode (default). The 9 automatic modes allow the output to automatically turn on and off based on individual alarms or any alarm. In manual mode the output is controlled via keypad command or remotely via touch-tone phone. A description of each mode is described below.

## 8.1 OUTPUT MODES

| Mode | Description |
|---|---|
| 1 | Output on when zone 1 goes into alarm. Off when alarm is acknowledged. |
| 2 | Output on when zone 2 goes into alarm. Off when alarm is acknowledged |
| 3 | Output on when zone 3 goes into alarm. Off when alarm is acknowledged. |
| 4 | Output on when zone 4 goes into alarm. Off when alarm is acknowledged. |
| 9 | Output on when a Sound alarm occurs. Off when alarm is acknowledged. |
| 0 | Output on when a Power alarm occurs. Off when alarm is acknowledged. |

| Mode | Description |
|---|---|
| **Phone** | Output on when phone line is unplugged for more than 15 seconds. Off when a phone line is plugged in. |
| • | Output on when any alarm occurs. Off when all alarms are acknowledged. |
| # | Output controlled manually via keypad command or touch-tone. |

### 8.1.1 TO PROGRAM THE OUTPUT MODE:

1. Press the SET key.




2. Press the OUTPUT key.




The 400 will say "Enter output mode."

3. Using the number keys, enter a value for the output mode.




4. Press the ENTER key.




The 400 will say "OK" and recite a description of the mode selected, such as "Automatic on Zone 1" or "Manual." Note that when Mode * is selected, the 400 will simply say "Automatic on Alarm," meaning that the output will automatically turn on when any alarm occurs.

### 8.1.2 TO PLAY BACK THE PROGRAMMED OUTPUT MODE:

1. Press WHAT IS.




2. Press OUTPUT.

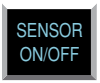



The 400 will recite the programmed output mode.

## 8.2 SWITCHING THE OUTPUT USING THE KEYPAD

When programmed for Manual mode, the command to switch the output is:

SENSOR ON/OFF + OUTPUT.







The 400 will respond "The output is on/off" to indicate the state of the output.

> **Note:** If the 400 says "Error," the output is not programmed for manual mode.

### 8.2.1 SWITCHING THE OUTPUT OVER THE PHONE

The following commands will allow you to check the status of the relay output and to toggle the Relay Output On and Off.

To recite the Output Status press W(9) + R(7) + O(6)




To switch the Output press S(7) + R(7) + O(6)



## 8.3 TYPICAL APPLICATIONS

### Heating Up Your Cottage Or Cabin Remotely

If you keep your cottage or cabin open all year around, or if you do not drain your pipes and add antifreeze to your plumbing, you likely keep your furnace active when you are away but at a very low temperature. The Sensaphone will provide an invaluable service to you by keeping you updated to any change in the status of your furnace operation. Prior to your arrival at your cottage or cabin, you can remotely use your Sensaphone 400 to raise the thermostat and increase the heat.

Most furnaces use a typical 4-wire (heat/cooling) or 3-wire (heat only) thermostat. The Sensaphone can easily control these types of thermostats. **If your heating source consists of high voltage electric baseboard heaters, you should consult a qualified electrician or heating professional for proper installation of the Sensaphone remote control facility**. Electric baseboard heaters may utilize either a low voltage (2-wire) thermostat or a direct control high voltage thermostat. Only the low voltage thermostat may be directly connected to the Sensaphone.

### 8.3.1 SINGLE THERMOSTAT CONTROL

There are two installation methods that can be used to remotely change the thermostat setting in your cottage or cabin; the single thermostat method and the dual thermostat method (see section 8.3.2 for details on the dual thermostat method). The single thermostat method requires you to install a model with an input to switch between two temperature settings. Sensaphone offers a 7-day programmable thermostat and power supply which has this feature (order part #'s FGD-0064 & XFR-0024). This thermostat has been carefully chosen to work with the model 400 to allow remote control between normal or vacation mode. You will need to replace your current thermostat, so if you are unsure about performing this work yourself, please contact a licensed heating/cooling professional for installation assistance. Follow the manufacturer's instructions for installing the thermostat.

The Model 400 will need to be wired to the thermostat to control it. For a visually appealing installation you may want to locate the Sensaphone close to your heater so that the cable follows the same path as the one from your heater to the thermostat. An added benefit of this location is that you can easily add a water sensor to monitor for leaks around your hot water heater or other plumbing. Typically the water heater is located near the heating and cooling system.

**Step 1: Install the thermostat.**

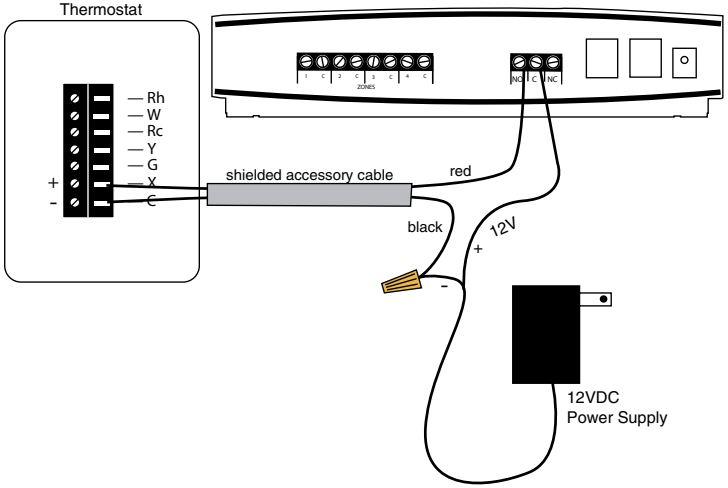
Refer to the manufacturer's instructions for installation. For installation assistance, contact Aube Technologies at 1-800-831-AUBE.

**Step 2: Mount the Sensaphone 400.**

Choose a location for your Sensaphone that allows for easy wiring to the thermostat, such as near your heater/air conditioning system. Mount the unit on a wall or flat on a desktop or table surface. Plug in the power supply and connect the telephone line.

**Step 3: Connect cable from thermostat to Sensaphone 400.**

This Sensaphone 400 has a terminal strip below the input/output wiring door that will connect to the 12VDC power supply and X & C terminals of the thermostat (See Figure 1). This connection is required to switch the thermostat between normal and vacation modes. Run a two-conductor cable from the thermostat to the Model 400. On the thermostat, connect the red wire to the X (+) terminal, and the black wire to the C (-) terminal. On the 400, connect the red wire to the NO terminal. Connect the black wire to the negative wire from the power supply. Use a wire nut to complete this connection. Connect the positive wire from the power supply to the "C" terminal on the model 400.




**Step 4: Program the Thermostat.**

Refer to the manufacturers instructions for programming the thermostat. Be sure to program settings for both normal and vacation modes.

## Controlling the Thermostat

The operating mode of the thermostat (normal/vacation) can be controlled at the Model 400 keypad or remotely via Touch-Tone comands. Both methods are described below:

**Keypad commands:**

1) To enable Vacation Mode, press the [SENSOR ON/OFF] key, then the [OUTPUT] key. The unit will respond by saying "ON" to indicate that Vacation Mode is set. The Suitcase icon  will appear and blink on the thermostat LCD.

2) To enable Normal Mode, press the [SENSOR ON/OFF] key, then the [OUTPUT] key. The unit will respond by saying "OFF" to indicate that Normal Mode is set. The Sun  or Moon  icon will appear on the thermostat LCD.

## TouchTone Commands:

Call the Sensaphone. When the unit answers, it will begin reciting a status report. At any time during the call, press a Touch-Tone. The unit will respond with "OK." The Sensaphone is now ready to accept Touch-Tone commands.

1) To enable Vacation Mode, press SRO (776). The unit will respond by saying "ON" to indicate that Vacation Mode is set. The Suitcase icon  will appear and blink on the thermostat LCD.

2) To enable Normal Mode, press SRO (776). The unit will respond by saying "OFF" to indicate that Normal Mode is set. The Sun  or Moon  icon will appear on the thermostat LCD.

3) To check the status of the ouput press WRO (976). The unit will respond "OFF" for Normal Mode or "ON" for Vacation Mode.

4) Hang up.

### 8.3.2 DUAL THERMOSTAT CONTROL

When a three or four wire low voltage thermostat is used, it is easy to connect the Sensaphone to your furnace with the addition of a secondary thermostat. One thermostat is set to your preferred "away" temperature and the other thermostat is set to your preferred "home" temperature. With your Sensaphone 400, you will be able to switch between these two thermostats using the relay output.

Ideally, the "away" thermostat would be in your pump or furnace room. Remember that your "away" thermostat will be the only thermostat that keeps your cottage or cabin at minimal heat while you are away. It should

not be located near a window or where direct sunlight might warm it, near a furnace radiator or vent, or any heat source such as a pilot light.

The second thermostat, the one pre-set for your preferred temperature when you arrive at your cottage or cabin, should be located in your normal living space. This would likely be your existing thermostat, already located in a suitable location by your heating professional at the time your furnace was installed.

By connecting these two thermostats together in a parallel fashion, and by passing the low voltage supply through the Sensaphone (See Figure 1), you can remotely or locally decide which thermostat is in control of your furnace.

It is recommended that the "away" thermostat be connected to the NC (Normally Closed) terminal while the "home" thermostat be connected to the N0 (Normally Open) terminal of the Sensaphone. This way, it's easy to understand which state your furnace is in: Output ON = Home and Output OFF = Away. The supply voltage from your furnace (typically the wire labeled R or 24VAC), should always be connected to the C (Common) terminal on the 400.

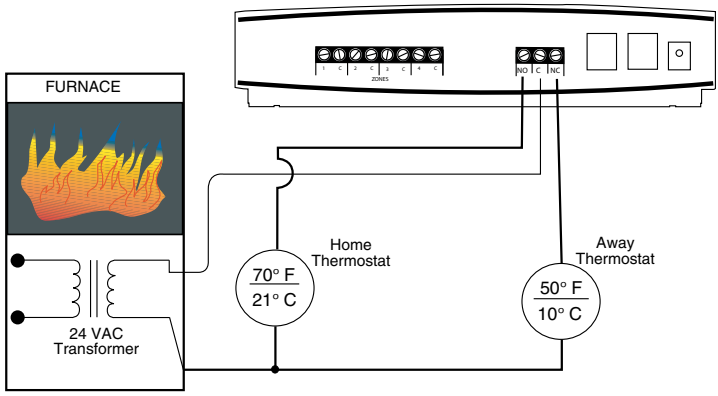



Figure 1: Dual Thermostat Setup

**Note:** This is a typical configuration when using standard single-zone heat/cool thermostats. For ease-of-use it is recommended that both thermostats be the same model. Note also that all thermostats may not be compatible with the dual-thermostat wiring diagram. Consult your heating/cooling professional for installation assistance.

## 8.3.3 CONTROLLING LIGHTS OR OTHER DEVICES

Using X10 technology, you can remotely activate any electrical device or appliance in your home through your Sensaphone. X10 technology is a suite of control modules that plug into your existing electrical outlets and transmit coded signals to lamps, lights, and appliances to turn them on or off (See Figure 2).

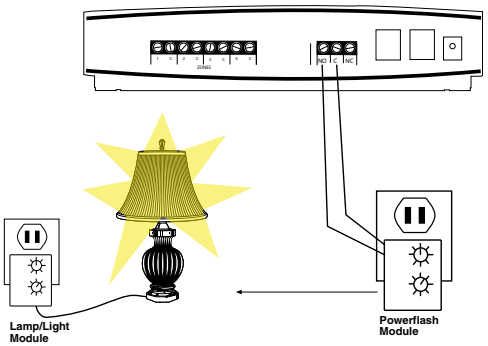



Figure 2: X10 Lighting Control Setup

Sensaphone supports these devices through use of the popular X10 Powerflash relay interface. To learn more about this technology, consult X10 products on the web at www.x10.com or visit your local electronics shop such as Radio Shack.

Such applications may include turning on a lamp or exterior lights remotely from your cellular telephone when arriving at your residence late at night. Or you can use the X10 Powerflash Module (set to momentary contact) in conjunction with the X10 Universal Module to remotely control your electric garage door opener over the telephone—an ideal way of letting in your service personnel without being on-site. You may also use the X10 technology to send the ON/OFF signal to a furnace or heater if your thermostat is not easy to wire directly.

Finally, in addition to remotely controlling devices, X10 technology lets you extend the reach of certain Sensaphone sensors such as door contacts, motion sensors, or water sensors. This is of great benefit where it is impossible to wire directly from your sensors to your Sensaphone. Consult a qualified electrician or your heating professional for assistance with locating your remote sensors or contact your Sensaphone dealer.

# APPENDIX A: WEEKLY TESTING PROCEDURE

We recommend that you test your Sensaphone weekly to be sure it is functioning properly. This will ensure that when a problem arises the Sensaphone will be ready to alert the appropriate personnel.

There are several tests that can be performed:

1) Call the unit and listen to the Status Report. This will test the unit's ability to answer the phone and speak a message. It will also verify that all of the zones are reading properly, the alarm conditions are OK, the electricity is on, the microphone is functioning, and the batteries are OK.

2) Create an alarm on each zone by tripping all connected sensors.
   Temperature sensors: Heat or cool the sensor.

   Motion sensors: Have someone walk in front of the sensor.

   Door/window sensors: open the door/window.

Water sensors: Apply a small amount of water beneath the sensor or use a wet towel and touch it to the sensor probes.

Humidity sensors: Raise the humidity around the sensor by holding a cup of very hot water beneath the sensor.

Allow the unit to contact all programmed telephone numbers. This will make sure that the Sensaphone is programmed properly. It will also prepare personnel to respond appropriately when they receive a call from the Sensaphone.

3) Test the batteries by unplugging the AC adapter and making sure that the Sensaphone continues to function. Press WHAT IS, then STATUS on the keypad, and listen to the status report. Make sure the report states that "the power is off" and "batteries are OK." Keep the AC adapter unplugged so that a Power Failure alarm occurs. Allow the unit to dial all programmed telephone numbers while running on battery backup. Plug in the AC adapter after the unit has finished dialing all of the telephone numbers.

4) If you are using your Sensaphone to listen for a smoke alarm, then be sure to test the smoke alarm to make sure that the Sensaphone picks up the audible signal and triggers a high-sound-level alarm. Allow the unit to dial all programmed telephone numbers.

5) Keep a log of your tests, noting the date and whether the 400 passed in each category tested. An example of such a log is shown below. (See "Test Log" at the end of this manual.)

400 Test Log

| Date | Inputs | | Dialout | | Call-in | | Tested by |
|---|---|---|---|---|---|---|---|
| | Pass | Fail | Pass | Fail | Pass | Fail | |
| 7/1/04 | X | | X | | X | | Bob H |
| 7/15/04 | X | | X | | X | | Alex G. |
| 7/22/04 | X | | X | | X | | Bob H. |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

If you require assistance, call Sensaphone Technical Support at 610-558-2700.

# APPENDIX B: TROUBLESHOOTING

In the event that a problem is encountered, this section will assist you in determining the cause, so you can return the unit to its usual monitoring routine with minimal interruption.

Most problems with the Model 400 are easy to identify and quickly corrected, and are found under the following general headings:

- Error Messages
- Communications/dial-out functions
- Temperature monitoring
- Sound level monitoring
- Other monitoring functions

If you have tried the solutions outlined in this section and are not satisfied with the results, call Sensaphone Technical Support at 610-558-2700, or follow the guidelines for shipping the Model 400 to Sensaphone for repair (see Appendix F).

## ERROR MESSAGES

| Problem | Cause | Solution |
|---|---|---|
| The unit says "Error 1." | An invalid value has been entered or too much time has passed without entering a value. | Only enter values within the allowed programming range, and make programming changes in a timely fashion. |
| The unit says "Error 2." | Programming changes were attempted without unlocking the keypad. | Unlock the keypad, then make programming changes. |

## COMMUNICATIONS / DIAL OUT

| Problem | Cause | Solution |
|---|---|---|
| 1)The Model 400 fails to dial out. | a) The telephone number may be incorrectly programmed. | Recheck programming steps. Refer to Chapter 4, Section 4.2.1. |
| | b) Tone or pulse (the current dialing method) is not compatible with the telephone line on which the Model 400 is installed. | Switch from the current setting: from tone to pulse, or from pulse to tone. Refer to Chapter 4, Section 4.3. |
| | c) Recognition Time is too long. An alert condition does not remain in effect long enough to become a valid alarm. | Reprogram Recognition Time. Set the Recognition Time to the minimum duration required to create a valid alarm. If possible, test the new setting by deliberately creating an alert condition. Refer to Chapter 5, Section 5.3. |
| | d) The Model 400 is connected to an incompatible telephone line. | The Model 400 must be connected to a standard (2-wire analog) telephone line, not a digital extension to a phone system. If the unit will not dial out and the factors previously listed have been ruled out, try connecting the unit to a standard residential telephone line. |

| Problem | Cause | Solution |
|---|---|---|
| 2. The Model 400 will not answer the telephone when called for a Status Report or alarm acknowledgment. | a) Rings Until Answer is incorrectly programmed. | Recheck programming of Rings Until Answer. Refer to Chapter 4, Section 4.5.1. |
| | b) The Model 400 is connected to an incompatible telephone line. | Some telephone systems will not allow the telephone to ring beyond 4 rings. If your Model 400's Rings Until Answer is set at more than 4 rings, you may not be able to access the unit. Try setting the Rings Until Answer to less than 4 rings. If this does not correct the problem, it may indicate telephone line incompatibility. In this case, try connecting the Model 400 to a standard, residential telephone line. |
| 3. The Model 400 will not answer the telephone for Callback Acknowledgement. | You did not allow the telephone to ring 10 times. Note: If the TAD (telephone answering device) is disabled, the telephone rings ten times before the Model 400 answers. If the TAD is enabled, you must call the unit and let the line ring once, then hang up, wait ten seconds and call back again within 30 seconds. | When calling the Model 400, and the TAD is disabled, allow the telephone to ring 10 times. Refer to Chapter 6, Section 6.1.3, and Chapter 4, Section 4.6.3. |
| 4. The Model 400 recites the alarm message or Status Report over the telephone, but is silent at the installation site. | The local voice mute feature is in effect. | Deactivate local voice mute. Refer to the programming steps in Chapter 4, Section 4.9. |
| 5. The Model 400 and telephone answering device (sharing the same line) answer incoming calls simultaneously. | The Model 400's number of Rings Until Answer is set to equal the number of rings set for the telephone answering device. | Change the number of Rings Until Answer for the Model 400. Refer to Chapter 4, Section 4.5. |

## TEMPERATURE MONITORING

| Problem | Cause | Solution |
|---|---|---|
| 1. Can't program temperature limits; or the unit won't read the temperature sensor. | The zone isn't configured to read a temperature sensor. | Press SET and CONFIGURE to program the zone. (See Section 5.1.1 for more information on configuring zones.) |
| 2. The temperature reading is -20° F or -30° C. | The temperature sensor has been disconnected or has broken wires. | Examine the wires to temperature sensor and connect or replace wiring. |
| 3. Temperature reads 150° F or 65° C. | Temperature sensor wires are touching or have shorted. | Verify and correct wiring. |
| 4. Temperature reading is inaccurate. | a) Temperature sensing may be affected by a source of ambient heat (ie., direct sunlight, or heat duct proximity).<br><br>b) Temperature may require calibration.<br><br>c) The unit is using the wrong temperature scale (Fahrenheit vs. Celsius). | Try moving the unit to a different location.<br><br>After moving or placing the unit away from ambient heat sources, the temperature may be calibrated to offset inaccurate normal reading by several degrees. Refer to Chapter 5, Section 5.6.<br><br>Verify temperature scale. Refer to Chapter 5, Section 5.5. |
| 5. False high temperature alarms from freezer. | Most freezers have a defrost cycle during which the temperature will rise considerably, thus causing an alarm to occur. | Program an zone recognition time longer than the defrost cycle. |
| 6. The Sensaphone calls with a high/low temperature alarm but recites a temperature that's within the programmed limits. | The Sensaphone recites the "current" temperature when it calls you, not the temperature at the time the alarm occurred. It is likely that the temperature has changed since the time the alarm was detected and has since returned to normal operating conditions. | Shorten the Call Delay or lengthen the Zone Recognition Time. |

## SOUND LEVEL MONITORING

| Problem | Cause | Solution |
|---|---|---|
| 1. False high sound alarms occur frequently. | The programmed sound sensitivity results in over-sensitivity to non-alarm sound as well as alarm sound.<br><br>Sound Recognition Time is too short. | Reprogram the sound sensitivity.<br>Refer to Chapter 5, Section 5.10.<br><br>Lengthen the sound Recognition Time.<br>Refer to Chapter 5, Section 5.10. |
| 2. High sound does not cause an alarm. | The unit is not close enough to the high sound source, or the programmed sound setting results in a lack of sensitivity to high sound. | Move the unit closer or reprogram the sound sensitivity.<br>Refer to Chapter 5, Section 5.10. |

## OTHER MONITORING

| Problem | Cause | Solution |
|---|---|---|
| 1. Alarm status of an alert zone is incorrect. | Incorrect zone normality. | Reconfigure the zone. Refer to Chapter 5, Section 5.1. |
| 2. False power out alarms | Programmed Recognition Time is too short. | AC power is often subject to brief interruptions. To avoid frequent, false alarms, increase the power Recognition Time. Refer to Chapter 5, Section 5.9. |
| 3. The Model 400 does not recognize power failure. | a) Batteries are either incorrectly installed or drained. | To verify proper battery function, unplug the unit and verify continued operation using batteries only. If unit ceases to function, first try reinstalling the batteries. If this is not successful, replace the batteries. Refer to Chapter 2, Section 2.4 for complete instructions. |
| | b) Recognition time setting is too long. | Reprogram Recognition Time. Set the Recognition Time to the minimum required before a valid alarm occurs. If possible, test the condition by deliberately creating an alert condition. Refer to Chapter 5, Section 5.9. |

| | | |
|---|---|---|
| 4. The Model 400 does not recognize any alarm. | a) Zones for alarm are disabled. | Enable the zones for alarm. Refer to Chapter 5, Section 5.2. |
| | b) Programmed Recognition Time is too long. | Reprogram Recognition Time. Set the Recognition Time to the minimum required for a monitored condition to become a valid alarm. If possible, test the condition by deliberately creating an alert condition. Refer to Chapter 5, Section 5.3. |
| 5. The batteries drain prematurely. | The unit's AC transformer is unplugged or for some other reason, full AC power is not available to the unit. | The batteries will take over powering the unit when the AC transformer is unplugged from the 120 VAC outlet. When storing the unit, be sure to remove the batteries. Refer to Chapter 2, Section 2.4. *Be sure to use alkaline batteries—do not use rechargeable batteries.* |

If the solutions offered above do not appear to correct the problem, apply the following steps, in the order shown.

- Remove the batteries.
- Unplug the unit.
- Wait one minute for the Model 400 to completely power down.
- Plug in the unit's AC adaptor into a standard 120 VAC outlet.
- Replace the batteries.

Refer to Chapter 2, Installation, for additional information on batteries and installation procedures.

# APPENDIX C: 400 QUICK REFERENCE

| Parameter | Description | Key Sequence* | Range | Default |
|---|---|---|---|---|
| Call Delay | Time delay until first call is made | [SET] or [WHAT IS] + [CALL DELAY] | Min: 00:00<br>Max 60:00<br>(min:sec) | 00:30<br>(min:sec) |
| Voice Reps | Number of times alarm message is repeated over the phone | [SET] or [WHAT IS] + [VOICE REPS] | Min: 1 rep<br>Max: 10 reps | 3 reps |
| Intercall Time | Time delay between phone calls | [SET] or [WHAT IS] + [INTERCALL TIME] | Min: 00:10<br>Max: 60:00<br>(min:sec) | 01:00<br>(min:sec) |
| Max Calls | Number of calls until unit self-acknowledges | [SET] or [WHAT IS] + [MAX CALLS] | Min: 1 call<br>Max: 255 calls | 100 calls |
| Temp Limits | High and low temperature alarm limits | [SET] or [WHAT IS] + [TEMP LIMITS] + [zone #] | Min: -20°F/-30°C<br>Max: 150°F/65°C | Low: 10°F<br>High:100°F |
| Calibrate | Temperature Correction factor | [SET] or [WHAT IS] + [CALIBRATE] + [zone #] | Min: -10°<br>Max: 10° | 0° |
| Recognition Time: zones 1–4 | Length of time a fault condition must exist to trip an alarm | [SET] or [WHAT IS]+ [RECOGNITION TIME] | Min: 00:00<br>Max: 540:00<br>(min:sec) | 00:03<br>(min:sec) |
| Recognition Time: Power Failure | Length of time the power must be off to trip an alarm | [SET] or [WHAT IS] +[RECOGNITION TIME]+[POWER] | Min: 0:00<br>Max: 540:00<br>(min:sec) | 05:00<br>(min:sec) |
| Recognition Time: High Sound Level | Length of time the sound must be high to trip an alarm | [SET] or [WHAT IS] +[RECOGNITION TIME] | Min: 5<br>Max: 60<br>(sec) | 00:08<br>(min:sec) |
| Clock | Real time clock | [SET] or [WHAT IS] + [CLOCK] + [time] + [AM] or [PM] | | 12:00 AM |
| High Sound Level Alarm Sensitivity | Microphone sensitivity for high sound level alarm | [SET] or [WHAT IS] + [CALIBRATE] + [SOUND] | Min: 1 unit<br>Max: 160 units | 32 units |
| Listen Time | Length of listen-in time during call-in status report | [SET] or [WHAT IS] + [LISTEN TIME] | Min: 0 sec<br>Max: 255 sec | 15 sec |
| Rings Until Answer | Number of rings until unit answers an incoming call | [SET] or [WHAT IS] + [RING] | Min: 1 ring<br>Max: 15 rings | 4 rings |

* press [ENTER] after all Key Sequences starting with [SET]

| Parameter | Description | Key Sequence* | Range/ Response | Default |
|---|---|---|---|---|
| TAD | Telephone Answering Device Compatibility | [SENSOR ON/OFF] + [TAD] | Enable / Disable | Disabled |
| ID Number | Sets the unit's telephone number | [SET] + [ID NUMBER] | 0-16 | |
| Dialout Test | Permits testing of dialout Telephone numbers | [SET] + [TEST]+ [1-8] | 1-8 | |
| Output Mode | Sets the relay output Mode | [SET] + [OUTPUT] | 1-4, *, #, PHONE | Manual |
| Output Control | Switches the relay output On or Off (manual mode) | [SENSOR ON/ OFF] + [OUTPUT] | | Off |
| Voice Message | Program or recite voice messages | [SET] or [WHAT IS] + [MESSAGE]+ [RECOGNITION TiME] + [zone#] | 0-4 | |
| Zone Configuration | Program or recite zone configuration | [SET] or [WHAT IS] +[CONFIG] | temp, NO, NC | No |
| Call Progress | Turns call progress Detection on or off | [SENSOR ON/ OFF] + [CONFIG] | Enable / Disable | Enabled |
| Telephone Number | Program or recite dialout telephone numbers | [SET] + [PHONE NUMBER] + [1-8] | | |
| Status Report | Recites a Status Report | [WHAT IS] + [STATUS] | | |
| Run/Standby Mode | Changes the operating mode between run and standby | [RUN/STANDBY] | | Run |

| Parameter | Description | Key Sequence | Response | Default |
|---|---|---|---|---|
| Speaker Mute | Turns off the speaker during alarm conditions | [SENSOR ON/OFF] + [MUTE] | On or Off | off |
| Designating A Zone Unused | Removes zone from status and alarm reports | [SENSOR ON/OFF] + [SET] + [zone #] | On or Off | On |
| Zone Enable/ Disable | Turns zone alarm detection on or off | [SENSOR ON/OFF] + [zone#] | Enabled / Disabled | Enabled |
| Power Alarm Enable/Disable | Turns power alarm detection on or off | [SENSOR ON/OFF] + [POWER] | Enabled / Disabled | Enabled |
| Sound Alarm Enable/Disable | Turns high sound level alarm detection on or off | [SENSOR ON/OFF] + [SOUND] | Enabled / Disabled | Enabled |
| Temperature Scale | Selects between Fahrenheit and Celsius | [SENSOR ON/OFF] + [F/C] | Fahrenheit or Celsius | Fahrenheit |
| Security Code | Prohibits programming changes | [SET] or [WHAT IS] + [CODE] + [4 digit code] | | none |
| Callback Acknowledgment | Turns Callback Acknowledgment on or off | [SENSOR ON/OFF] + [PHONE] | Enabled / Disabled | Disabled |

# APPENDIX D: ACCESSORIES

The sensors listed below are available from Phonetics, Inc., and represent the most commonly used zone devices. Other dry contact sensors, designed for more specialized applications, may also be used. Commercial or industrial electrical supply houses can provide devices to monitor virtually any condition. For further information, contact Sensaphone Customer Service at 610-558-2700.

| PART # | SENSOR / SWITCH |
|---|---|
| FGD-0006 | Magnetic Reed Switch |
| FGD-0007 | Passive Infra-Red Detector |
| FGD-0010 | 50’ two-conductor #22AWG Shielded Cable |
| FGD-0013 | Spot Water Detector |
| FGD-0022 | Temp° Alert |
| FGD-0064 | Surge Suppressor |
| FGD-0027 | Humidistat |
| FGD-0049 | Smoke Detector with Built-in Relay |
| FGD-0054 | Power-Out Alert™ |
| FGD-0056 | Zone Water Detector w/Water Rope |
| FGD-0063 | Additional 10’ Water Rope for FGD-0056 |
| FGD-0064 | Programmable Thermostat with Remote Setback |
| XFR-0024 | 12VDC Power Supply for Thermostat |
| FGD-0100 | Remote Temperature Sensor |
| FGD-0101 | Weatherproof Temperature Probe |
| FGD-0205 | Multi-Point Wireless I/O System |

# APPENDIX E: SPECIFICATIONS

## ALERT ZONES

**Number of Zones**: 4 (thermistor installed on zone #1 for local temperature monitoring)

**Zone Connector**: terminal block

**Zone Types**: N.O./N.C. contact, 2.8K thermistor ( -20° F to 150° F or -30° C to 65° C )

**Zone Characteristics**: 5.11K to 2.85V (Short circuit current: 1mA max.)

**A/D Converter Resolution**: 10 bits ±2 LSB

**Zone Protection**: 5.5VDC Metal Oxide Varistor with fast acting diode clamps.

## MICROPHONE

**Internal Electret Condenser**: For listening in to on-site sounds and detecting high sound levels.

## PHONE INTERFACE

**Line RJ11 Jack**: For connection to a two-wire analog telephone line. (6' modular cord included)

**Extension RJ11 Jack w/ Line Seizure**: For connecting other devices on the same telephone line, devices connected to this jack are disconnected in the event that the 400 must dial out for an alarm.

**Phone Line Protection**: Metal Oxide Varistor & self-resetting fuse

## LED INDICATOR

**System On**: On steady when the unit is in RUN mode. LED blinks once every few seconds while in STANDBY mode.

**Phone In Use**: On steady when the telephone line is being used. LED blinks when no dial tone is detected. Off when telephone line is not in use.

**Alarm**: Off when no alarm exists. Blinks when an unacknowleged alarm exists. On steady when an acknowledged alarm exists

**Battery Ok**: On steady when the battery is in good condition. Blinks when the battery is low. Off when the battery must be replaced.

## RELAY OUTPUT

Rated for 1A 30VAC/1A 30VDC maximum.

## POWER SUPPLY

**Power Supply**: 120VAC/9VDC 60Hz 6W wall plug-in transformer w/6' cord.

**Power Consumption**: 1.5 Watts

**Power Protection**: Metal Oxide Varistor

**Battery Backup**: Six size-C alkaline batteries (not included), providing up to 24 hours of back-up time.

## ENVIRONMENTAL

**Operating Temperature**: 32–122° F (0–50° C)

**Operating Humidity**: 0–90% RH non-condensing

**Storage Temperature**: 32°–140° F (0–60° C)

## PHYSICAL

**Dimensions**: 2.1"h x 7.8"w x 8.8"d

**Weight**: 2 lbs.

**Enclosure**: Indoor-rated plastic housing suitable for wall or desktop installation.

**Alarm**: Off when no alarm exists. Blinks when an unacknowleged alarm exists. On steady when an acknowledged alarm exists

**Battery Ok**: On steady when the battery is in good condition. Blinks when the battery is low. Off when the battery must be replaced.

# APPENDIX F: RETURNING THE UNIT FOR REPAIR

In the event that the Model 400 does not function properly, we suggest that you do the following:

1) Record your observations regarding the Model 400's malfunction.

2) Call the Technical Service Department at 610-558-2700 prior to sending the unit to Sensaphone for repair.

If the unit must be sent to Sensaphone for Servicing, please do the following:

1) Unplug the AC power supply from the wall outlet, remove the batteries, and disconnect all sensors from the alert zones.

2) Carefully pack the unit to avoid damage in transit. Use the original container (if available) or a sturdy shipping box.

3) You must include the following information to avoid shipping delays:

a) Your name, address and telephone number.

b) A note explaining the problem.

4) Ship your package to the address below:

**SERVICE DEPARTMENT**

**SENSAPHONE**

**901 Tryens Road**

**Aston, PA 19014**

5) Ship prepaid and insured via UPS or US Mail to ensure a traceable shipment with recourse for damage or replacement.

# APPENDIX G: TEST LOG

| Date | Inputs | | Dialout | | Call-In | | Battery | | | | Tested By |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |

| Date | Inputs | | Dialout | | Call-In | | Battery | | | | Tested By |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |
| | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | Pass ☐ | Fail ☐ | |

SectionG 2004.qxd 6/26/04 12:18 PM Page G-3



# Filtration Accessories

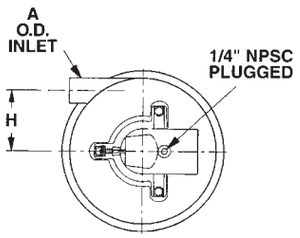
| Blower Connection Key |
|---|
| NPT – American National Standard Taper Pipe Thread (Male) |
| NPSC – American National Standard Straight Pipe Thread for Coupling (Female) |
| SO – Slip On (Smooth – No Threads) |

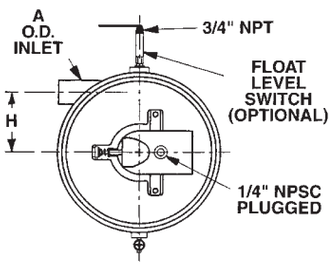
## Moisture Separator™

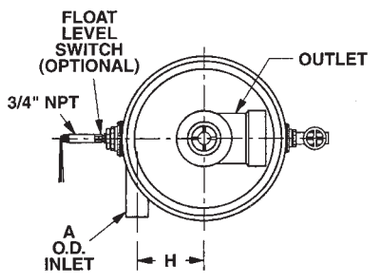
By separating and containing entrained liquids, Rotron's moisture separator helps protect our regenerative blowers and the end treatment system from corrosion and mineralization damage. Recommended for all soil vacuum extraction applications.

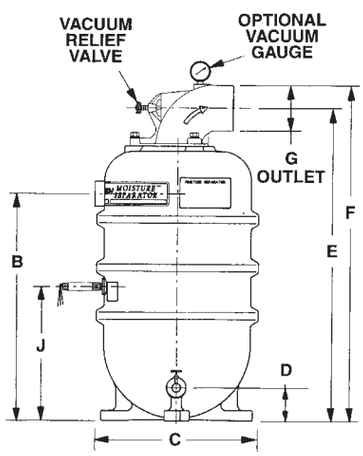
### SPECIFICATIONS:

SEPARATION METHOD – High Efficiency Cyclonic
RELIEF VALVE MATERIAL – Brass & Stainless Steel
FLOAT MATERIAL – Copper
FLOAT SWITCH – SPDT, Explosion-proof
NEMA 7&9, 5 Amp max.

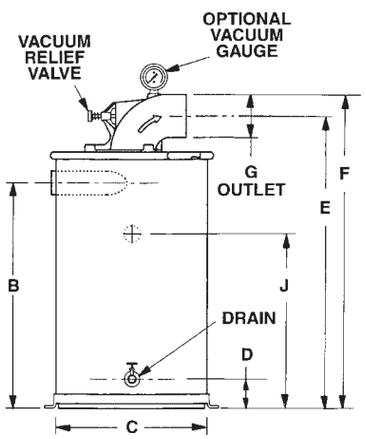


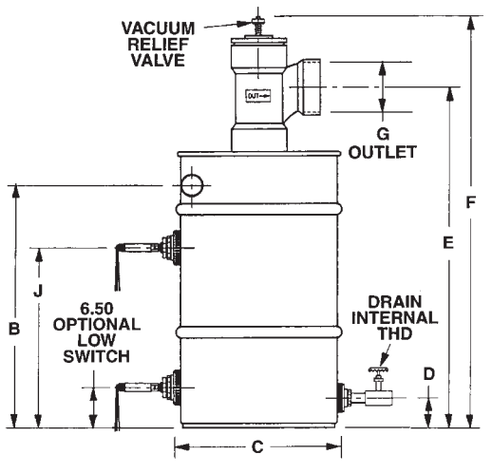




PLASTIC "P" DESIGN




METAL "D" DESIGN




METAL "B" DESIGN

| Model | Part No. | CFM Max. | A Dia. | B | C Dia. | D | E | F | G Dia. | H | J Switch | Drain Internal THD | Shipping Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MS200PS | 038519 | 200 | 2.38 | 22.46 | 16.00 | 3.25 | 31.05 | 33.30 | 4.50 OD | 6.00 | 13.25 | 3/4" NPT | 42 lb. |
| MS300PS | 038520 | 300 | 2.88 | | | | | | | | | | |
| MS200DS | 080086 | 200 | 2.00 | 22.12 | 16.75 | 2.75 | 27.92 | 30.17 | | 6.56 | 12.62 | | |
| MS300DS | 080087 | 300 | 2.50 | | | | | | | 6.81 | | | |
| MS350BS | 038357 | 350 | 3.25 | 28.00 | 23.00 | 4.00 | 37.25 | 39.50 | | 9.75 | 17.50 | 1" NPT | 82 lb. |
| MS500BS | 080660 | 500 | | | | | 37.37 | 54.50 | 6.63 ID | | | | 95 lb. |
| MS600BS | 080659 | 600 | 4.00 | 27.00 | | | | | | 9.25 | | | 96 lb. |
| MS1000BS | 038914 | 1000 | 6.00 | 31.00 | 27.00 | | 47.32 | 51.70 | 8.62 OD | 10.00 | 19.88 | | 150 lb. |

Models without float switch available. Metal MS200/300DS models are not the standard stocked, but are available.

Rev. 2/04

SectionG 2004.qxd 6/26/04 12:18 PM Page G-4



| Blower Model Reference Key | |
|---|---|
| A = SPIRAL | E = DR/EN/CP 656, 6, 623, S7 |
| B = DR/EN/CP 068, 083, 101, 202 | F = DR/EN/CP 707, 808, 858, S9, P9 (Inlet Only) |
| C = DR/EN/CP 303, 312, 313, 353 | G = DR/EN/CP 823, S13, P13 (Inlet Only) |
| D = DR/EN/CP 404, 454, 513, 505, 555, 523 | H = DR/EN/CP 909, 979, 1223, 14, S15, P15 (Inlet Only) |

# 2.0 Moisture Separator™ Specifications

## 2.1 DUTY

The moisture separator shall be designed for use in a soil vapor extraction system capable of continuous operation with a pressure drop of less than six inches of water at the rated flow of _____ SCFM. The separator shall be capable of operation under various inlet conditions ranging from a fine mist to slugs of water with high efficiency.

## 2.2 PRINCIPLE OF OPERATION

The moisture separator shall incorporate cyclonic separation to remove entrained water. The separator must protect against an overflow by fail safe mechanical means. An electrical switch or contact(s) alone is not an acceptable means of protection against overflow, but is a good backup.

## 2.3 CONSTRUCTION

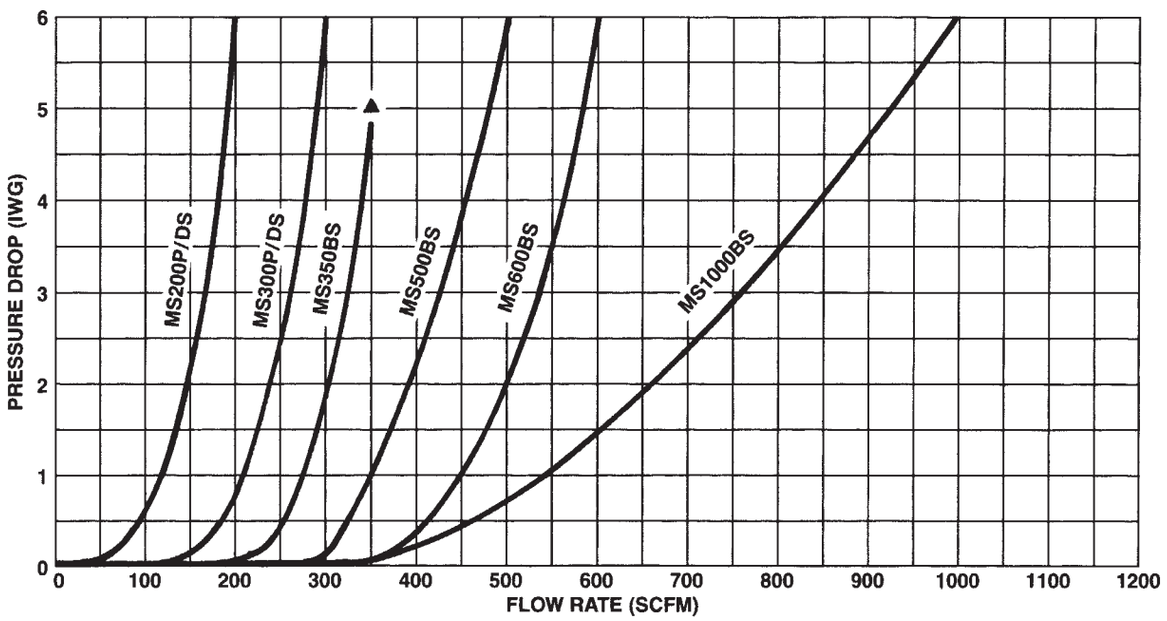
The body of the moisture separator shall be constructed of heavy wall plastic or heavy gauge cold rolled steel. The steel interior and exterior shall be epoxy (powder) coated to resist abrasion, corrosion, and chipping that might expose the surface. The inlet shall be tangentially located and welded to the body. The outlet port shall be constructed of PVC or cast aluminum alloy, flanged and sealed to the center of the top of the separator. The separator shall incorporate a non-sparking copper float ball and an adjustable relief valve to protect against overflow and overheating the blower.

## 2.4 CAPACITY AND DIMENSIONS

The moisture separator must have a liquid capacity of _____ gallons. The inlet shall be _____ inch OD slip-on type. The outlet shall be _____ inch OD slip-on type.

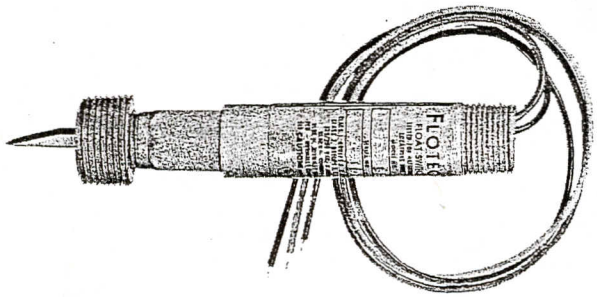
| For DR/EN/CP Blower Model | Selector Moisture Separator Model | Liquid-holding Capacity (gallons) | Inlet (OD) | Outlet | Max Vacuum Allowed (IHg) |
|---|---|---|---|---|---|
| 404<br>454<br>505<br>513<br>523<br>555<br>623<br>823 | MS200PS | 7 | 2.38 | 4.5" OD | 12 |
| | MS200DS | 10 | 2.0 | | 22 |
| 656<br>6<br>707 | MS300PS | 7 | 2.88 | | 12 |
| | MS300DS | 10 | 2.5 | | 22 |
| 808 | MS350BS | 40 | 3.25 | 6.63" ID | |
| 858<br>1223 | MS500BS | | | | |
| 909 | MS600BS | | 4.0" | | |
| 979<br>14 | MS1000BS | 65 | 6.0" | 8.62" OD | |

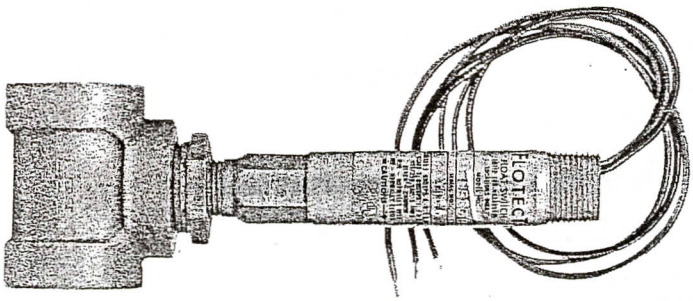
## 2.5 PRESSURE DROP



# FLOTECT™ MODEL L-6 FLOAT SWITCH

## Installation and Operating Instructions





**Explosion-Proof; U.L. and C.S.A. Listed -**
**Class I, Groups *A, B, C & D**
**Class II, Groups E, F & G**
**CENELEC: EExd IIC T6 (T amb=75°C)**
*(Group A, stainless steel body only)

### PHYSICAL DATA

**Temperature Limit:** 220°F (105°C) maximum
**Maximum Pressure:** See chart below
**Switches:** One or two SPDT snap switches
**Electrical Rating: U.L.:** 5A @ 125/250 VAC.
**C.S.A. and CENELEC:** 5A @ 125/250 VAC, 5A resistive, 3A inductive @ 30 VDC.
Optional ratings: MV option—Gold contacts for dry circuits. Rated 0.1A @ 125 VAC MT option: 400°F (205°C) 5A @ 125/250 VAC (not listed).
**Wiring Connections:** 3-18" (460mm) wire leads, 18 ga.
CENELEC models only: push-in type terminal blocks
Black = common, blue = N.O., red = N.C.
**Minimum Specific Gravity:**
Polypropylene float - 0.9
Round SS float - 0.7
Cylindrical SS float - 0.5
**Switch Body:** Brass 3/4" NPT conduit connection.
For SS switch body, change model no. to L6EPS.
**Piping/Mounting Connection:** 1" NPT
**Installation:** Horizontal, index arrow pointing down.
**Weight:** 1 lb. (.5 KG); w/external chamber 1-3/4 lb. (.8 KG)

### WETTED MATERIALS CHART

| Model | Brass | Bronze | Ceramic | Polypropylene | 301SS | 303SS | 304SS |
|---|---|---|---|---|---|---|---|
| B-S-3-A | X | | X | | X | | X |
| B-S-3-B | X | X | X | X | X | | |
| B-S-3-C | X | | X | | X | | X |
| B-S-3-H | X | X | X | | X | | X |
| B-S-3-O | X | | X | X | X | | |
| S-S-3-A | | | X | X | X | | X |
| S-S-3-C | | | X | | X | X | X |
| S-S-3-L | | | X | | X | X | X |
| S-S-3-O | | | X | X | X | X | |
| S-S-3-S | | | X | X | X | X | |

### MAXIMUM PRESSURE CHART

| Model Number | Float | Pressure Rating PSIG (KG/CM²) |
|---|---|---|
| L6EPB-B-S-3-A | Cylindrical SS | 200 (14) |
| L6EPB-B-S-3-B | Polypropylene | 250 (18) |
| L6EPB-B-S-3-C | Round SS | 350 (25) |
| L6EPB-B-S-3-H | Round SS | 250 (18) |
| L6EPB-B-S-3-O | Polypropylene | 1000 (70) |
| L6EPB-S-S-3-A | Cylindrical SS | 200 (14) |
| L6EPB-S-S-3-C | Round SS | 350 (25) |
| L6EPB-S-S-3-L | Round SS | 350 (25) |
| L6EPB-S-S-3-O | Polypropylene | 2000 (140) |
| L6EPB-S-S-3-S | Polypropylene | 2000 (140) |

### INSTALLATION:

Unpack switch and remove any packing material found inside lower housing or float chamber.

Switch must be installed with body in a horizontal plane and arrow on side pointing down.

If switch has an external float chamber (tee), connect it to vertical sections of 1" NPT pipe installed outside vessel walls at appropriate levels. If unit has no external float chamber, it must be mounted in a 1" NPT half coupling welded to the vessel wall. The coupling must extend through the wall.

Inspect and clean wetted parts at regular intervals.

### ELECTRICAL CONNECTIONS:

Connect wire leads in accordance with local electrical codes and switch action required. N.O. contacts will close and N.C. contacts will open when liquid level causes float to rise. They will return to "normal" condition on decreasing liquid level. Black = common, Blue = N.O. and Red = N.C.

For units supplied with both internal and external grounds, the ground screw inside the housing must be used to ground the control. The external ground screw is for supplementary bonding when allowed or required by local code. Some CSA listed models are furnished with a separate green ground wire. Such units must be equipped with a junction box, not supplied but available on special order.

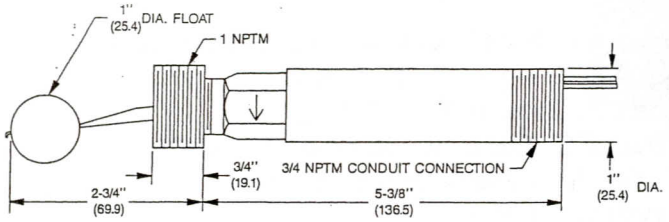
CENELEC certified models include a junction box. Cable should enter enclosure through an approved EX cable gland, not supplied. Push stripped and tinned leads into appropriate openings in terminal block(s). To connect fine stranded leads or to remove any wire, depress spring release with small screwdriver first.

All wiring, conduit and enclosures must meet applicable codes for hazardous areas. Conduits and enclosures must be properly sealed. For outdoor or other locations where temperatures vary widely, precautions should be taken to prevent condensation inside switch or enclosure. Electrical components must be kept dry at all times. **CAUTION:** To prevent ignition of hazardous atmospheres, disconnect the device from the supply circuit before opening. Keep assembly tightly closed when in use.

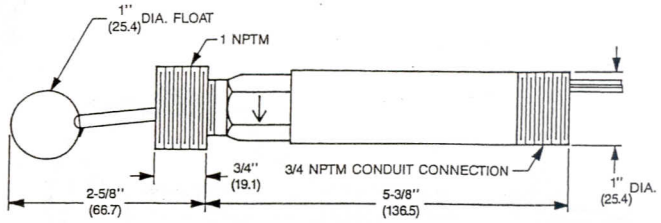
*Dimensions on reverse*

W.E. ANDERSON DIV., DWYER INSTRUMENTS, INC.
P. O. BOX 358 • MICHIGAN CITY, INDIANA 46360, U.S.A.
Telephone 219/879-8000
Fax 219/872-9057

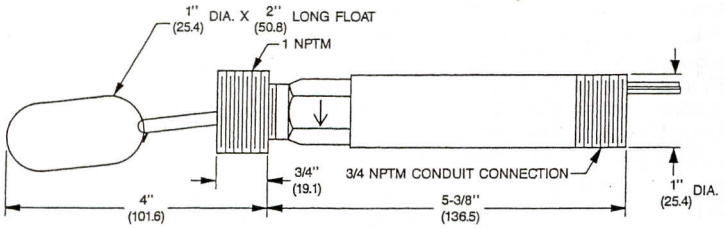
# FLOTECT™ MODEL L-6 FLOAT SWITCH — DIMENSION DRAWINGS



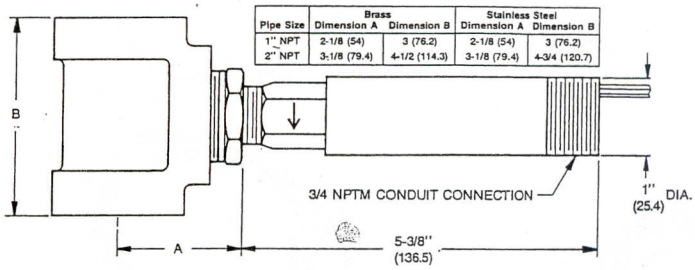

**Polypropylene Float**




**Round Stainless Steel Float**

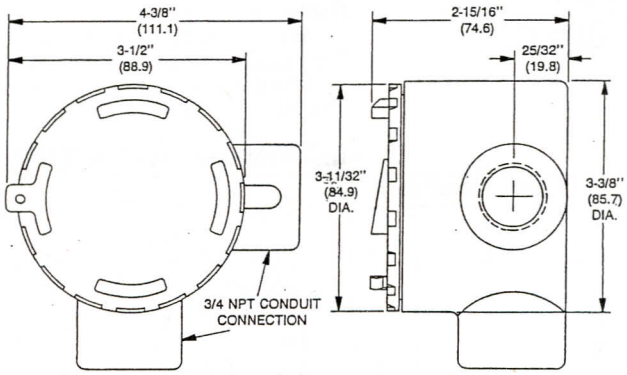



**Cylindrical Stainless Steel Float**




| Pipe Size | Brass Dimension A | Brass Dimension B | Stainless Steel Dimension A | Stainless Steel Dimension B |
|---|---|---|---|---|
| 1" NPT | 2-1/8 (54) | 3 (76.2) | 2-1/8 (54) | 3 (76.2) |
| 2" NPT | 3-1/8 (79.4) | 4-1/2 (114.3) | 3-1/8 (79.4) | 4-3/4 (120.7) |

**With External Float Chamber (Tee)**




**CSA, CENELEC Conduit Enclosure**

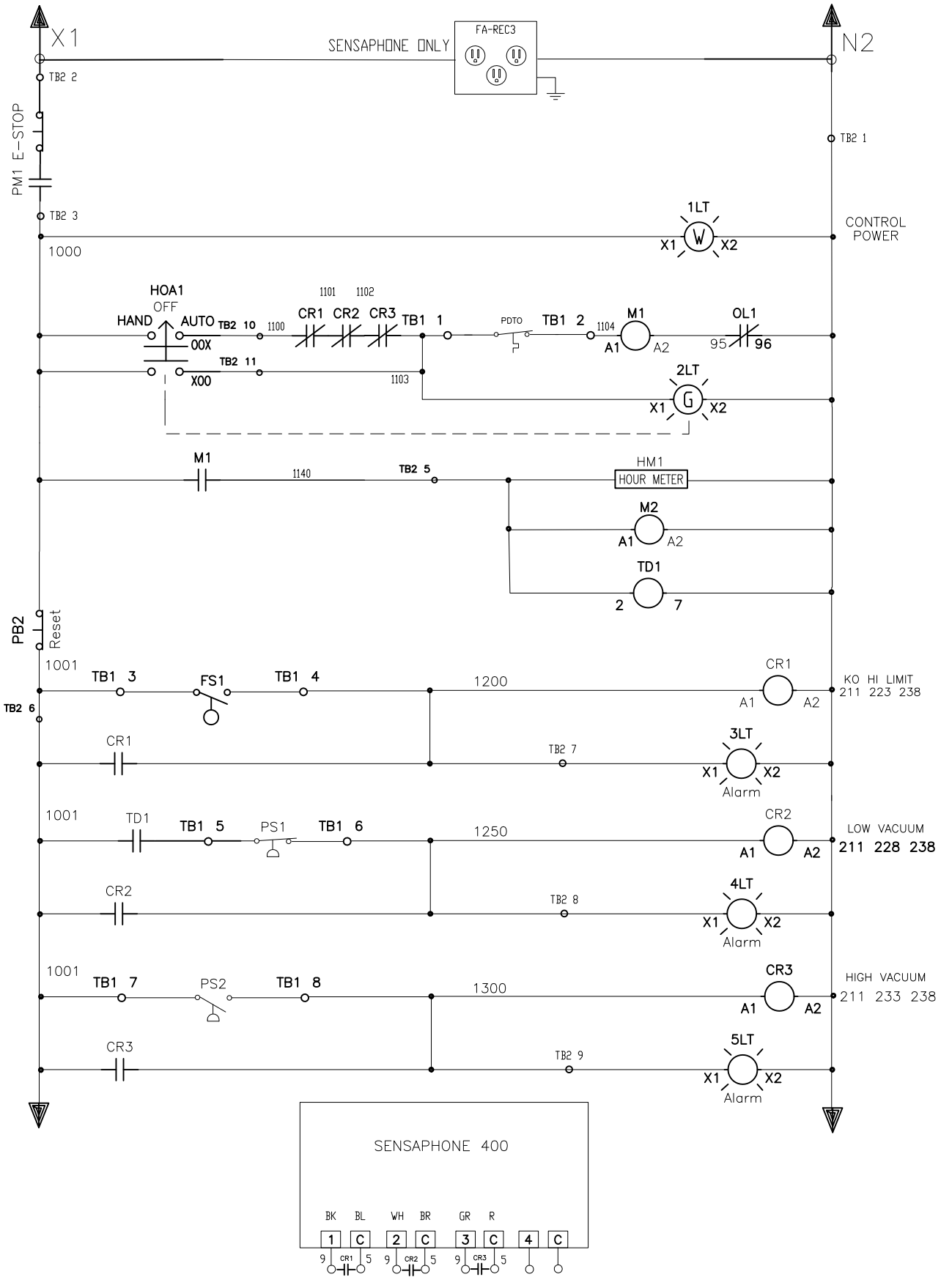
**Limited Warranty:** The Seller warrants all Dwyer instruments and equipment to be free from defects in workmanship or material under normal use and service for a period of one year from date of shipment. Liability under this warranty is limited to repair or replacement F.O.B. factory of any parts which prove to be defective within that time or repayment of the purchase price at the Seller's opinion provided the instruments have been returned, transportation prepaid, within one year from the date of purchase. All technical advice, recommendations and services are based on technical data and information which the Seller believes to be reliable and are intended for use by persons having skill and knowledge of the business, at their own discretion. In no case is Seller liable beyond replacement of equipment F.O.B. factory or the full purchase price. This warranty does not apply if the maximum ratings label is removed or if the instrument or equipment is abused, altered, used at ratings above the maximum specified, or otherwise misused in any way.

THIS EXPRESS LIMITED WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER REPRESENTATIONS MADE BY ADVERTISEMENTS OR BY AGENTS AND ALL OTHER WARRANTIES, BOTH EXPRESS AND IMPLIED. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE FOR GOODS COVERED HEREUNDER.

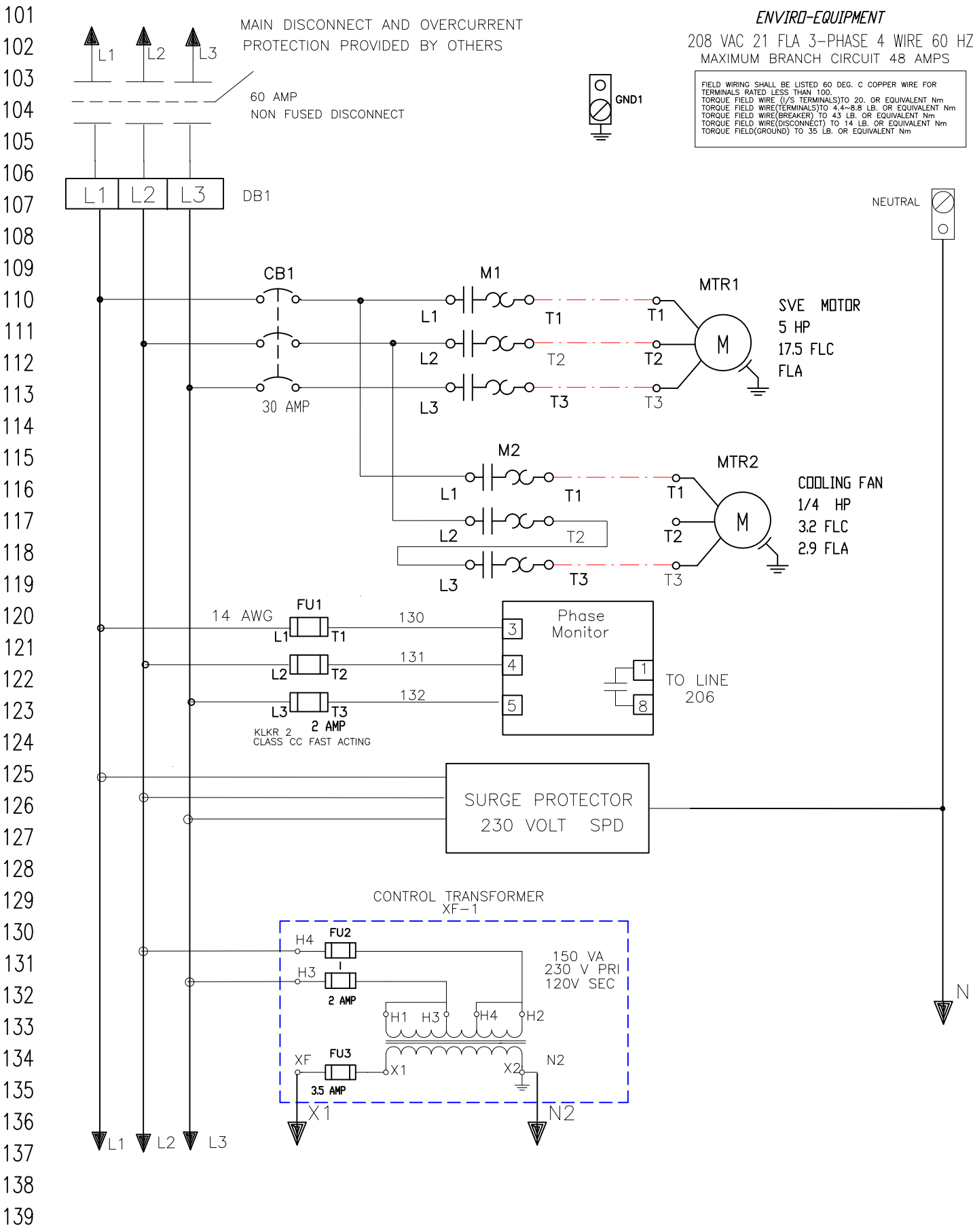
**Buyers Remedies:** THE BUYER'S EXCLUSIVE AND SOLE REMEDY ON ACCOUNT OF OR IN RESPECT TO THE FURNISHING OF NONCONFORMING OR DEFECTIVE MATERIAL SHALL BE TO SECURE REPLACEMENT THEREOF AS AFORESAID. THE SELLER SHALL NOT IN ANY EVENT BE LIABLE FOR THE COST OF ANY LABOR EXPENDED ON ANY SUCH MATERIAL OR FOR ANY SPECIAL, DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES TO ANYONE BY REASON OF THE FACT THAT IT SHALL HAVE BEEN NON-CONFORMING OR DEFECTIVE.

W.E. ANDERSON DIV. DWYER INSTRUMENTS, INC.
P.O. Box 358
Michigan City, IN 46360
Phone: 219/879-8000

©Copyright 1993 Dwyer Instruments, Inc.
FR 82-440726-00
Printed in U.S.A. 10/93




| | DATE | NAME | ENVIRO-EQUIPMENT | PROJECT: | DRAWING-NO.: |
|---|---|---|---|---|---|
| DRAWN BY | 07/14/15 | CKR | 10120 Industrial Drive<br>Pineville, NC 28134<br>704-556-7723 | EEI 3374 | JOB-NO.: |
| CKD BY | | | | PAGE DESCRIPTION | PAGE: 1 OF 2 |




| | DATE | NAME |
|---|---|---|
| DRAWN BY | 07/14/15 | CKR |
| CKD BY | | |

**ENVIRO-EQUIPMENT**
10120 Industrial Drive
Pineville, NC 28134
704-556-7723

PROJECT: EEI 3374

DRAWING-NO.:

JOB-NO.:

PAGE DESCRIPTION

PAGE: 1 OF 1

# Series 1950 Explosion-Proof Differential Pressure Switches

## Specifications - Installation and Operating Instructions




**Series 1950 Explosion-Proof Differential Pressure Switches** combine the best features of the Series 1900 Pressure Switch with an integral explosion-proof and weather-proof housing. Each unit is UL & CSA listed; FM approved for use in Class I, Groups C & D; Class II, Groups E, F, & G; and Class III atmospheres (NEMA 7 & 9). They are totally rain-tight for outdoor installations. Twelve models allow set-points from .03 to 20 inches w.c. and from .5 to 50 psi (3.4 to 345 kPa).

Easy access to the SPDT switch for electrical hook-up is provided by removing the top plate of the three-part aluminum housing. Adjustment to the set point of the switch can be made without disassembling the housing. The unit is very compact, about half the weight and bulk of equivalent conventional explosion-proof switches.

**CAUTION**
For use only with air or compatible gases. Use of the Model 1950 switch with explosive media connected to the Low pressure port (including differential pressure applications in such media) is not recommended. Switch contact arcing can cause an explosion inside the switch housing which, while contained, may render the switch inoperative. If switch is being used to sense a single positive pressure relative to atmosphere, run a line from the low pressure port to a non-hazardous area free of combustible gases. This may increase response time on -0 and -00 models.

**Note:** The last number-letter combination in the model number identifies the switch's electrical rating (number) and diaphragm material (letter). The 2F combination is standard as described in the physical data above. In case of special models, a number 1 rating is the same as 2; a number 3 or 4 rating is 10A 125, 250, 480 VAC; 1/8 H.P. 125 VAC; 1/4 H.P. 250 VAC; a number 5 or 6 rating is 1A 125 VAC. Letter B indicates a Buna-N diaphragm; N = Neoprene; S = Silicone; and V = Viton®.

**UL and CSA Listed, FM Approved For**
CL. I GR. C, D - CL. II GR. E, F, G - CL. III

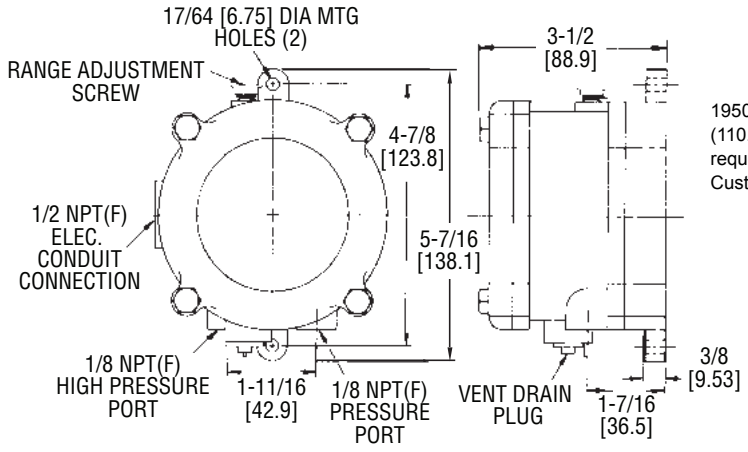
**Series 1950 Switches**
Operating ranges and deadbands

| To order specify Model Number | Operating Range: Inches, W.C. | Approximate Dead Band | |
|---|---|---|---|
| | | At Min. Set Point | At Max. Set Point |
| 1950-02-2S | 0.03 to 0.10 | 0.025 | 0.05 |
| 1950-00-2F | 0.07 to 0.15 | 0.04 | 0.05 |
| 1950-0-2F | 0.15 to 0.5 | 0.10 | 0.15 |
| 1950-1-2F | 0.4 to 1.6 | 0.15 | 0.20 |
| 1950-5-2F | 1.4 to 5.5 | 0.3 | 0.4 |
| 1950-10-2F | 3.0 to 11.0 | 0.4 | 0.5 |
| 1950-20-2F | 4.0 to 20.0 | 0.4 | 0.6 |
| | Operating | Approximate Dead Band | |
| Model Number | Range: PSI | Min. Set Point | Max. Set Point |
| 1950P-2-2F | 0.5 to 2.0 | 0.3 psi | 0.3 psi |
| 1950P-8-2F | 1.5 to 8.0 | 1.0 psi | 1.0 psi |
| 1950P-15-2F | 3.0 to 15.0 | 0.9 psi | 0.9 psi |
| 1950P-25-2F | 4.0 to 25.0 | 0.7 psi | 0.7 psi |
| 1950P-50-2F | 15.0 to 50 | 1.0 psi | 1.5 psi |

**SPECIFICATIONS**
**Service:** Air and non-combustible, compatible gases.
**Wetted Materials:** Consult factory.
**Temperature Limits:** -40 to 140°F (-40 to 60°C); 0 to 140°F (-17.8 to 60°C) for 1950P-8, 15, 25, and 50. -30 to 130°F (-34.4 to 54.4°C) for 1950-02.
**Pressure Limits:**
Continuous: 1950's - 45″ w.c. (0.11 bar);
1950P's - 35 psi (2.41 bar); 1950P-50 only - 70 psi (4.83 bar).
Surge: 1950's - 10 psi (0.69 bar), 1950P's - 50 psi (3.45 bar), 1950P-50 only - 90 psi (6.21 bar).
**Enclosure Rating:** IP54, NEMA 3, 7 and 9.
**Switch Type:** Single-pole double-throw (SPDT).
**Electrical Rating:** 15 A @, 125, 250, 480 VAC, 60 Hz. Resistive 1/8 HP @ 125 VAC, 1/4 HP @ 250 VAC, 60 Hz.
**Electrical Connections:** 3 screw type, common, normally open and normally closed.
**Process Connections:** 1/8″ female NPT.
**Mounting Orientation:** Diaphragm in vertical position. Consult factory for other position orientations.
**Set Point Adjustment:** Screw type on top of housing.
**Weight:** 3.25 lb (1.5 kg); 1950-02 model, 4.4 lb (2 kg).
**Agency Approvals:** CE, UL, CSA, FM.

**RESPONSE TIME:** Because of restrictive effect of flame arrestors, switch response time may be as much as 10-25 seconds where applied pressures are near set point.

**DWYER INSTRUMENTS, INC.**
**P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.**
**Phone: 219/879-8000** **www.dwyer-inst.com**
**Fax: 219/872-9057** **e-mail: info@dwyer-inst.com**




1950-02: 7-3/4″ (196.9) dia. x 4-11/32″ (110.3) depth. For complete dimensions request drawing 28-700175-00 from our Customer Service Department

**1950 Switch Outline Dimensions**

**INSTALLATION**

1. Select a location free from excess vibration and corrosive atmospheres where temperatures will be within the limits noted under Specifications on reverse. Switch may be installed outdoors or in areas where the hazard of explosion exists. See reverse for specific types of hazardous service.

2. Mount standard switches with the diaphragm in a vertical plane and with switch lettering and nameplate in an upright position. Some switches are position sensitive and may not reset properly unless they are mounted with the diaphragm vertical.

3. Connect switch to source of pressure, vacuum or differential pressure. Metal tubing with 1/4″ O.D. is recommended, but any tubing which will not restrict the air flow can be used. Connect to the two 1/8″ female NPT pressure ports as noted below:

A. Differential pressures - connect pipes or tubes from source of greater pressure to high pressure port marked HIGH PRESS, and from source of lower pressure to low pressure port marked LOW PRESS.

B. Pressure only (above atmospheric pressure) - connect tube from source of pressure to high pressure port. The low pressure port is left open to atmosphere.

C. Vacuum only (below atmospheric pressure) - connect tube from source of vacuum to low pressure port. The high pressure port is left open to atmosphere.

4. To make electrical connections, remove the three hex head screws from the cover and after loosening the fourth captive screw, swing the cover aside. Electrical connections to the standard single pole, double throw snap switch are provided by means of terminals marked “COM” (common), “NO” (norm open), “NC” (norm closed). The normally open contacts close and the normally closed contacts open when pressure increases beyond the set point. Switch loads for standard models should not exceed the maximum specified current rating of 15 amps resistive. Switch capabilities decrease with an increase in ambient temperature, load inductance, or cycling rate. Whenever an application involves one or more of these factors, the user may find it desirable to limit the switched current to 10 amps or less in the interest of prolonging switch life.

**ADJUSTMENT: To Change the Set point**

1. Remove the plastic cap and turn the slotted Adjust-ment Screw at the top of the housing clockwise to raise the set point pressure and counterclockwise to lower the set point. After calibration, replace the plastic cap and re-check the set point.

2. The recommended procedure for calibrating or checking calibration is to use a “T” assembly with three rubber tubing leads, all as short as possible and the entire assembly offering minimum flow restriction. Run one lead to the pressure switch, another to a manometer of known accuracy and appropriate range, and apply pressure through the third tube. Make final approach to the set point very slowly. Note that manometer and pressure switch will have different response times due to different internal volumes, lengths of tubing, fluid drainage, etc. Be certain the switch is checked in the position it will assume in use, i.e. with diaphragm in a vertical plane and switch lettering and Dwyer nameplate in an upright position.

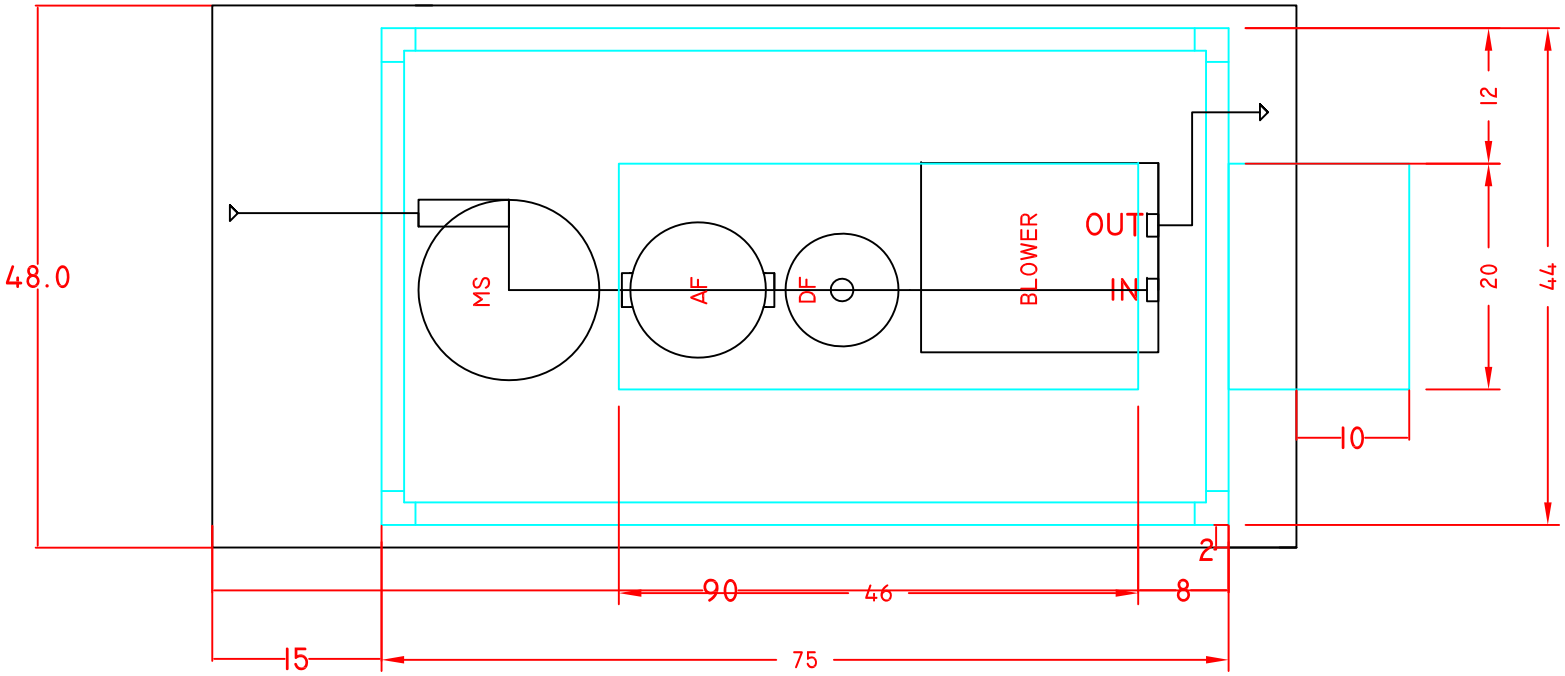
3. For highly critical applications check the set point adjustment and if necessary, reset it as noted in step A.

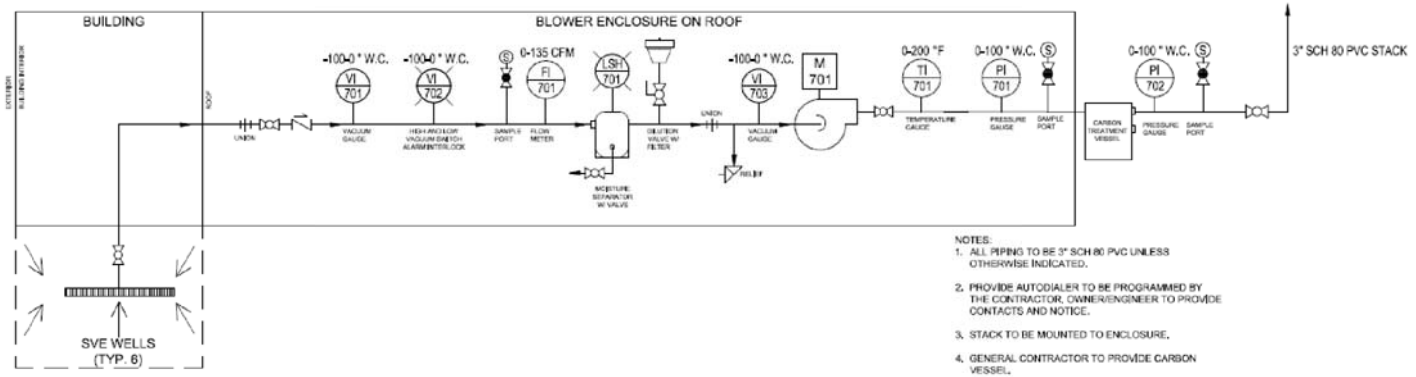
**MAINTENANCE**

The moving parts of these switches need no maintenance or lubrication. The only adjustment is that of the set point. Care should be taken to keep the switch reasonably clean. Periodically the vent drain plug should be rotated, then returned to its original position. This will dislodge deposits which could accumulate in applications where there is excessive condensation within the switch. The Series 1950 Explosion-Proof Differential Pressure Switch is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

©Copyright 2012 Dwyer Instruments, Inc.
Printed in U.S.A. 1/12 FR# 26-440332-00 Rev. 13

**DWYER INSTRUMENTS, INC.**
**P.O. BOX 373 • MICHIGAN CITY, INDIANA 46360, U.S.A.**
**Phone: 219/879-8000** **www.dwyer-inst.com**
**Fax: 219/872-9057** **e-mail: info@dwyer-inst.com**




## PROCESS & INSTRUMENTATION DIAGRAM

NOT TO SCALE

| DATE | REVISION | BY | CH'D |
|---|---|---|---|
| | | | |

ENVIRO-EQUIPMENT, INC.
10120 Industrial Drive
Pineville, N.C. 28134
PHONE 704-556-7723
FAX 704-556-7728

TOLERANCES (UNLESS OTHERWISE SPECIFIED)

CUSTOMER: VA EZ AIR

TITLE: CONEY ISLAND SVE SKID

| SCALE: | DRAWN BY: | CHECKED BY: | APP'D BY: |
|---|---|---|---|
| 1 | EVAN CHEW | EC | BC |

| DATE: | SHEET | OF SHEETS | DRAWING NO. |
|---|---|---|---|
| 6/29/15 | 1 | 1 | 3374 |