

APPENDIX E OER

Remedial Action

Workplan

148-28 Hillside Avenue
QUEENS, NEW YORK

Remedial Action Work Plan

NYC VCP Project Number 17CVCP044Q
OER Project Number 17TMP0097Q

Prepared For:

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REMEDIAL ACTION WORK PLAN

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C&D	Construction and Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering Controls and Institutional Controls
ELAP	Environmental Laboratory Accreditation Program
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IRM	Interim Remedial Measure
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYS DEC	New York State Department of Environmental Conservation
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYC VCP	New York City Voluntary Cleanup Program
NYCRR	New York Codes Rules and Regulations
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation

NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
RI	Remedial Investigation
RMZ	Residual Management Zone
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
USGS	United States Geological Survey
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VOC	Volatile Organic Compound

CERTIFICATION

I, Andrew Levenbaum, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the site located at 148-28 Hillside Avenue, Jamaica, New York, OER site number 17TMP0097Q. I certify to the following:

- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Remedial Action Work Plan and are of sufficient detail to enable proper construction.
- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Name

PE License Number

Signature

Date

PE Stamp

I, Paul P. Stewart, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the site located at 148-28 Hillside Avenue, Jamaica, New York, OER site number 17TMP0097Q. I certify to the following:

- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

QEP Name

QEP Signature

Date

EXECUTIVE SUMMARY

Chung Lam is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a 17,450-square foot site located at 148-28 Hillside Avenue in Queens, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Background

The Site is located at 148-28 Hillside Avenue in the central portion of the borough of Queens in New York City and is identified as Block 9694 and Lot 17 on the New York City Tax Map. The Site is 17,450 square feet in area and has a building footprint of approximately 1,920 square feet for the current building. The Site formerly was operated as an auto repair facility, occupied by Arm Auto Services. Currently the site is vacant with the building and site features present. The redevelopment plans for the property propose a 9-story mixed-use building with 51 parking spaces.

An initial subsurface investigation was performed by ACT in June 2015. That subsurface investigation was supplemented with an additional subsurface investigation performed between November 18 and 19, 2015. This RIR summarizes the nature and extent of contamination and provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy that is protective of human health and the environment consistent with the use of the property pursuant to RCNY§ 43-1407(f).

Summary of Redevelopment Plan

The proposed future redevelopment of the Site consists of a 9-story mixed-use building. There is a cellar, which will accommodate 37 parking spaces, utility rooms, refuse room and two

elevators along the northern boundary of the building. The first floor will have two commercial units, 14 parking spaces at grade and a ramp to access the 37 parking spaces in the cellar. Floors 2 through 9 will consist of 52 one-bedroom, 24 two-bedroom and 4 two-bedroom duplex units. The proposed building will consist of a full build out of the lot, which will be approximately 17,450 square feet in the cellar. The excavation depth at the property will be approximately 13 feet bgs.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

Summary of Surrounding Property

The Site is bounded by Hillside Avenue to the north followed by a two-story mixed-use building with apartments above commercial businesses. To the east of the property is a one-story commercial building occupied by a supermarket. To the south, a six-story residential apartment building and a two-story religious building are located. To the west is a two-story commercial building occupied by the National Organization of Industrial Trade Unions. The area in the vicinity of the Site is composed predominantly of residential, commercial and mixed-use buildings.

Summary of Past Site Uses and Areas of Concern

According to Sanborn maps, as of 1888, the Site contained a three-story residential building. By 1925, a one-story filling station with gasoline tanks had also been constructed. By 1942, the three-story building was identified as mixed-use and it was demolished by 1963. By 1967, the gasoline tanks were no longer identified, and by 1992 the building was identified as an auto repair shop. The property remained substantially unchanged through 2006.

According to ACT's Phase I Environmental Site Assessment dated July 14, 2015, five abandoned 550-gallon gasoline underground storage tanks were present in front of the building. One inactive 250-gallon waste oil underground storage tank was observed in the interior of the repair shop. According to the site contact, six underground storage tanks were removed from the property approximately 25 years ago. The GPR survey detected disturbed soil that likely was the former location of removed underground storage tanks.

The AOCs identified for this site include:

1. Abandoned and former underground gasoline storage tanks;
2. Inactive underground waste oil tank;
3. In-ground hydraulic vehicle lifts;
4. Exterior storm drains and interior floor drains.

Summary of Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Conducted a geophysical investigation to identify the approximate locations of current USTs and former tank pits;
3. Installed ten soil borings across the entire project Site, and collected 18 soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed seven soil vapor probes around Site perimeter and collected seven samples for chemical analysis;
5. Installed three groundwater monitoring wells at the property and collected three groundwater samples for chemical analysis from the monitoring wells to evaluate groundwater quality.

Summary of Findings of Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called "Remedial Investigation Report, 148-28 Hillside Avenue, Jamaica, New York", dated October 2016 (RIR). Supplemental remedial investigation was performed of soil vapor and groundwater quality from November to December 2016.

Soil quality data was compared to Unrestricted and Restricted Residential Use Soil Cleanup Objectives (UUSCOs and RRSCOs) contained in NYSDEC 6 NYCRR Part 375. VOC compounds including Acetone (maximum of 110 µg/kg) and Tetrachloroethylene (11,000 µg/kg) were detected above their Unrestricted Use SCOs in two shallow soil samples. Two SVOCs,

Benzo(a)anthracene (1,550 µg/kg) and Chrysene (1,560 µg/kg) exceeded Unrestricted Use SCOs in one shallow soil sample. Benzo(a)anthracene also exceeded Restricted Residential Use SCOs. One Pesticide, 4,4'-DDT (max. of 5.06 mg/kg) exceeded its Unrestricted Use Soil Cleanup Objective. Several metals were identified and lead (1,100 mg/Kg) and selenium (7.18 mg/Kg) exceeded Unrestricted Use SCOs. Lead also exceeded Restricted Residential Use SCOs. Overall, with the exception of PCE disposal, the soil chemistry is similar to sites with historic urban fill in New York City.

Soil vapor samples collected during the RI were compared to the compounds listed in Table 3.1 Air Guidance Values derived by the New York State Department of Health (NYSDOH) located in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006, updated June 2007 for the soil vapor/indoor air matrices, updated September 2013 for Tetrachloroethylene, and updated August 2015 for Trichloroethylene. Soil vapor sampling detected several petroleum related and chlorinated compounds. Highest concentrations were detected for 2-Butanone at 1,100 µg/m³. Petroleum related (BTEX) compounds were detected at a maximum concentration of 299 µg/m³. Chlorinated compound, Tetrachloroethylene was detected in all seven samples and ranged in concentrations from 10 to 2,700 µg/m³, compared to a NYSDOH screening value of 30 µg/m³. Trichloroethylene was detected in one soil vapor sample in the east section of the site at 55 µg/m³, above the NYSDOH screening value of 2 µg/m³. Concentrations of Tetrachloroethylene and Trichloroethylene are above the NYSDOH guidance matrix and require mitigation.

Groundwater samples collected during the RI were compared to the New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). Groundwater samples showed no Pesticides or dissolved Metals exceeding their GQS. One VOC, Chloroform was detected in two of the groundwater samples (max. of 14 µg/L) above its GQS of 7 µg/L. One SVOC, Bis(2-ethylhexyl)phthalate was detected in one groundwater sample (11 µg/L) above its GQS of 5 µg/L. Total PCBs were detected in the three groundwater samples (max. 0.135 µg/L) above its GQS of 0.09 µg/L.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste is not suspected at this site.

Summary of the Remedial Action

The preferred remedy for the site is Alternative 2, Site Specific Track 4 cleanup. The Alternative 2 remedy will remove all soil/fill exceeding Track 4 Site Specific Use SCOs throughout the Site, which will be confirmed with post-excavation sampling. This remedy will include a concrete slab covering the entire site and waterproofing membrane and an active SSDS. Additionally, a high volume air exchange is required by NYC Building Code to address indoor vehicle parking. Use restrictions will be imposed on the site and the Site would continue to be encumbered with an E-designation for hazardous material.

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.

5. Perform additional site characterization sampling of soil. Soil samples are proposed to delineate the shallow soil impacts of Tetrachloroethylene previously identified in SB-9. Five-foot spacing soil borings in four radial directions are proposed to investigate shallow impacts of Tetrachloroethylene. If warranted, additional soil borings will be advanced at ten-foot spacings from the initially identified hotspot. Two-foot sample intervals will be sampled at each soil boring consisting of the 4' to 6' and the 6' to 8' depth.
6. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
7. Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs.
The entire footprint of the Site will be excavated to a depth of approximately 13 feet below grade for development purposes. A small portion of property will be excavated to the depths of 18 feet below grade for elevator pit(s).
8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
9. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10. Removal of five 550-gallon gasoline UST's from the northwestern portion of the site and one 250-gallon waste oil UST from the interior of the existing building.
11. Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
12. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
13. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.

14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
15. Construction of an engineered composite cover consisting of a minimum of 6 inches of reinforced concrete slab underlain by 6 inches of clean sub-base material in building areas.
16. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a 20-mil Vaporblock Plus vapor barrier manufactured by Raven Industries or equivalent below the slab throughout the full building area and a 1.2 mm nominal thickness Preprufe 300 LT blindside waterproofing manufactured by Grace Construction Products or equivalent outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. The vapor barrier system is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the vapor barrier system was designed and properly installed to mitigate soil vapor migration into the building.
17. Installation of an active sub-slab depressurization system (SSDS) consisting of a network of horizontal perforated piping set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The horizontal piping will consist of fabric wrapped, 4-inch corrugated drain pipe connected to a 4-inch steel riser pipe that penetrates the slab and travels through the building to the roof. The gas permeable layer will consist of a 6-inch thick layer of ¾-inch bluestone. The pipe will be finished at the roof line with a 4-inch goose neck pipe to prevent rain infiltration. The active SSDS will be hardwired and will include an appropriate rated blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the basement. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building.

18. Construction and operation of a cellar parking garage with high volume air exchange in conformance with NYC Building Code.
19. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
20. Dewatering if required will be in compliance with city, state, and federal laws and regulations. Extracted groundwater will either be containerized for off-site licensed or permitted disposal or will be treated under a permit from New York City Department of Environmental Protection (NYCDEP) to meet pretreatment requirements prior to discharge to the sewer system.
21. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
22. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
23. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
24. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

The NYC Office of Environmental Remediation (OER) provides governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan (“cleanup plan”) describes the findings of prior environmental studies, shows the location of identified contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

This cleanup plan provides a very high level of protection for neighboring communities and also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Project Information:

- Site Address: 148-28 Hillside Avenue, Jamaica, New York
- NYC Voluntary Cleanup Program Project Number: 17CVCP044Q

Project Contacts:

- OER Project Manager: Anna Brooks, 212-788-7423
- Site Project Manager: Mark Gelband, 516-441-5800 ext. 104
- Site Safety Officer: Yisong Yang, 516-441-5800 ext. 108
- Online Document Repository: <https://a002-epic.nyc.gov/app/search/advanced>

Remedial Investigation and Cleanup Plan: Under the oversight of the NYC OER, a thorough study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and to identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

Identification of Sensitive Land Uses: Prior to selecting a cleanup, the neighborhood was evaluated to identify sensitive land uses nearby, such as schools, day care facilities, hospitals and residential areas. The cleanup program was then tailored to address the special conditions of this community.

Qualitative Human Health Exposure Assessment: An important part of the cleanup planning for the Site is a study to find all of the ways that people might come in contact with contaminants at the Site now or in the future. This study is called a Qualitative Human Health Exposure Assessment (QHHEA). A QHHEA was performed for this project. This assessment has considered all known contamination at the Site and evaluated the potential for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

Health and Safety Plan: This cleanup plan includes a Construction Health and Safety Plan (CHASP) that is designed to protect community residents and on-Site workers. The elements of this RAWP are in compliance with applicable safety requirements of the United States Occupational Safety and Health Administration (OSHA). This RAWP includes many protective elements including those discussed below.

Site Safety Coordinator: This project has a designated Site safety coordinator to implement the CHASP. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is identified at the beginning of this Community Protection Statement.

Worker Training: Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan: Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a 'Contingency Plan').

Odor, Dust and Noise Control: This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with applicable NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager or NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document.

Quality Assurance: This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report. This report will be submitted to the NYC Office of Environmental Remediation and will be thoroughly reviewed.

Stormwater Management: To limit the potential for soil erosion and discharge, this cleanup plan has provisions for stormwater management. The main elements of the stormwater management include physical barriers such as tarp covers and erosion fencing, and a program for frequent inspection.

Hours of Operation: The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances

issued by that agency. For this cleanup project, the hours of operation will conform to requirements of the NYC Department of Buildings.

Signage: While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC Voluntary Cleanup Program and provides project contact names and numbers, and a link to the document repository where project documents can be viewed.

Complaint Management: The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager or the NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

Utility Mark-outs: To promote safety during excavation in this cleanup, the contractor is required to first identify all utilities and must perform all excavation and construction work in compliance with NYC Department of Buildings regulations.

Soil and Liquid Disposal: All soil and liquid material removed from the Site as part of the cleanup will be transported and disposed of in accordance with all applicable City, State and Federal regulations, and required permits will be obtained.

Soil Chemical Testing and Screening: All excavations will be supervised by a trained and properly qualified environmental professional. In addition to extensive sampling and chemical testing of soils on the Site, excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection.

Stockpile Management: Soil stockpiles will be kept covered with tarps to prevent dust, odor and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be

promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed, to protect storm water catch basins and other discharge points.

Trucks and Covers: Loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with applicable laws and regulations.

Imported Material: All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on the Site. Waste materials will not be brought onto the Site. Trucks entering the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

Equipment Decontamination: All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

Housekeeping: Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

Truck Routing: Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

Final Report: The results of all cleanup work will be fully documented in a final report (called the Remedial Action Report) that will be available for public review online. A link to the online document repository and the public library with Internet access nearest the Site are listed on the first page of this Community Protection Statement document

Long-Term Site Management: If long-term protection is needed after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined either in the property's deed or established through a city environmental designation registered with the Department of Buildings. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 Project Background

Chung Lam is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program and/or in the “E” Designation Program to investigate and remediate a property located at 148-28 Hillside Avenue in the Jamaica section of Queens, New York (the “Site”). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Background

The Site is located at 148-28 Hillside Avenue in the central portion of the borough of Queens in New York City and is identified as Block 9694 and Lot 17 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 17,450 square feet in area and has a building footprint of approximately 1,920 square feet for the current building. The Site formerly was operated as an auto repair facility, occupied by Arm Auto Services. A diagram of site features is shown in Figure 2. Currently the site is vacant with the building and site features present. The redevelopment plans for the property propose a 9-story mixed-use building with 51 parking spaces.

An initial subsurface investigation was performed by ACT in June 2015. That subsurface investigation was supplemented with an additional subsurface investigation performed between November 18 and 19, 2015. This RIR summarizes the nature and extent of contamination and provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy that is protective of human health and the environment consistent with the use of the property pursuant to RCNY§ 43-1407(f).

1.2 Redevelopment Plan

The proposed future redevelopment of the Site consists of a 9-story mixed-use building. There is a cellar, which will accommodate 37 parking spaces, utility rooms, refuse room and two elevators along the northern boundary of the building. The first floor will have two commercial units, 14 parking spaces at grade and a ramp to access the 37 parking spaces in the cellar. Floors 2 through 9 will consist of 52 one-bedroom, 24 two-bedroom and 4 two-bedroom duplex units. The proposed building will consist of a full build out of the lot, which will be approximately 17,450 square feet in the cellar. The excavation depth at the property will be approximately 13 feet bgs.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

1.3 Description of Surrounding Property

Figure 1 shows the surrounding land usage. The Site is bounded by Hillside Avenue to the north followed by a two-story mixed-use building with apartments above commercial businesses. To the east of the property is a one-story commercial building occupied by a supermarket. To the south, a six-story residential apartment building and a two-story religious building are located. To the west is a two-story commercial building occupied by the National Organization of Industrial Trade Unions. The area in the vicinity of the Site is composed predominantly of residential, commercial and mixed-use buildings.

1.4 Summary of Past Site Uses and Areas of Concern

According to Sanborn maps, as of 1888, the Site contained a three-story residential building. By 1925, a one-story filling station with gasoline tanks had also been constructed. By 1942, the three-story building was identified as mixed-use and it was demolished by 1963. By 1967, the gasoline tanks were no longer identified, and by 1992 the building was identified as an auto repair shop. The property remained substantially unchanged through 2006.

According to ACT's Phase I Environmental Site Assessment dated July 14, 2015, five abandoned 550-gallon gasoline underground storage tanks were present in front of the building. One inactive 250-gallon waste oil underground storage tank was observed in the interior of the

repair shop. According to the site contact, six underground storage tanks were removed from the property approximately 25 years ago. The GPR survey detected disturbed soil that likely was the former location of removed underground storage tanks.

The AOCs identified for this site include:

1. Abandoned and former underground gasoline storage tanks;
2. Inactive underground waste oil tank;
3. In-ground hydraulic vehicle lifts;
4. Exterior storm drains and interior floor drains.

1.5 Summary of Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Conducted a geophysical investigation to identify the approximate locations of current USTs and former tank pits;
3. Installed ten soil borings across the entire project Site, and collected 18 soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed seven soil vapor probes around Site perimeter and collected seven samples for chemical analysis;
5. Installed three groundwater monitoring wells at the property and collected three groundwater samples for chemical analysis from the monitoring wells to evaluate groundwater quality.

1.6 Summary of Findings of Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called “Remedial Investigation Report, 148-28 Hillside Avenue, Jamaica, New York”,

dated October 2016 (RIR). Supplemental remedial investigation was performed of soil vapor and groundwater quality from November to December 2016. The analytical results are provided in Table 5 through 9.

Soil quality data was compared to Unrestricted and Restricted Residential Use Soil Cleanup Objectives (UUSCOs and RRSCOs) contained in NYSDEC 6 NYCRR Part 375. VOC compounds including Acetone (maximum of 110 µg/kg) and Tetrachloroethylene (11,000 µg/kg) were detected above their Unrestricted Use SCOs in two shallow soil samples. Two SVOCs, Benzo(a)anthracene (1,550 µg/kg) and Chrysene (1,560 µg/kg) exceeded Unrestricted Use SCOs in one shallow soil sample. Benzo(a)anthracene also exceeded Restricted Residential Use SCOs. One Pesticide, 4,4'-DDT (max. of 5.06 mg/kg) exceeded its Unrestricted Use Soil Cleanup Objective. Several metals were identified and lead (1,100 mg/Kg) and selenium (7.18 mg/Kg) exceeded Unrestricted Use SCOs. Lead also exceeded Restricted Residential Use SCOs. Overall, with the exception of PCE disposal, the soil chemistry is similar to sites with historic urban fill in New York City.

Soil vapor samples collected during the RI were compared to the compounds listed in Table 3.1 Air Guidance Values derived by the New York State Department of Health (NYSDOH) located in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006, updated June 2007 for the soil vapor/indoor air matrices, updated September 2013 for Tetrachloroethylene, and updated August 2015 for Trichloroethylene. Soil vapor sampling detected several petroleum related and chlorinated compounds. Highest concentrations were detected for 2-Butanone at 1,100 µg/m³. Petroleum related (BTEX) compounds were detected at a maximum concentration of 299 µg/m³. Chlorinated compound, Tetrachloroethylene was detected in all seven samples and ranged in concentrations from 10 to 2,700 µg/m³, compared to a NYSDOH screening value of 30 µg/m³. Trichloroethylene was detected in one soil vapor sample in the east section of the site at 55 µg/m³, above the NYSDOH screening value of 2 µg/m³. Concentrations of Tetrachloroethylene and Trichloroethylene are above the NYSDOH guidance matrix and require mitigation.

Groundwater samples collected during the RI were compared to the New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). Groundwater samples showed no Pesticides or dissolved Metals exceeding their GQS. One VOC, Chloroform was

detected in two of the groundwater samples (max. of 14 µg/L) above its GQS of 7 µg/L. One SVOC, Bis(2-ethylhexyl)phthalate was detected in one groundwater sample (11 µg/L) above its GQS of 5 µg/L. Total PCBs were detected in the three groundwater samples (max. 0.135 µg/L) above its GQS of 0.09 µg/L.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste is not suspected at this site.

2.0 Remedial Action Objectives

Based on the results of the RI, the following Remedial Action Objectives (RAOs) have been identified for this Site:

Soil

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from contaminated soil.
- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Groundwater

- Remove contaminant sources causing impact to groundwater.
- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

Soil Vapor

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor into dwelling and other occupied structures.

3.0 Remedial Alternatives Analysis

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). Remedial alternatives are then developed and evaluated based on the following ten criteria:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community acceptance;
- Land use; and
- Sustainability.

As required, a Track 1 Unrestricted Use scenario is evaluated for the remedial action. The following is a detailed description of the alternatives analyzed to address impacted media at the Site:

Alternative 1:

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would be achieved by excavation for the redevelopment, across the majority of the site to a depth of 13 feet would be required to achieve Unrestricted Use SCOs based on analytical results from lower soil sample collected

during RI sampling. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building's cellar level is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Track 1 Unrestricted Use SCOs.

- No Engineering or Institutional Controls are required for a Track 1 cleanup. However, as part of development, a vapor barrier, sub-slab depressurization system (SSDS) and sub-grade ventilated parking would be installed to prevent potential exposures from soil vapor in the future.

Alternative 2:

- Establishment of Site Specific (Track 4) SCOs;
- Removal of all soil/fill exceeding Track 4 Site-specific SCOs and confirmation that Track 4 Site-specific SCOs have been achieved with post-excavation end point sampling. Based on the results of the Remedial Investigation, it is expected that SCOs would be achieved by excavating for construction of the new building's cellar level to a depth of approximately 13 feet across the entire Site. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation, additional excavation would be performed to meet Track 4 Site-Specific SCOs.
- Placement of a composite cover system over the entire Site to prevent exposure to remaining soil/fill;
- Installation of a vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor;
- Installation of an active Sub Slab Depressurization System (SSDS);
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without OER approval;
- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of

periodic inspections and certification that the controls are performing as they were intended. The SMP will note that the property owner and property owner's successors and assigns must comply with the approved SMP; and

- The property will continue to be registered with an E-Designation at the NYC Buildings Department.

3.1 Threshold Criteria

Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of Engineering Controls or Institutional Controls. Protection of public health and the environment must be achieved for all approved remedial actions.

Alternative 1 would be protective of human health and the environment by removing all soil/fill exceeding Track 1 Unrestricted Use SCO's and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contaminants leaching into groundwater.

Alternative 2 would achieve comparable protections of human health and the environment by excavation and removal of most of the historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCO's, as well as by placement of Institutional and Engineering Controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing Institutional Controls including a Site Management Plan and continuing the E-designation. Establishment of Track 4 Site-Specific SCO's would minimize the risk of contamination leaching into groundwater. For both Alternatives, potential exposure to contaminated soils or groundwater, during construction would be minimized by implementing a Construction Health and Safety Plan, an approved Soil/Materials Management Plan, and Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be prevented as its use is prohibited by

city laws and regulations. Potential future migration of off-Site soil vapors into the new building would be prevented by installing a vapor barrier below the building slab and outside foundations walls below grade.

3.2 Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

This evaluation criterion assesses the ability of the alternative to achieve applicable standards, criteria and guidance.

Alternative 1 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCO's and Protection of Groundwater SCO's. Compliance with SCGs for soil vapor would also be achieved by installing a waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier outside of subgrade foundation walls, as part of development. In addition, the cellar of the building will contain a parking garage with high volume air exchange that conforms to the NYC Building Code.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCG's and RAOs for soil through removal of soil to meet Track 4 Site-Specific SCO's. Compliance with SCG's for soil vapor would also be achieved by installation and operation of an active SSDS, installing a waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier outside of subgrade foundation walls. A Site Management Plan would ensure that these controls remained protective for the long term. In addition, the cellar of the building will contain a parking garage with high volume air exchange that conforms to the NYC Building Code and will mediate any potential accumulation of soil vapors inside the building.

Health and safety measures contained in the CHASP and Community Air Monitoring Plan (CAMP) will be implemented during Site redevelopment under this RAWP. For both Alternatives, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance

with applicable SCGs. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

Short-Term Effectiveness and Impacts

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their short-term effects during the remedial action on public health and the environment during implementation of the remedial action, including protection of the community, protection of onsite workers and environmental impacts.

Both Alternative 1 and 2 have similar short-term effectiveness during their implementation, as each requires excavation of historic fill material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. Short-term impacts could potentially be higher for Alternative 1 since excavation of greater amounts of historical fill material would take place. However, focused attention to means and methods during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize the overall impact of these activities.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flag persons will be used to protect pedestrians at Site entrances and exits.

The potential adverse impact to the community, workers and the environment for both alternatives would be minimized through implementation of control plans including a Construction Health and Safety Plan, a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a Construction Health and Safety Plan (CHASP) would provide

protection from on-Site contaminants by using personal protective equipment that would be worn consistent with the documented risks within the respective work zones.

Long-term effectiveness and permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of Engineering Controls/Institutional Controls (ECs/ICs) that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all impacted soil/fill above Track 1 Unrestricted Use SCO's. Removal of on-Site contaminant sources will also prevent future groundwater contamination.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs; installing a composite cover system across the Site; maintaining use restrictions; establishing an SMP to ensure long-term management of ICs and ECs; and maintaining registration as an E-designated property to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended, assuring that protections designed into the remedy continue to provide the required level of protection.

Reduction of toxicity, mobility, or volume of contaminated material

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of

exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.

Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing all soil in excess of Track 1 Unrestricted Use SCO's.

Alternative 2 would remove most of the historic fill at the Site, and all remaining on-Site soil/fill beneath the new building will meet Track 4 Site-Specific SCO's.

Alternative 1 would remove a greater total mass of contaminants from the Site. The removal of soil to 13 feet for the new development in both scenarios would lessen the difference in contaminant mass removal between these two alternatives.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

The techniques, materials and equipment to implement both Alternatives 1 and 2 are readily available and have been proven to be effective in remediating the contaminants present on the Site. They use standard equipment and technologies that are well established in the industry. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

Cost effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Since historic fill at the Site was found to extend to a depth of up to 3.5 feet below grade during the RI, and the new building requires excavation of the entire Site to a depth of 13 feet, the costs

associated with both Alternative 1 and Alternative 2 will likely be comparable. Costs associated with Alternative 1 could potentially be higher than Alternative 2 if soil with analytes above Track 1 Unrestricted Use SCOs is encountered below the excavation depth required for development. Additional costs would include installation of additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on implementation of a Site Management Plan as part of Alternative 2.

The remedial plan would couple the remedial action with the redevelopment of the Site, lowering total costs. The remedial plan will also consider the selection of the most appropriate disposal facilities to reduce transportation and disposal costs during cleanup and redevelopment of the Site.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.

This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in Appendix 1. Observations here will be supplemented by public comment received on the RAWP. Under both alternatives, the overall goals of the remedial program, to protect public health and the environment and eliminate potential contaminant exposures, have been broadly supported by citizens in NYC communities.

Land use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns

and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. The proposed future use of the Site includes a ten story mixed-use building with 89 dwelling units and 48 parking spaces within the cellar and first floor levels. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 4 Site-Specific SCOs, both of which are protective of public health and the environment for its planned residential use. The proposed use is compliant with the property's zoning and is consistent with recent development patterns. The areas surrounding the site is urban and consists of predominantly mixed residential and commercial buildings in zoning districts designated for commercial and residential uses. The development would remediate a vacant contaminated lot and provide a modern residential building. The proposed development would clean up the property and make it safer, create new employment opportunities, living space and associated societal benefits to the community, and other economic benefits from land revitalization.

Temporary short-term project impacts are being mitigated through site management controls and truck traffic controls during remediation activities. Following remediation, the Site will meet either Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs, both of which are protective of public health and the environmental for its planned use.

The Site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites, natural resources, waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species. The Site is located in an urban area and not in proximity to fish or wildlife and neither alternative would result in any potential exposure pathways of contaminant migration affecting fish or wildlife. The remedial action is also protective of groundwater natural resources. The Site does not lie in a Federal Emergency Management Agency (FEMA)-designated flood plain. Both alternatives are equally protective of natural resources and cultural resources. Improvements in the current environmental condition of the property achieved by both alternatives considered in this plan are consistent with the City's goals for cleanup of contaminated land.

Sustainability of the Remedial Action

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in PlaNYC: A Greener, Greater New York. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development.

While Alternative 2 would potentially result in lower energy usage based on reducing the volume of material transported off-Site, both remedial alternatives are comparable with respect to the opportunity to achieve sustainable remedial action. The remedial plan for either alternative would take into consideration the shortest trucking routes during off-Site disposal of historic fill and other soils, which would reduce greenhouse gas emissions and conserve energy used to fuel trucks. The New York City Clean Soil Bank program is available for reuse of any clean native soils under either alternative. A complete list of green remedial activities considered as part of the NYC VCP is included in a Sustainability Statement.

SELECTION OF THE PREFERRED REMEDY

The preferred remedy for the site is Alternative 2, Site Specific Track 4 cleanup. Data generated during the site investigation support the conclusion that Unrestricted Use SCOs may be achieved for soil, however, due to elevated soil vapor contamination, an active SSDS is required. Active systems are not allowed in Unrestricted Use Track 1 cleanups.

The Alternative 2 remedy will remove all soil/fill exceeding Track 4 Site Specific Use SCOs throughout the Site, which will be confirmed with post-excavation sampling. If soil/fill containing analytes at concentrations above Track 4 Site Specific Use SCOs is still present at the base or walls of the excavation after removal of all soil required for construction of the new building's cellar level and slab are complete, additional excavation would be performed to ensure

complete removal of soil/ fill that does not meet Track 4 Site Specific Use SCOs. This remedy will include a concrete slab covering the entire site and waterproofing membrane. Additional soil vapor management would be required and includes an active SSDS beneath the building. Additionally, a high volume air exchange is required by NYC Building Code to address indoor vehicle parking.

Use restrictions will be imposed on the site (including prohibitions on any use higher than Restricted Residential, e.g. the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without NYSDEC approval). The Site would continue to be encumbered with an E-designation for hazardous material.

4.0 Remedial Action

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is Alternative 2, the Track 4 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Perform additional site characterization sampling of soil. Soil samples are proposed to delineate the shallow soil impacts of Tetrachloroethylene previously identified in SB-9. Five-foot spacing soil borings in four radial directions are proposed to investigate shallow impacts of Tetrachloroethylene. If warranted, additional soil borings will be advanced at ten-foot spacings from the initially identified hotspot. Two-foot sample intervals will be sampled at each soil boring consisting of the 4' to 6' and the 6' to 8' depth.
6. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).

7. Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs.
The entire footprint of the Site will be excavated to a depth of approximately 13 feet below grade for development purposes. A small portion of property will be excavated to the depths of 18 feet below grade for elevator pit(s).
8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
9. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10. Removal of five 550-gallon gasoline UST's from the northwestern portion of the site and one 250-gallon waste oil UST from the interior of the existing building.
Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
11. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
13. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
14. Construction of an engineered composite cover consisting of a minimum of 6 inches of reinforced concrete slab underlain by 6 inches of clean sub-base material in building areas.
15. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of a 20-mil Vaporblock Plus vapor barrier manufactured by Raven Industries or equivalent below the slab throughout the full building area and a 1.2 mm nominal thickness Preprufe 300 LT

blindside waterproofing manufactured by Grace Construction Products or equivalent outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. The vapor barrier system is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the vapor barrier system was designed and properly installed to mitigate soil vapor migration into the building.

16. Installation of an active sub-slab depressurization system (SSDS) consisting of a network of horizontal perforated piping set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The horizontal piping will consist of fabric wrapped, 4-inch corrugated drain pipe connected to a 4-inch steel riser pipe that penetrates the slab and travels through the building to the roof. The gas permeable layer will consist of a 6-inch thick layer of $\frac{3}{4}$ -inch bluestone. The pipe will be finished at the roof line with a 4-inch goose neck pipe to prevent rain infiltration. The active SSDS will be hardwired and will include an appropriate rated blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the basement. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building.
17. Construction and operation of a cellar parking garage with high volume air exchange in conformance with NYC Building Code.
18. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
19. Dewatering if required will be in compliance with city, state, and federal laws and regulations. Extracted groundwater will either be containerized for off-site licensed or permitted disposal or will be treated under a permit from New York City Department of Environmental Protection (NYCDEP) to meet pretreatment requirements prior to discharge to the sewer system.

20. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
21. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
22. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives and Soil/ Fill Management

Track 1 SCO's are proposed for this project and SCO's are defined in 6 NYCRR Part 375, Table 6.8(a) Track 1 Unrestricted Use. If Track 1 SCO's are not achieved, the following Track 4 Site-Specific SCO's:

The following Track 4 Site-Specific SCO's will be utilized for this project:

<u>Contaminant</u>	<u>Site-Specific SCO's</u>
Total SVOCs	100 ppm
Lead	1,000 ppm
Mercury	2.0 ppm

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix

3. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Soil/Fill Excavation and Removal

The extent of excavation is planned to accommodate a fully built out cellar to approximately 13 feet bgs. The location of planned excavations is shown in the redevelopment plans as Figure 6. The total quantity of soil/fill expected to be excavated and disposed off-Site is 9,500 tons. For each disposal facility to be used in the remedial action, a letter from the developer/QEP to the receiving facility requesting approval for disposal and a letter back to the developer/QEP providing approval for disposal will be submitted to OER prior to any transport and disposal of soil at a facility.

Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

End-point Sampling

End-point samples will be analyzed for compounds and elements as described below utilizing the following methodology:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs performing end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values.

Confirmation End-point Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Five confirmation samples will be collected from the base of the excavation at locations to be determined by OER. To evaluate attainment of Track 4 Site-specific SCOs, analytes will include those for which SCOs have been developed, including

SVOCs, Lead and Mercury according to analytical methods described above. If Track 1 Unrestricted Use SCOs are pursued, samples will be analyzed for VOCs, SVOCs, pesticides, PCBs and metals according to analytical methods described above.

Hotspot End-point Sampling

End-point samples will be collected from the sidewalls and base of excavation at the hotspot location identified in the Remedial Investigation, according to the procedure listed below.

Hotspots include the extent of the PCE impacts initially identified in SB-9 based upon delineation soil borings to define the lateral and vertical Tetrachloroethylene soil impacts. End-point samples will be analyzed for SCO trigger parameters.

For any hotspots identified during this remedial program, including any hotspots identified during the remedial action, hotspot removal actions will be performed to ensure that hotspots are fully removed and end-point samples will be collected at the following frequency:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
 - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
 - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation end-point sample locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field

indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination.

If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and “finger print analysis” and required regulatory reporting (i.e. spills hotline) will be performed.

Quality Assurance/Quality Control

The fundamental QA objective with respect to accuracy, precision and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol for all data generated.

Soil samples will be analyzed for VOCs by EPA Method 8260; SVOCs by EPA Method 8270; TAL Metals by EPA Method 6010 and Pesticides and PCBS by EPA Method 8081/8082. The soil samples will be compared to the NYSDEC standards for Unrestricted Use Soil Cleanup Objectives, Restricted Residential Soil Cleanup Objectives and Commercial Soil Cleanup Objective (UUSCO, RRSCO and CSCO).

Collected samples will be appropriately packaged, placed in coolers and shipped via laboratory courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or “cold-paks” to maintain a temperature of 4°C. The holding times for VOCs, SVOCs, Pesticides and PCBs are 14 days from sample collection and TAL Metals have a holding time of 6 months with the exception of mercury, which is 28 days.

Dedicated disposable sampling materials will be used for the collection of endpoint samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1

for every eight samples collected. Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil;
- Rinse with tap water;
- Wash withalconox® detergent solution and scrub;
- Rinse with tap water;
- Rinse with distilled or deionized water.

Field blanks are prepared by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will be used whenever groundwater samples are transported to the laboratory for analysis of VOCs. Trip blanks will not be used for samples to be analyzed for metals, SVOCs or pesticides.

Import of Soils

Soil import is not planned on this project.

Reuse of Onsite Soils

Soil reuse is not planned on this project.

4.3 Engineering Controls

Engineering Controls will be employed in the remedial action to address residual contamination remaining at the site. The Site has four primary Engineering Control Systems. These are:

- (1) Composite Cover System
- (2) Soil Vapor Barrier System
- (3) Active Sub-Slab Depressurization System
- (4) Sub-grade ventilated garage

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system will be comprised of a minimum of 6 inches of reinforced concrete slab underlain by 6 inches of clean sub-base material in building areas. The

typical design for each remedial cover type used on this Site and the location of each cover type built at the Site will be provided under separate cover in the Stipulation List.

The composite cover system will be a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the Remedial Action Report.

Vapor Barrier System

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will consist of 20-mil Vaporblock Plus co-extruded barrier consisting of a seven-layer polyethylene and ethylene vinyl alcohol resins manufactured by Raven Industries or an equivalent below the slab throughout the full building area and a 1.2 mm nominal thickness Preprufe 300 LT blindside waterproofing manufactured by Grace Construction Products or equivalent outside all sub-grade foundation sidewalls.

The vapor barrier will extend throughout the area occupied by the footprint of the new building and up the foundation sidewalls and will be installed in accordance with manufacturer specifications.

A plan view showing the location of the proposed vapor barrier system and typical design sections for the vapor barrier on slab and sidewalls will be provided under separate cover in the Stipulation List.. Product specification sheets are provided in Appendix 5. The Remedial Action Report will include as-built drawings and diagrams; manufacturer documentation; and photographs.

The Remedial Action Report will include a PE-certified letter (on company letterhead) from the primary contractor responsible for installation oversight and field inspections and a copy of the manufacturer's certificate of warranty.

The Vapor Barrier System is a permanent engineering control and will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying vapor barrier system is disturbed after the remedial action is complete. Maintenance of these systems will be described in the Site Management Plan in the Remedial Action Report.

Sub-Slab Depressurization System

Migration of soil vapor into the building will be mitigated with the construction of an active Sub-Slab Depressurization System (SSDS). The SSDS will consist of a network of horizontal piping set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The horizontal piping will consist of fabric wrapped, 4-inch corrugated drain pipe connected to a 6-inch steel riser pipe that penetrates the slab and travels through the building to the roof. The gas permeable layer will consist of a 6-inch thick layer of ¾-inch bluestone. The pipe will be finished at the roof line with a 4-inch goose neck pipe to prevent rain infiltration. The active SSDS will be hardwired and will include an appropriate rated blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the basement. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building. This pressure testing will be performed prior to obtaining Notice of Satisfaction from OER. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. Maintenance of this SSDS will be described in the Site Management Plan in the Remedial Action Report. The SSDS design and details will be provided under separate cover with the Stipulation List.

4.4 Institutional Controls

A series of Institutional Controls (IC's) are required under this Remedial Action to assure permanent protection of public health by elimination of exposure to residual materials. These IC's define the program to operate, maintain, inspect and certify the performance of Engineering

Controls and Institutional Controls on this property. Institutional Controls would be implemented in accordance with a Site Management Plan included in the final Remedial Action Report (RAR). Institutional Controls would be:

- Continued registration of the E-Designation for the property. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the SMP which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a SMP in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, inspection, and certification of ECs and IC's. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; 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. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted at a frequency to be determine by OER in the SMP and will comply with RCNY §43-1407(l)(3).
- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for residential and commercial and will not be used for a higher level of use without prior approval by OER.

4.5 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure

implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) operation and maintenance of EC's; (3) inspection and certification of IC's and EC's.

Site management activities and EC/IC certification will be scheduled by OER on a periodic basis to be established in the RAR and the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by July 30 of the year following the reporting period.

4.6 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment is to identify potential receptors and pathways for human exposure to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Data and information reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA) for this project. As part of the VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk under current and future conditions by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Contaminant Sources

Based on the results of the RIR, the contaminants of concern are:

Soil: Benzo(a)anthracene and Lead were detected above their respective RRSCOs.

Groundwater: Chloroform, Bis(2-ethylhexyl)phthalate and total PCBs were detected above NYSDEC TOGS 1.1.1 Standards and Guidance Values.

Soil Vapor: Benzene, Chloroform and Ethylbenzene were detected above USEPA Soil Vapor Guidelines. Tetrachloroethylene and Trichloroethylene were detected above NYSDOH soil vapor screening levels.

Nature, Extent, Fate and Transport of Contaminants

Soil: SVOCs and Metals were detected in shallow soil above RRSCOs in the southern portion of the Site. The SVOCs identified have the potential to migrate into groundwater or volatilize into soil vapor. Metals potentially could leach into underground aquifers impacting groundwater quality.

Groundwater: VOCs were identified towards the south of the property above NYSDEC TOGS 1.1.1 Standards and Guidance Values. SVOCs were identified in the monitoring well towards the central portion of the southern groundwater monitoring wells. Total PCBs were identified in groundwater monitoring wells throughout the property.

Soil Vapor: Benzene was detected in the two sub-slab samples at the interior western portion of the site and at the exterior of the building near the eastern boundary. Chloroform was detected in the northeastern corner of the Site. Ethylbenzene was detected in the western portion of interior of the building. Tetrachloroethylene was detected above NYSDOH screening levels throughout the Site. Trichloroethylene was detected in one soil vapor sample near the eastern portion of the exterior of the building.

Receptor Populations

On-Site Receptors: The site is currently vacant and consists of the building for the former auto repair facility at the property. Access to the Site is restricted by a steel track-mounted locked rolling chain-link fence with gates for vehicle access and egress. Onsite receptors are limited to trespassers, site representatives, government officials and visitors granted access to the property. During construction, potential on-site receptors include construction workers, site

representatives, government officials and visitors. Under proposed future conditions, potential on-site receptors include adult and child building residents, workers and visitors.

Off-Site Receptors: Potential off-site receptors within a 500-foot radius of the Site include adult and child residents; commercial and construction workers; pedestrians; and trespassers based on the following land uses within 500 feet of the Site:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/ Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools – existing and future

Potential Routes of Exposure

Three potential primary routes exist by which chemicals can enter the body: ingestion, inhalation, and dermal absorption. Exposure can occur based on the following potential media:

- Ingestion of groundwater or fill/ soil;
- Inhalation of vapors or particulates; and
- Dermal absorption of groundwater or fill/ soil.

Potential Exposure Points

Current Conditions: The site is currently capped with asphalt there are no potential exposure pathways from ingestion, inhalation, or dermal absorption of soil/ fill. Groundwater is not exposed at the site. The site is served by the public water supply and groundwater is not used at the site for potable supply and there is no potential for exposure. Because the site is currently vacant, the potential exposure is limited to transient visitation, therefore long-term exposure is not expected. The former uses and the age of the property would likely result in passive ventilation of the indoor atmosphere rendering the air quality permissible under normal conditions.

Construction/ Remediation Conditions: During the remedial action, onsite workers will come into direct contact with surface and subsurface soils as a result of on-Site construction and excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with exposed impacted soil and fill. Similarly, off-Site receptors could be

exposed to dust and vapors from on-Site activities. Due to the depth of groundwater, direct contact with groundwater is not expected. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

Proposed Future Conditions: Under future remediated conditions, all soils in excess of Track 4 SCO's will be removed. The site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and engineering controls (vapor barrier/SSDS) will prevent any potential exposure due to inhalation by preventing soil vapor intrusion. The site is served by the public water supply, and groundwater is not used at the site. There are no plausible off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

Overall Human Health Exposure Assessment

There are potential complete exposure pathways for the current site condition. There are potential complete exposure pathways that require mitigation during implementation of the remedy. There are no complete exposure pathways under future conditions after the site is developed. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure, site-wide surface cover, and a subsurface vapor barrier system for the building. Additionally, an active SSDS system and continuously ventilated parking garage will mitigate elevated soil vapor condition. Under current conditions, on-Site exposure pathways exist for those with access to the Site and trespassers. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Soil/Materials Management Plan, and a Construction Health and Safety Plan. Potential post-construction use of groundwater is not considered an option because groundwater in this area of New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened.

5.0 Remedial Action Management

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Paul Stewart, President of ACT. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Andrew Levenbaum (PE) and Paul Stewart (QEP).

5.2 Site Security

Site access will be controlled by a wooden construction fence with restricted access through a locked gate.

5.3 Work Hours

The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. The hours of operation will be conveyed to OER during the pre-construction meeting.

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix 4. The Site Safety Coordinator will be Yisong Yang. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, such as 40-hour hazardous waste operator training and annual 8-hour refresher training. Site Safety Officer will be responsible for maintaining workers training records. Personnel entering any exclusion zone will be trained in the provisions of the HASP and will comply with all requirements of 29 CFR 1910.120. Site-specific training will be provided to

field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the CHASP. That document will define the specific project contacts for use in case of emergency.

5.5 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedences of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work.

Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The

equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m³) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m³ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m³ above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m³ of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for OER personnel to review.

5.6 Agency Approvals

All permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction. Approval of this RAWP by OER does not constitute satisfaction of these requirements and will not be a substitute for any required permit.

5.7 Site Preparation

Pre-Construction Meeting

OER will be invited to attend the pre-construction meeting at the Site with all parties involved in the remedial process prior to the start of remedial construction activities.

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility

mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and regulations including NYC Building Code to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Mark-Out Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

Dewatering

Dewatering is not anticipated during remediation and construction.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete pads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit.

Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and clean water will be utilized for the removal of soil from vehicles and equipment, as necessary.

Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from excavated areas, trenches and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

Storm Response

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to OER at the completion of site inspection and after the site security is assessed. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Stormwater control systems and structures will be inspected and maintained as necessary. If soil or fill materials are discharged off site to adjacent properties, property owners and OER will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to OER and implemented following approval by OER and granting of site access by the property owner. Impacted offsite areas may require characterization based on site conditions, at the discretion of OER. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYS DEC's spill hotline at DEC 800-457-7362 within statutory defined timelines. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

Storm Response Reporting

A site inspection report will be submitted to OER at the completion of site inspection. An inspection report established by OER is available on OER's website (www.nyc.gov/oer) and will

be used for this purpose. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be sent to the OER project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the support of excavation; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; schedule for corrective actions. This report should be completed and submitted to OER project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

5.8 Traffic Control

Drivers of trucks leaving the Site with soil/fill will be instructed to proceed without stopping in the vicinity of the Site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is shown on Figure 7.

5.9 Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

5.10 Reporting and Record Keeping

Daily reports

Daily reports providing a general summary of activities for each day of active remedial work will be emailed to the OER Project Manager by the end of the following business day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of excavation and other remedial work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP results noting all excursions. CAMP data may be reported;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

Record Keeping and Photo Documentation

Job-site record keeping for all remedial work will be performed. These records will be maintained on-Site during the project and will be available for inspection by OER staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas.

Photographs will be submitted at the completion of the project in the RAR in digital format (i.e. jpeg files).

5.11 Complaint Management

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.12 Deviations From The Remedial Action Work Plan

All changes to the RAWP will be reported to, and approved by, the OER Project Manager and will be documented in daily reports and reported in the Remedial Action Report. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- Determination with basis that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 Remedial Action Report

A Remedial Action Report (RAR) will be submitted to OER following implementation of the remedial action defined in this RAWP. The RAR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RAR will include:

- Information required by this RAWP;
- Text description with thorough detail of all engineering and institutional controls (if Track 1 remedial action is not achieved)
- As-built drawings for all constructed remedial elements;
- Manifests for all soil or fill disposal;
- Photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 remedial action is not achieved);

- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results (including all soil test results from the remedial investigation for soil that will remain on site) and all soil/fill waste characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all soil or fill material removed from the Site including a map showing the location of these excavations and hotspots, tanks or other contaminant source areas;
- Full accounting of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;
- Account of the origin and required chemical quality testing for material imported onto the Site;
- Continue registration of the property with an E-Designation by the NYC Department of Buildings (if Track 1 remedial action is not achieved);
- The RAWP and Remedial Investigation Report will be included as appendices to the RAR;
- Reports and supporting material will be submitted in digital form and final PDF's will include bookmarks for each appendix.

Remedial Action Report Certification

I, Andrew Levenbaum, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the site located at 148-28 Hillside Avenue, Jamaica, New York, OER site number 17TMP0097Q. I certify to the following:

- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.
- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial Action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The OER-approved Remedial Action Work Plan dated [date] and Stipulations in a letter dated [date] were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Name

PE License Number

Signature

Date

PE Stamp

I, Paul Stewart, am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the site located at 148-28 Hillside Avenue, Jamaica, New York, OER site number 17TMP0097Q. I certify to the following:

- The OER-approved Remedial Action Work Plan dated August 15, 20XX and Stipulations in a letter dated September 10, 20XX were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

QEP Name

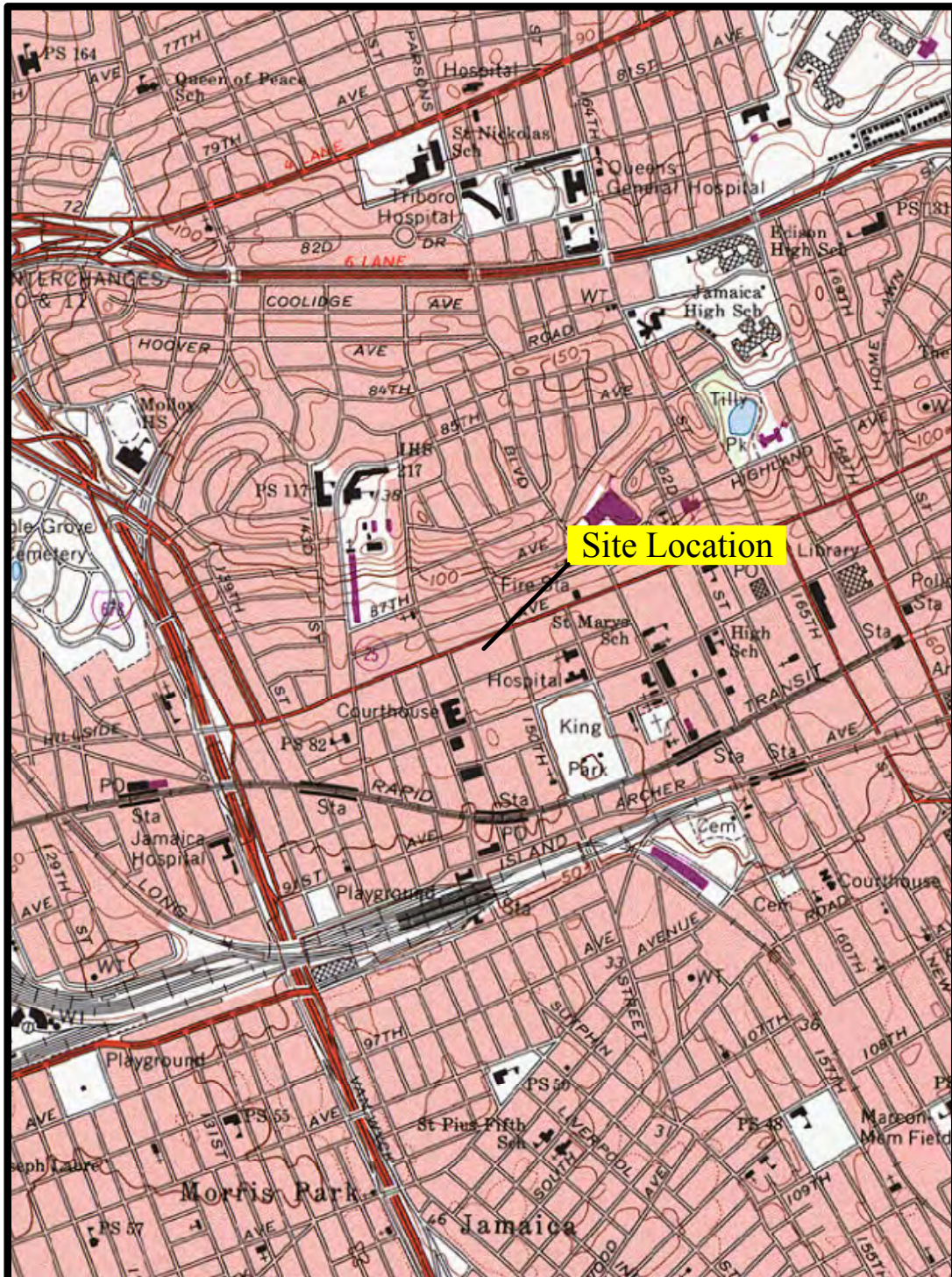
QEP Signature

Date

7.0 Schedule

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 10 month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	4 weeks
Fact Sheet 2 announcing start of remedy	0	1 week
Mobilization	0	4 weeks
Remedial Excavation	4 weeks	25 weeks
Demobilization	29 weeks	11 weeks
Submit Remedial Action Report	40 weeks	4 weeks



From USGS 7.5 Minute Topographic Map Of
Jamaica, NY Quadrangle



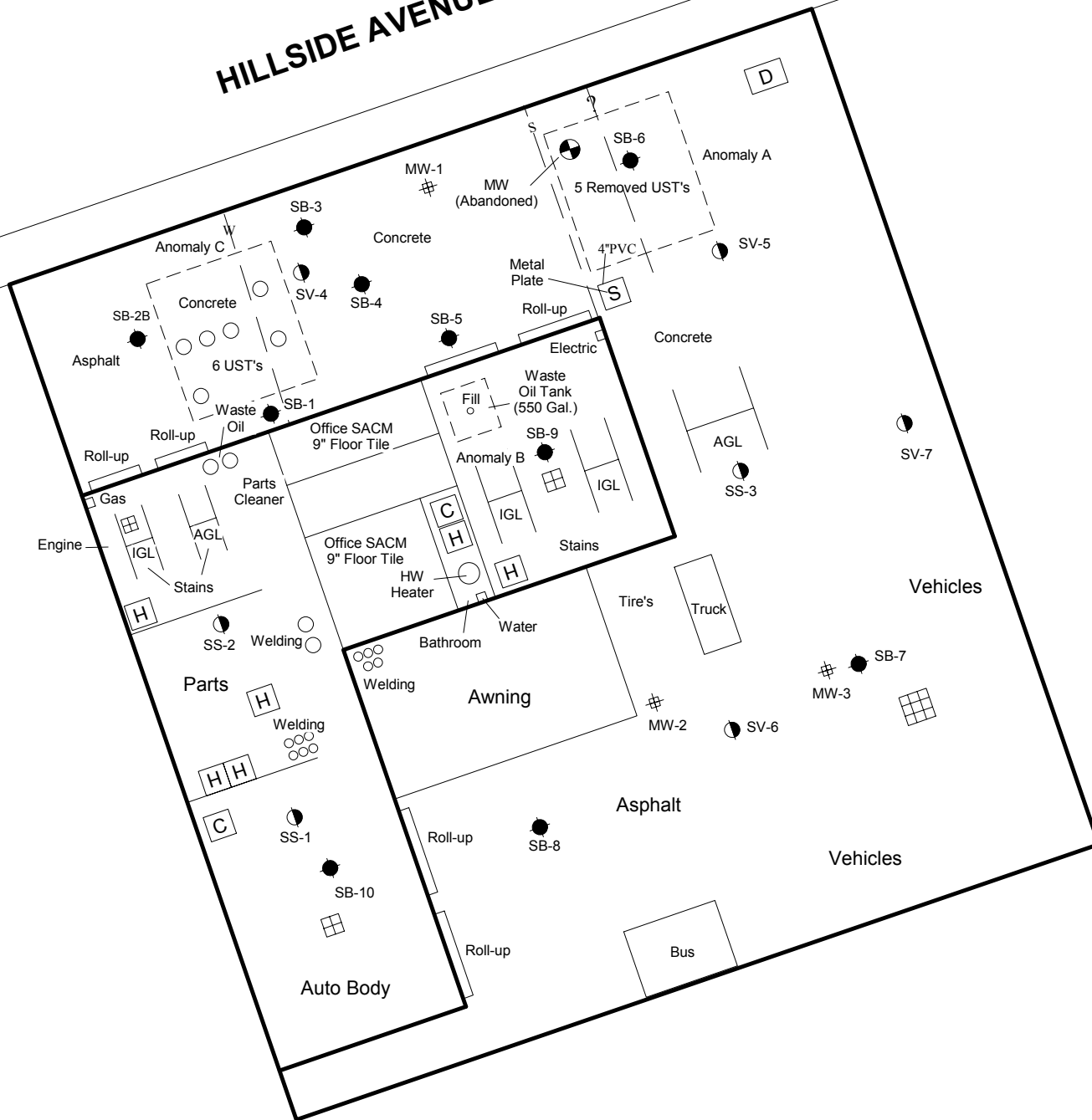
Locational Diagram

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

110 Main Street, Suite 103, Port Washington, NY 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 8346-JANY	Figure No.: 1
Date: 06/12/2015	Scale: 1 inch = 2000 feet

HILLSIDE AVENUE



Legend

- — Subsurface Utility
- SB-1 Soil Boring Sampling Location
- SS-1 Soil Vapor / Sub-Slab Soil Vapor Sampling Location
- ⊕ MW-1 Groundwater Monitoring Well Location



Sampling Diagram



110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 8346-JANY

Figure No.: 2

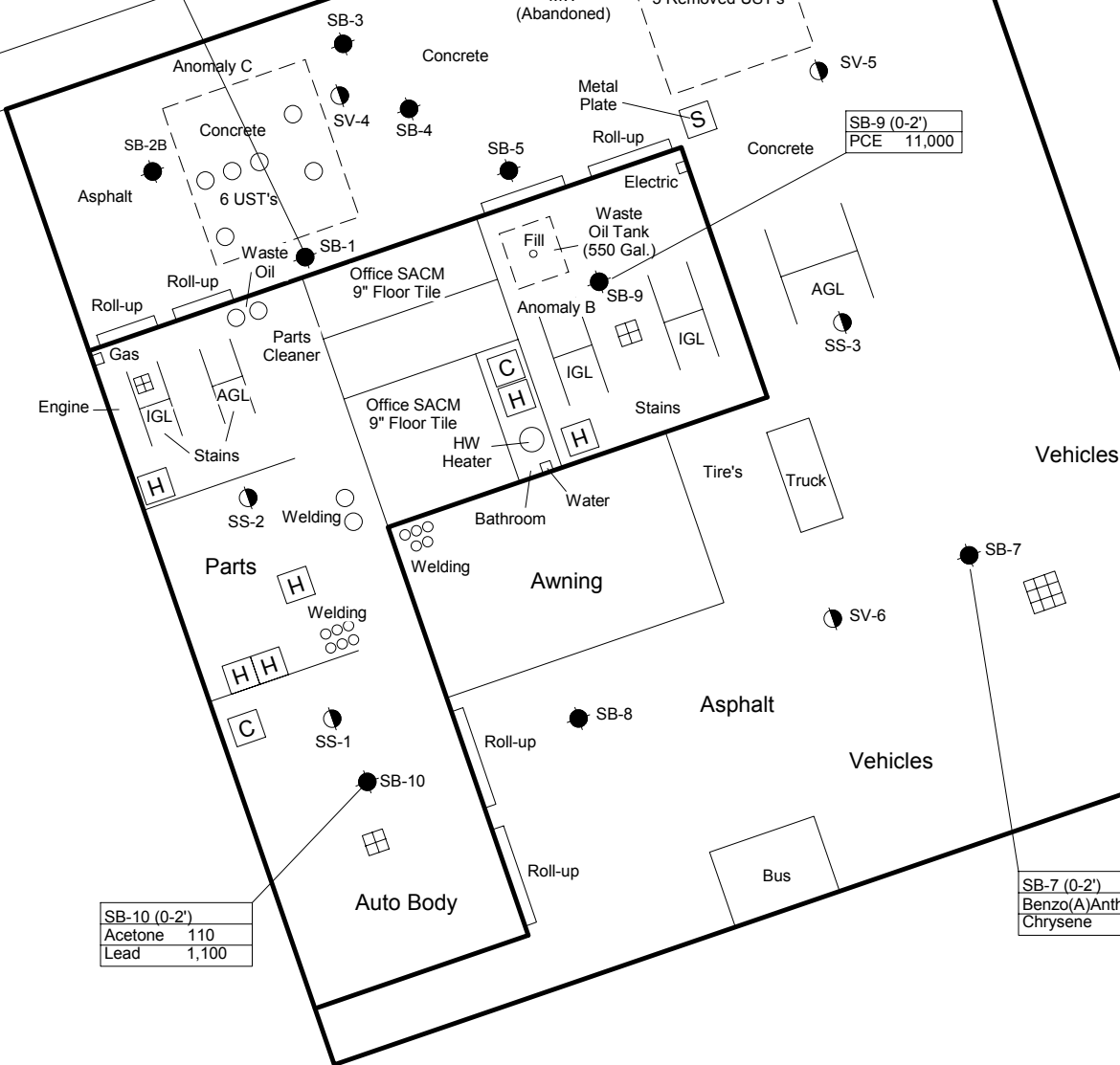
Date: 12/30/2016

Scale: Not To Scale

HILLSIDE AVENUE

SB-1 (0-2')
4,4'DDT 3.82

SB-6 (0-2')
4,4'DDT 5.06



SB-10 (0-2')
Acetone 110
Lead 1,100

SB-9 (0-2')
PCE 11,000

SB-7 (0-2')
Benzo(A)Anthracene 1,550
Chrysene 1,560

Legend

- Soil Boring
- ⊙ Soil Vapor / Sub-Slab Soil Vapor Sampling Location

Concentrations of VOCs and SVOCs Reported in ug/kg,
and Pesticides and Metals Reported in mg/kg.

Metal Exceedances Greater Than CSCO Noted In
Summary Boxes.



Exceedances In Shallow Soil Borings



110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

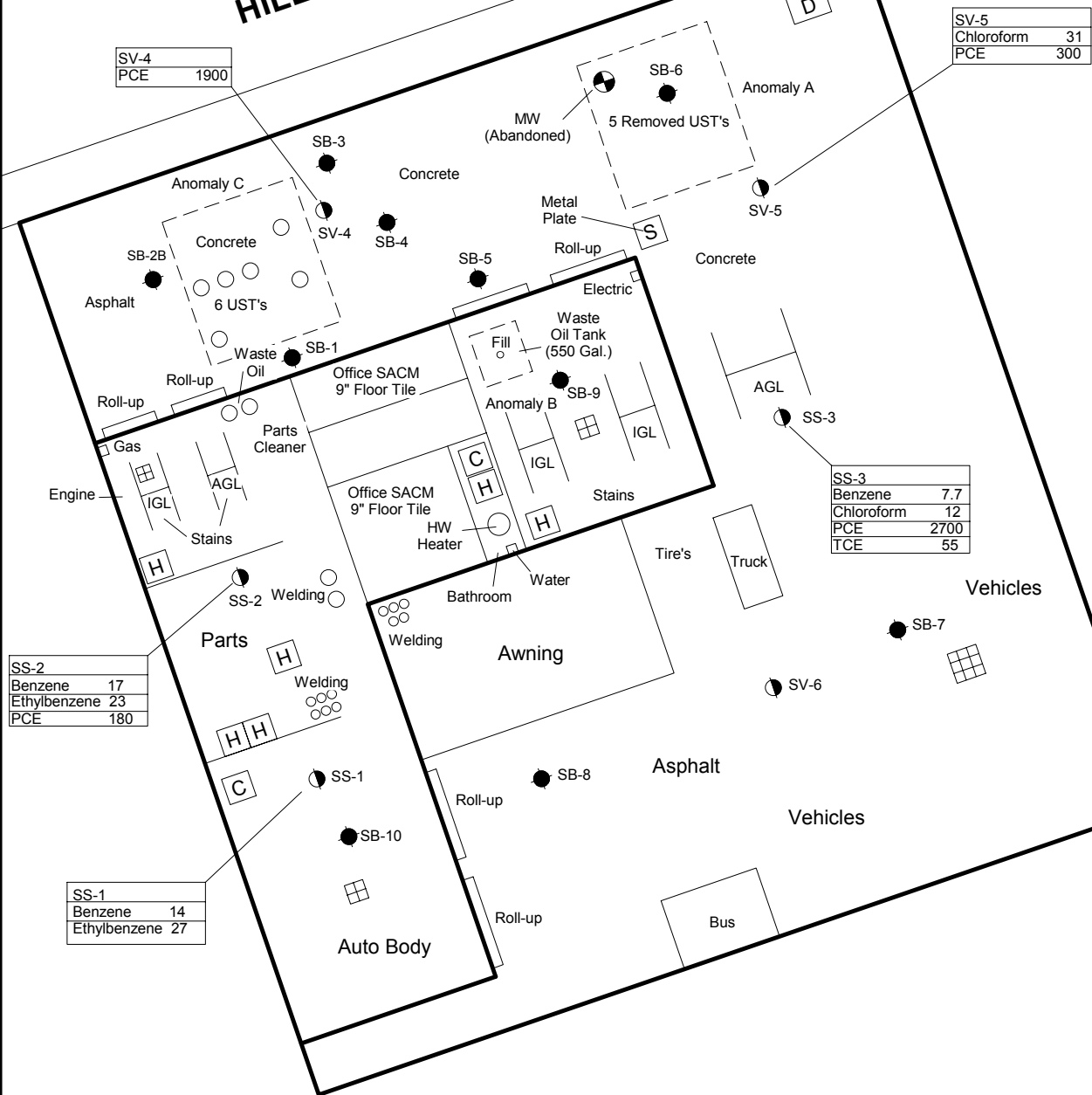
Project No.: 8346-JANY

Figure No.: 3

Date: 01/18/2016

Scale: Not To Scale

HILLSIDE AVENUE



Legend

- Soil Boring
- ⊙ Soil Vapor / Sub-Slab Soil Vapor Sampling Location

Concentrations Reported in ug/m3



Exceedances In Soil Vapor



110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

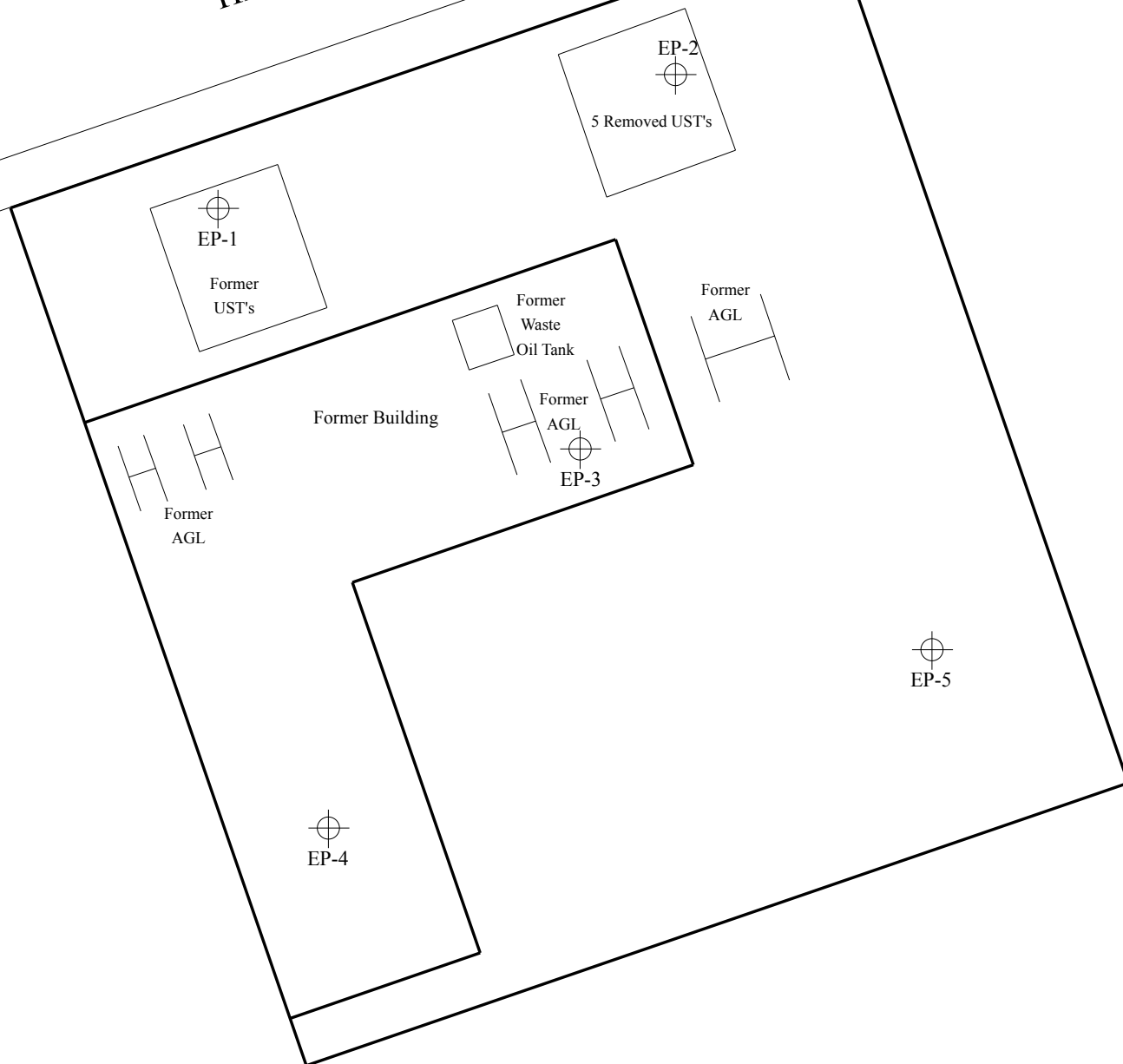
Project No.: 8346-JANY

Figure No.: 4

Date: 01/18/2016

Scale: Not To Scale

HILLSIDE AVENUE



Legend



EP-1

Proposed Endpoint Sample Locations



N

Proposed Endpoint Sample Locations



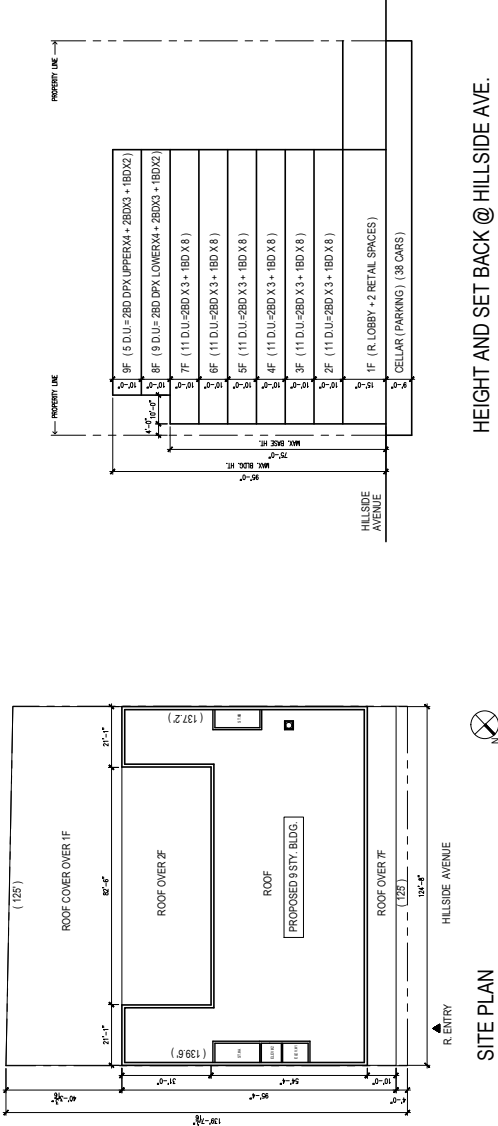
110 Main Street, Suite 103, Port Washington, New York 11050
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 8346-JANY

Figure No.: 5

Date: 12/27/2016

Scale: Not To Scale



SITE PLAN

HEIGHT AND SET BACK @ HILLSIDE AVE.

TOTAL UNITS :
80 D.U. + 2 C.U. + 52 CARS
4 - DUPLEX (2BD)
24 - 2BD UNITS
52 - 1BD UNITS

APARTMENT @ R7A : TOTAL 80 R. UNITS (4) 2BD DUPLEX UNITS + (24) 2BD UNITS + (52) 1BD UNITS	
FLOOR	UNIT
9F (APARTMENT)	5 D.U.=2BD DPX UPPER X4 + 2BD X3 + 1BD X2
8F (APARTMENT)	9 D.U.=2BD DPX LOWER X4 + 2BD X3 + 1BD X2
7F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
6F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
5F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
4F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
3F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
2F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8

COMMERCIAL @ C2-3 : TOTAL 2 C. UNITS	
RETAIL	2 COMMERCIAL UNITS
PARKING	TOTAL 52 +14 (OUTDOOR) + 38 (INDOOR)

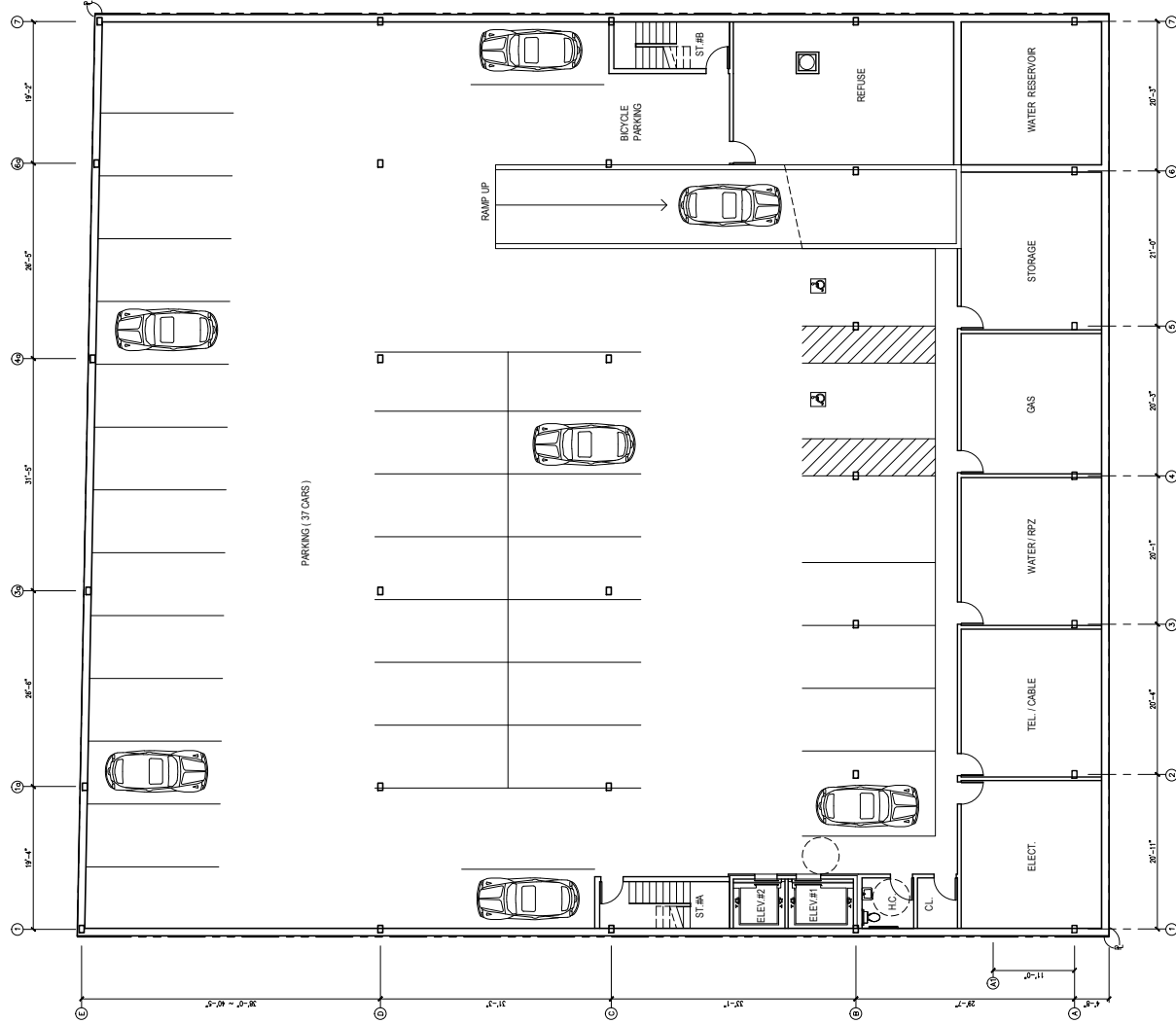
TOTAL FAR : 79,580 SF.
TOTAL GROSS : 81,621 SF.
TOTAL DEDUCTION : 2,367 SF.
TOTAL NET : 79,254 SF.

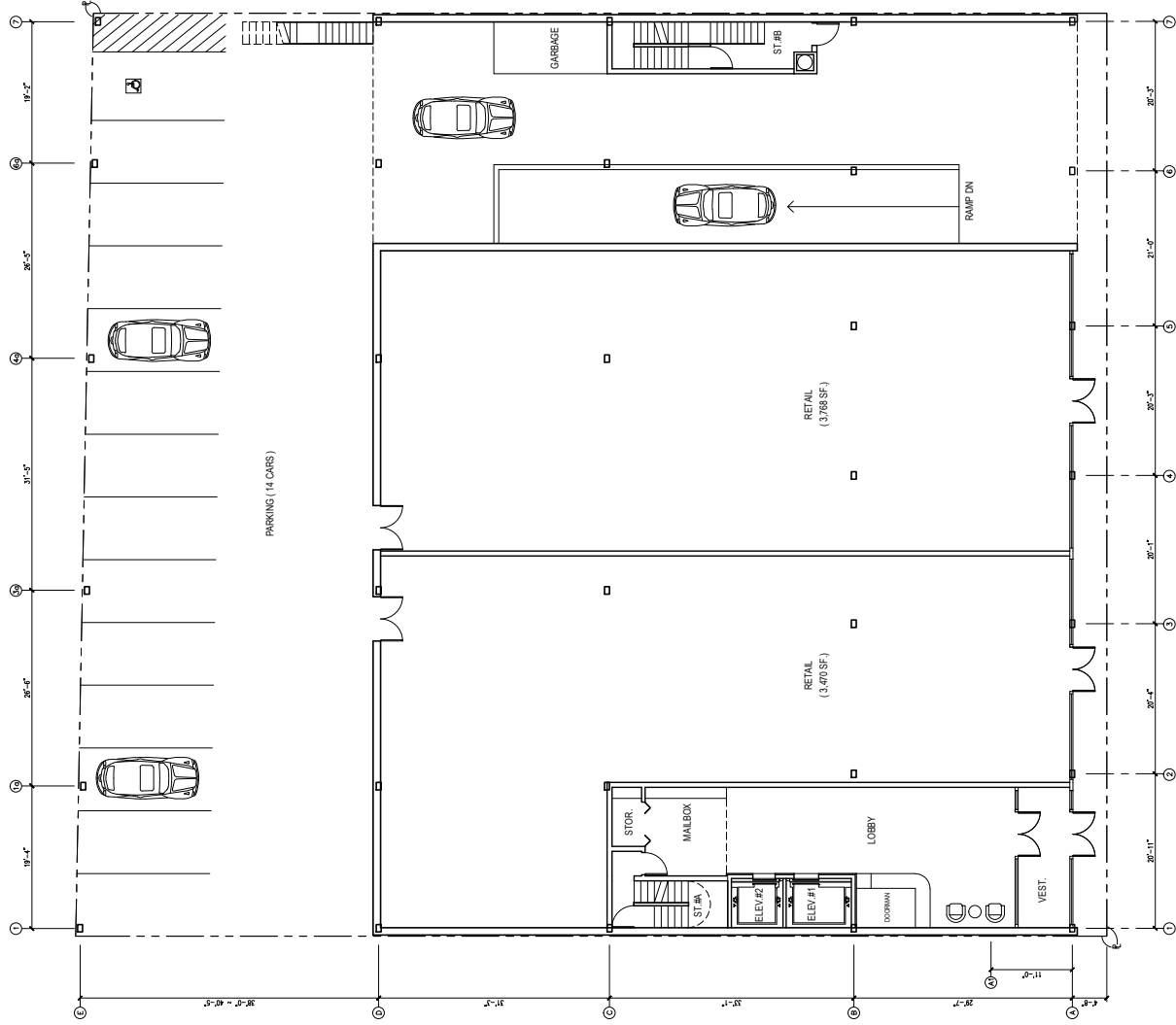
FLOOR	GROSS	DEDUCTION	NET
ROOF	410 SF.	N/A	410 SF.
9F	8,076 SF.	511 SF.	7,565 SF.
8F	8,076 SF.	511 SF.	7,565 SF.
7F	9,322 SF.	152 SF.	9,170 SF.
6F	9,322 SF.	152 SF.	9,170 SF.
5F	9,322 SF.	152 SF.	9,170 SF.
4F	9,322 SF.	152 SF.	9,170 SF.
3F	9,322 SF.	152 SF.	9,170 SF.
2F	9,322 SF.	152 SF.	9,170 SF.
1F	1,513 SF.	433 SF.	1,080 SF.
TOTAL	74,007 SF.	2,367 SF.	71,640 SF.

LOT @ C2-3 / R7A : 17,300 SF. C:2.0 MAX.	
1F	7,614 SF.

A-2

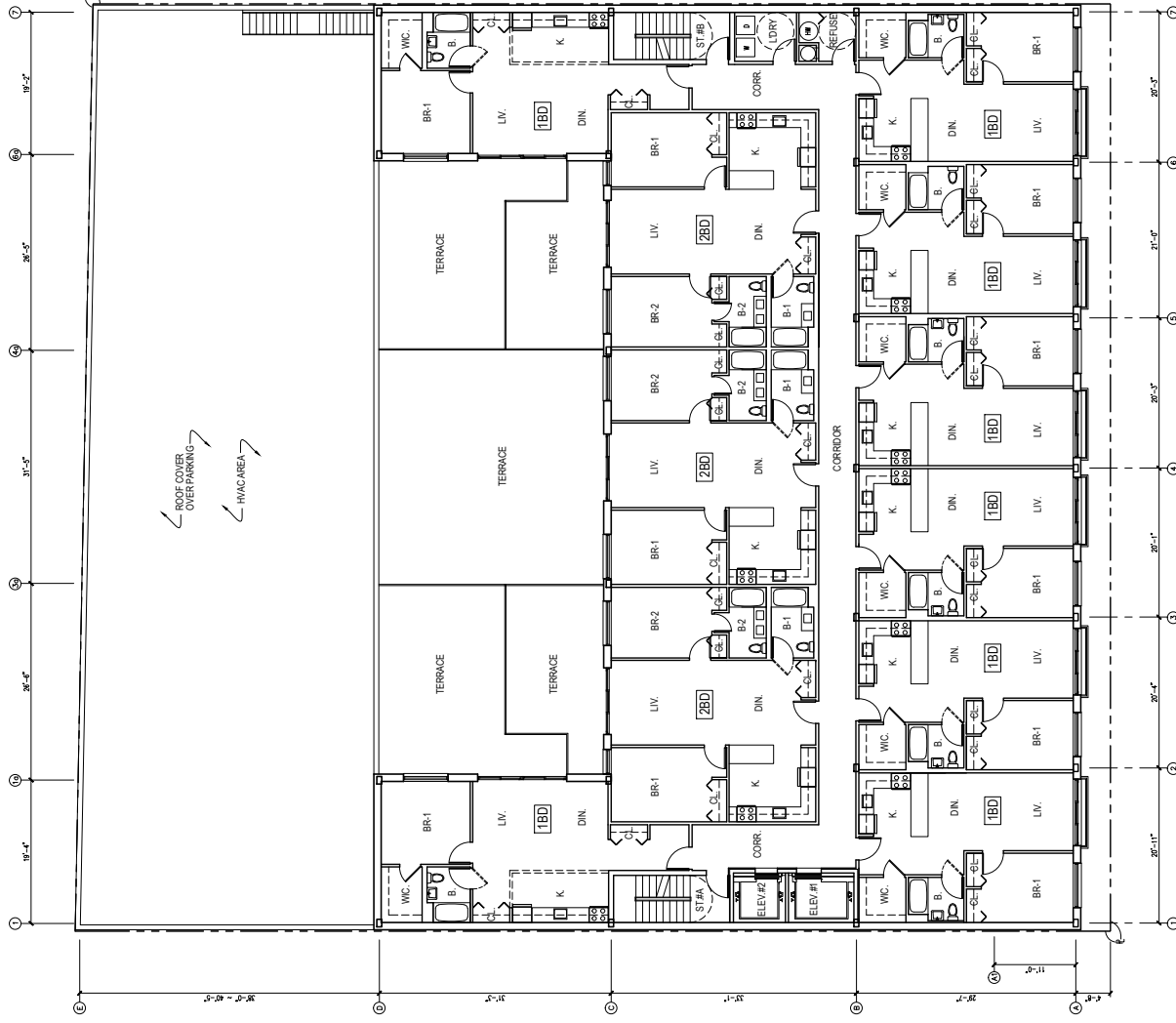
CELLAR PLAN
SCALE : 1/8"=1'-0"
DATE : 10/26/2016

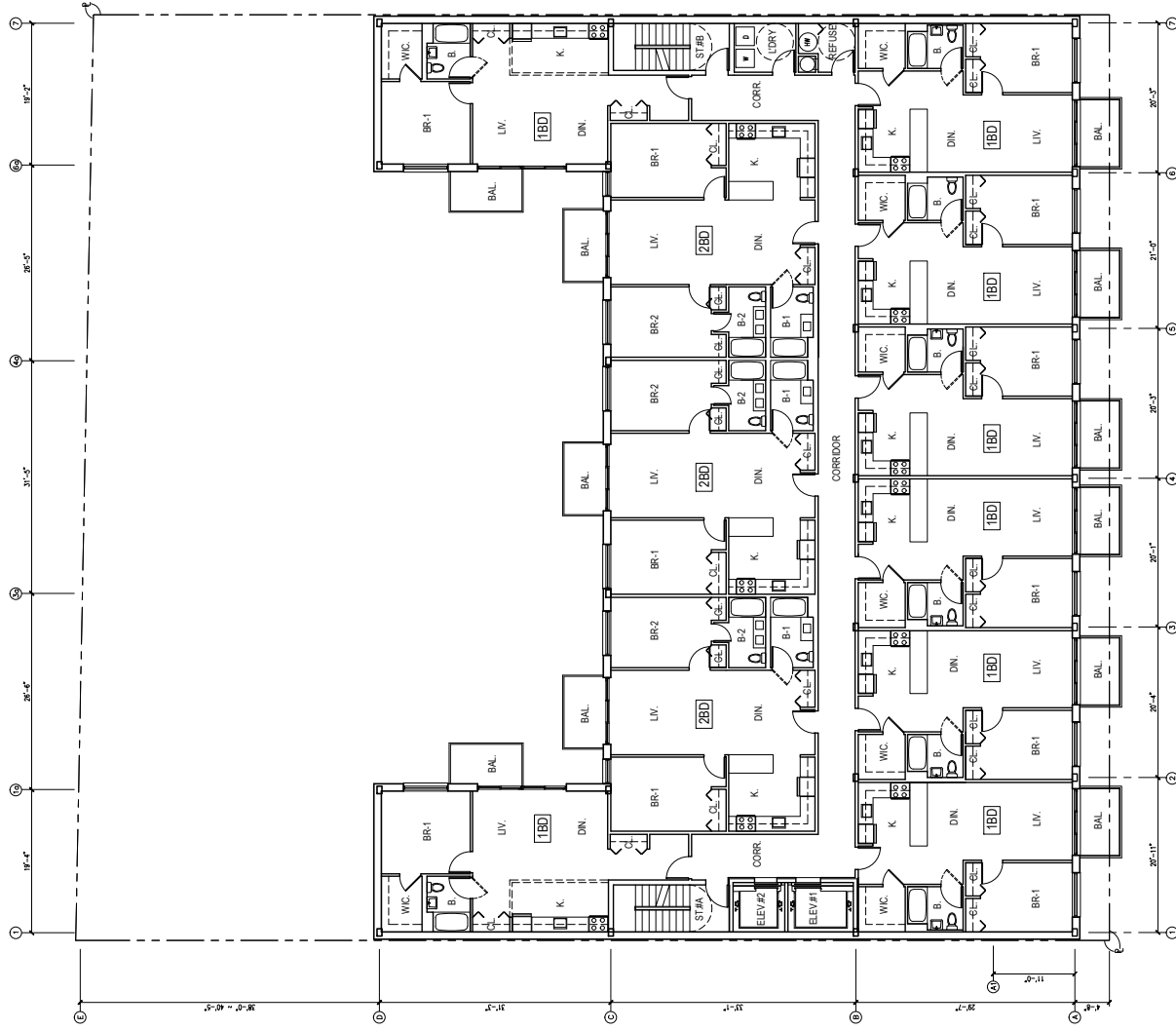




A-4

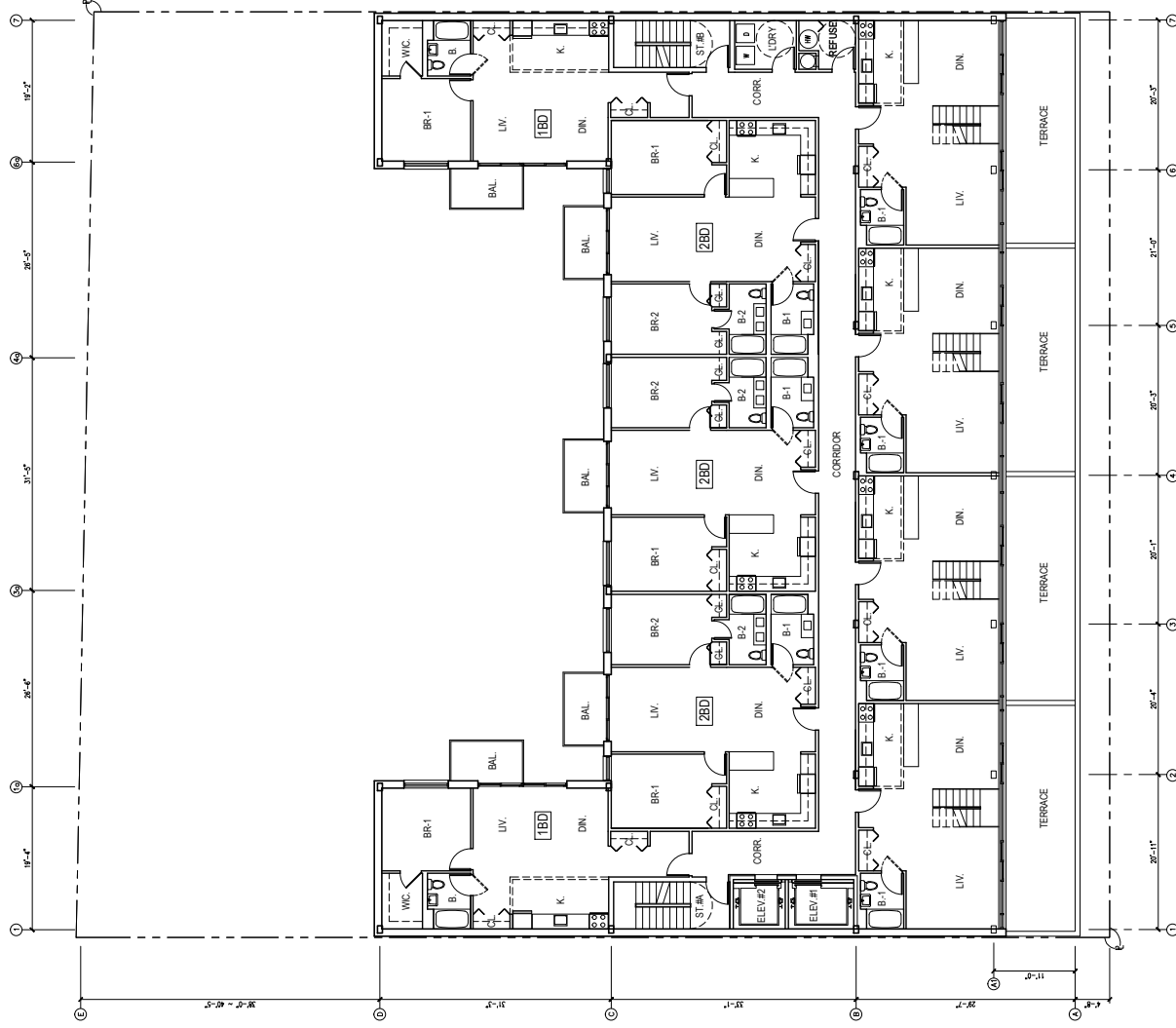
2F PLAN
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DATE : 10/26/2016

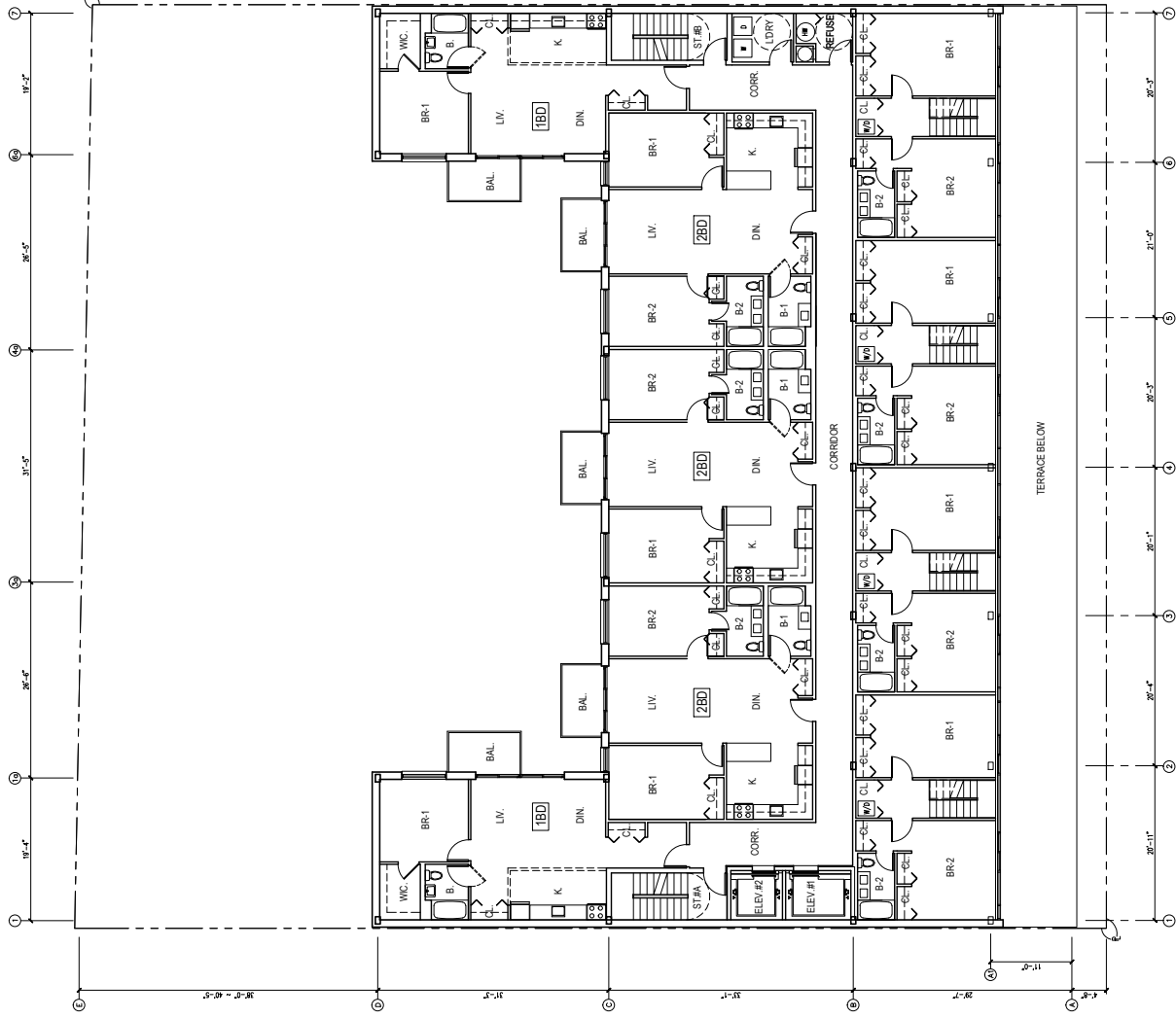


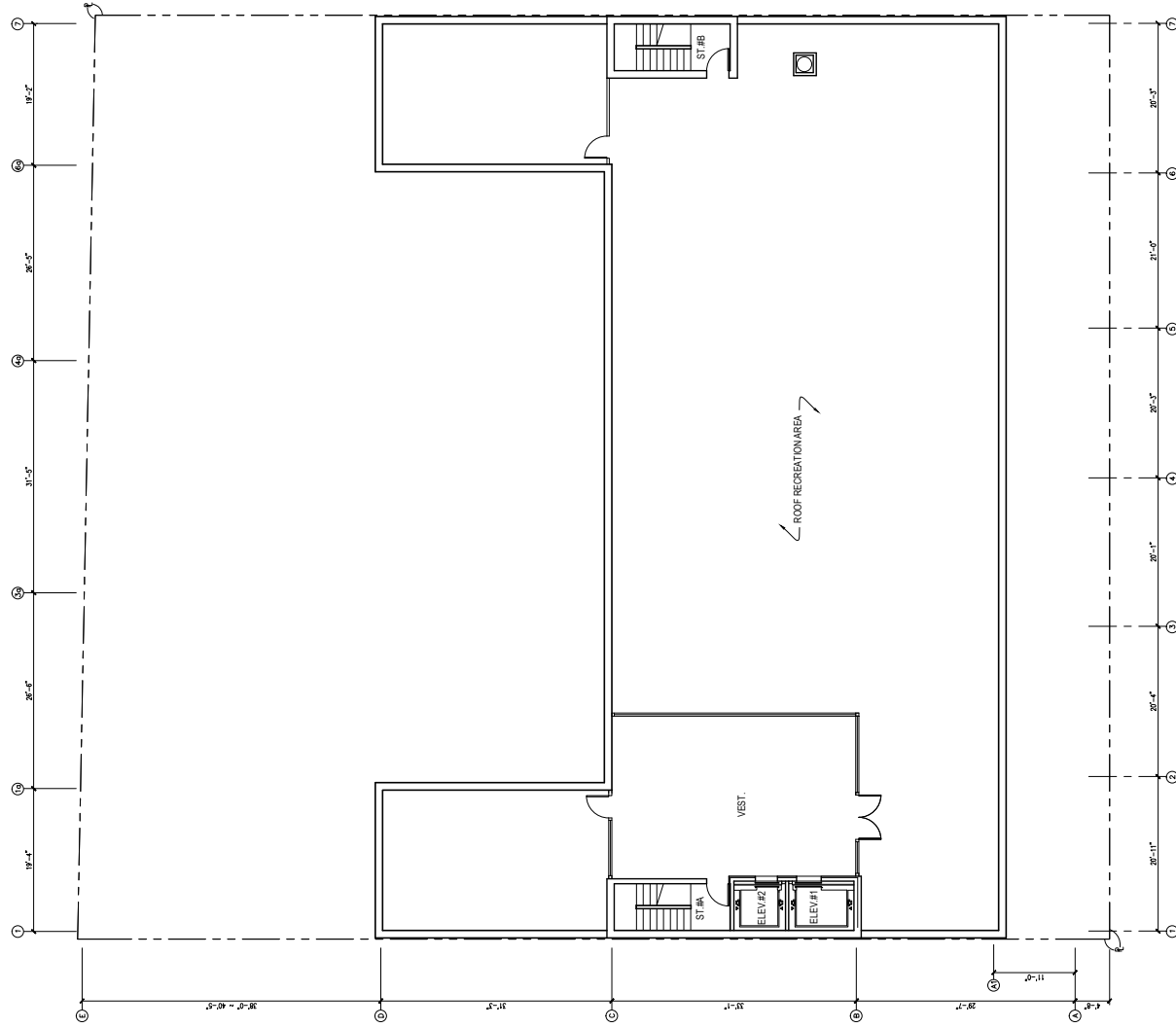


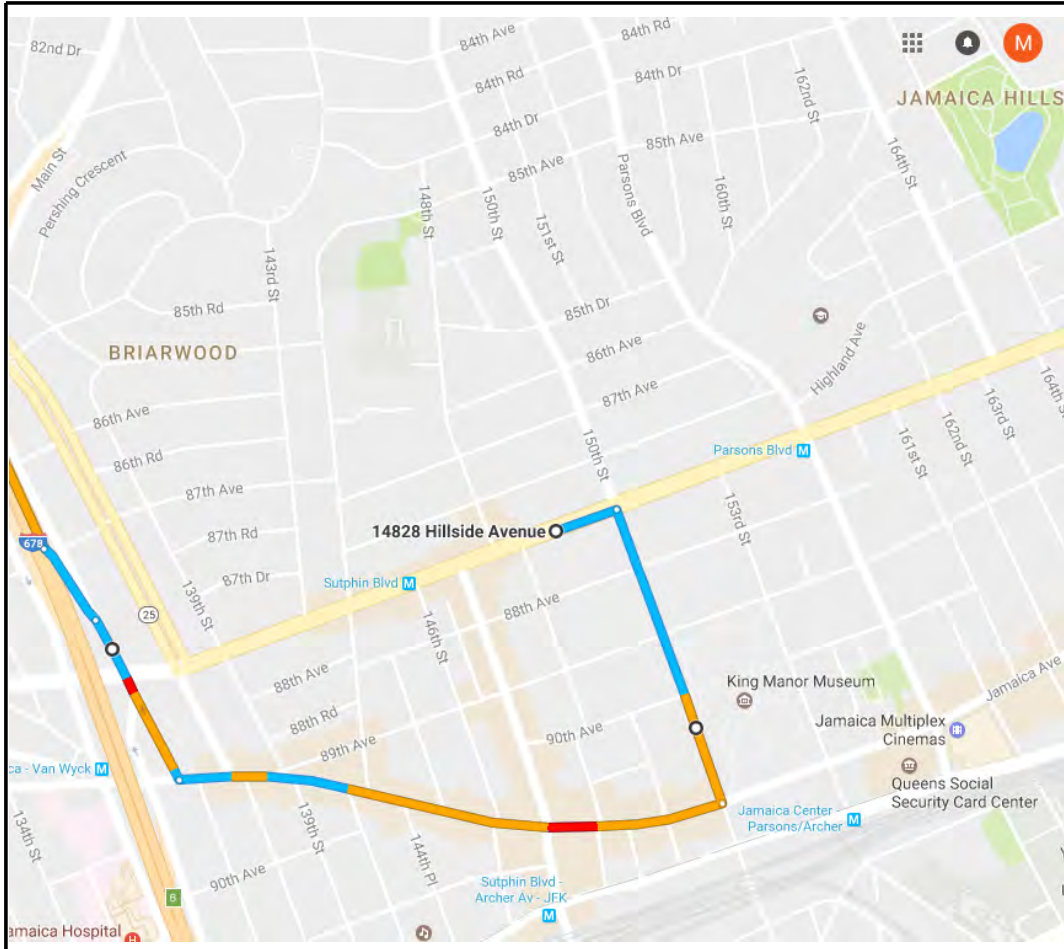
A-6

8F PLAN
SCALE : 1/8"=1'-0"
DATE : 10/26/2016









Souce: Google Maps



Truck Route	
	
110 Main Street, Suite 103, Port Washington, New York 11050 Tel: 516-441-5800 Fax: 516-441-5511	
Project No.: 8346-JANY	Figure No.: 7
Date: 12/27/2016	Scale: Not To Scale

Table 1 Volatile Organic Compounds in Soil (ug/kg-dry) EPA Method 8260 148-28 Hillside Avenue Jamaica, NY 11435 ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-1 (0-2')	SB-1 (13'-15')	SB-2B (13'-15')	SB-3 (0-3')	SB-3 (13'-15')	SB-4 (13'-15')
Sample Date				11/18/15	6/24/15	6/25/15	11/18/15	6/24/15	6/25/15
1,1,1,2-Tetrachloroethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,1,1-Trichloroethane	680	100,000	500,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,1,2,2-Tetrachloroethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,1,2-Trichloro-1,2,2-trifluoroethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,1,2-Trichloroethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,1-Dichloroethane	270	26,000	240,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,1-Dichloroethene	330	100,000	500,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,2,4-Trichlorobenzene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,2,4-Trimethylbenzene	4,700	5,200	19,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,2-Dibromo-3-chloropropane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,2-Dibromoethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,2-Dichlorobenzene	1,100	100,000	500,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,2-Dichloroethane	20	3,100	30,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,2-Dichloropropane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,3,5-Trimethylbenzene	4,700	5,200	19,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,3-Dichlorobenzene	2,400	49,000	280,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,4-Dichlorobenzene	1,800	13,000	130,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,4-Dioxane	980	1,300	13,000	<5.3	<4.1	<5.0	<6.1	<5.0	<4.4
Cyclohexane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
2-Butanone	120	100,000	500,000	<2.6	3.5	<2.5	<3.0	<2.5	<2.2
2-Hexanone	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
4-Methyl-2-pentanone	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Acetone	50	100,000	500,000	11	18	<5.0	11	<5.0	<4.4
Acrolein	NS	NS	NS	<5.3	<4.1	<5.0	<6.1	<5.0	<4.4
Acrylonitrile	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Benzene	60	4,800	44,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Bromodichloromethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Bromoform	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Bromomethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Carbon disulfide	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Carbon tetrachloride	760	2,400	22,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Chlorobenzene	1,100	100,000	500,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Chloroethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Chloroform	370	49,000	350,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Chloromethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
cis-1,2-Dichloroethene	250	100,000	500,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
cis-1,3-Dichloropropene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Dibromochloromethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Dibromomethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Dichlorodifluoromethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Ethylbenzene	1,000	41,000	390,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Methylcyclohexane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Hexachlorobutadiene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Isopropylbenzene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Methyl acetate	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Methyl tert-butyl ether	930	100,000	500,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Methylene chloride	50	100,000	500,000	<5.3	<4.1	<5.0	<6.1	<5.0	<4.4
n-Butylbenzene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
1,2,3-Trichlorobenzene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
n-Propylbenzene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
o-Xylene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
p- & m- Xylenes	NS	NS	NS	<5.3	<4.1	<5.0	<6.1	<5.0	<4.4
p-Isopropyltoluene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
sec-Butylbenzene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Styrene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
tert-Butyl alcohol (TBA)	NS	NS	NS	<5.3	<2.1	<2.5	<6.1	<2.5	<2.2
tert-Butylbenzene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Tetrachloroethene	1,300	19,000	150,000	5.8	<2.1	<2.5	<3.0	<2.5	<2.2
Toluene	700	100,000	500,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
trans-1,2-Dichloroethene	100,000	100,000	500,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
trans-1,3-Dichloropropene	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Trichloroethene	470	21,000	200,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Trichlorofluoromethane	NS	NS	NS	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Vinyl chloride	20	900	13,000	<2.6	<2.1	<2.5	<3.0	<2.5	<2.2
Xylenes (Total)	260	100,000	500,000	<7.9	<6.2	<7.6	<9.1	<7.5	<6.6

Table 1 (Continued) Volatile Organic Compounds in Soil (ug/kg-dry) EPA Method 8260 148-28 Hillside Avenue Jamaica, NY 11435 ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-5 (0-2')	SB-5 (13'-15')	SB-6 (0-2')	SB-6 (13'-15')	SB-7A (0-2')	SB-7B (10-12')
Sample Date				11/18/15	6/24/15	11/18/15	6/24/15	11/18/15	11/18/15
1,1,1,2-Tetrachloroethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,1,1-Trichloroethane	680	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,1,2,2-Tetrachloroethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,1,2-Trichloro-1,2,2-trifluoroethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,1,2-Trichloroethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,1-Dichloroethane	270	26,000	240,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,1-Dichloroethene	330	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,2,4-Trichlorobenzene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,2,4-Trimethylbenzene	4,700	5,200	19,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,2-Dibromo-3-chloropropane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,2-Dibromoethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,2-Dichlorobenzene	1,100	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,2-Dichloroethane	20	3,100	30,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,2-Dichloropropane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,3,5-Trimethylbenzene	4,700	5,200	19,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,3-Dichlorobenzene	2,400	49,000	280,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,4-Dichlorobenzene	1,800	13,000	130,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,4-Dioxane	980	1,300	13,000	<39	<56	<53	<49	<53	<52
Cyclohexane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
2-Butanone	120	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
2-Hexanone	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
4-Methyl-2-pentanone	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Acetone	50	100,000	500,000	7.3	<5.6	7.4	<4.9	12	12
Acrolein	NS	NS	NS	<3.9	<5.6	<5.3	<4.9	<5.3	<5.2
Acrylonitrile	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Benzene	60	4,800	44,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Bromodichloromethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Bromoform	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Bromomethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Carbon disulfide	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Carbon tetrachloride	760	2,400	22,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Chlorobenzene	1,100	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Chloroethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Chloroform	370	49,000	350,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Chloromethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
cis-1,2-Dichloroethene	250	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
cis-1,3-Dichloropropene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Dibromochloromethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Dibromomethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Dichlorodifluoromethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Ethylbenzene	1,000	41,000	390,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Methylcyclohexane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Hexachlorobutadiene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Isopropylbenzene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Methyl acetate	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Methyl tert-butyl ether	930	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Methylene chloride	50	100,000	500,000	<3.9	<5.6	<5.3	<4.9	<5.3	<5.2
n-Butylbenzene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
1,2,3-Trichlorobenzene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
n-Propylbenzene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
o-Xylene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
p- & m- Xylenes	NS	NS	NS	<3.9	<5.6	<5.3	<4.9	<5.3	<5.2
p-Isopropyltoluene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
sec-Butylbenzene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Styrene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
tert-Butyl alcohol (TBA)	NS	NS	NS	<3.9	<2.8	<5.3	<2.5	<5.3	<5.2
tert-Butylbenzene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Tetrachloroethene	1,300	19,000	150,000	33	<2.8	<2.6	<2.5	<2.7	<2.6
Toluene	700	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
trans-1,2-Dichloroethene	100,000	100,000	500,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
trans-1,3-Dichloropropene	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Trichloroethene	470	21,000	200,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Trichlorofluoromethane	NS	NS	NS	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Vinyl chloride	20	900	13,000	<2.0	<2.8	<2.6	<2.5	<2.7	<2.6
Xylenes (Total)	260	100,000	500,000	<5.9	<8.4	<7.9	<7.4	<8.0	<7.8

**Volatile Organic Compounds in Soil (ug/kg-dry)
EPA Method 8260
148-28 Hillside Avenue
Jamaica, NY 11435**

Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-8A (0-2') 11/18/15	SB-8B (10-12') 11/18/15	SB-9 (0-2') 11/19/15	SB-9 (10-12') 11/19/15	SB-10 (0-2') 11/19/15	SB-10 (10-12') 11/19/15
Sample Date									
1,1,1,2-Tetrachloroethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,1,1-Trichloroethane	680	100,000	500,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,1,2,2-Tetrachloroethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,1,2-Trichloro-1,2,2-trifluoroethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,1,2-Trichloroethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,1-Dichloroethane	270	26,000	240,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,1-Dichloroethane	330	100,000	500,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,2,4-Trichlorobenzene	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,2,4-Trimethylbenzene	4,700	5,200	19,000	<3.4	<2.4	<3.8	<3.1	87	<2.7
1,2-Dibromo-3-chloropropane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,2-Dibromoethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,2-Dichlorobenzene	1,100	100,000	500,000	<3.4	<2.4	36	<3.1	<3.2	<2.7
1,2-Dichloroethane	20	3,100	30,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,2-Dichloropropane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,3,5-Trimethylbenzene	4,700	5,200	19,000	<3.4	<2.4	<3.8	<3.1	14	<2.7
1,3-Dichlorobenzene	2,400	49,000	280,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,4-Dichlorobenzene	1,800	13,000	130,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
1,4-Dioxane	980	1,300	13,000	<6.9	<4.9	<7.6	<6.1	<6.3	<5.3
Cyclohexane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
2-Butanone	120	100,000	500,000	<3.4	<2.4	<3.8	<3.1	25	9.2
2-Hexanone	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
4-Methyl-2-pentanone	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Acetone	50	100,000	500,000	8.3	11	21	8.9	110	13
Acrolein	NS	NS	NS	<6.9	<4.9	<7.6	<6.1	<6.3	<5.3
Acrylonitrile	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Benzene	60	4,800	44,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Bromodichloromethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Bromofom	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Bromomethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Carbon disulfide	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Carbon tetrachloride	760	2,400	22,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Chlorobenzene	1,100	100,000	500,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Chloroethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Chloroform	370	49,000	350,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Chloromethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
cis-1,2-Dichloroethene	250	100,000	500,000	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
cis-1,3-Dichloropropene	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Dibromochloromethane	NS	NS	NS	<3.4	<2.4	<3.8	<3.1	<3.2	<2.7
Dibromomethane	NS	NS	NS	<3.4	&				

NS = No Standard

Table 2									
Semi Volatile Organic Compounds in Soil (ug/kg-dry)									
EPA Method 8270									
148-28 Hillside Avenue									
Jamaica, NY 11435									
ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSO ³	SB-1 (0-2') 11/18/15	SB-1 (13'-15') 6/24/15	SB-2B (13'-15') 6/25/15	SB-3 (0-3') 11/18/15	SB-3 (13'-15') 6/24/15	SB-4 (13'-15') 6/25/15
Sample Date									
1,1'-Biphenyl	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
1,2,4,5-Tetrachlorobenzene	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
1,2,4-Trichlorobenzene	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
1,2-Dichlorobenzene	100,000	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
1,2-Diphenylhydrazine (as Azobenzene)	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
1,3-Dichlorobenzene	17,000	49,000	280,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
1,4-Dichlorobenzene	980	13,000	130,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2,3,4,6-Tetrachlorophenol	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
2,4,5-Trichlorophenol	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2,4,6-Trichlorophenol	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2,4-Dichlorophenol	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2,4-Dimethylphenol	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2,4-Dinitrophenol	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
2,4-Dinitrotoluene	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2,6-Dinitrotoluene	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2-Chloronaphthalene	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2-Chlorophenol	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2-Methylnaphthalene	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2-Methylphenol	330	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
2-Nitroaniline	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
2-Nitrophenol	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
3- & 4-Methylphenols	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
3,3'-Dichlorobenzidine	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
3-Nitroaniline	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
4,6-Dinitro-2-methylphenol	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
4-Bromophenyl phenyl ether	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
4-Chloro-3-methylphenol	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
4-Chloroaniline	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
4-Chlorophenyl phenyl ether	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
4-Nitroaniline	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
4-Nitrophenol	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
Acenaphthene	20,000	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Acenaphthylene	100,000	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Acetophenone	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Aniline	48,000	10,000	500,000	<193	<85.3	<86.0	<189	<85.5	<86.3
Anthracene	100,000	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Atrazine	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Benzaldehyde	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Benzidine	NS	NS	NS	<193	<85.3	<86.0	<189	<85.5	<86.3
Benzo(a)anthracene	1,000	1,000	5,600	<48.3	<21.4	<21.5	158	<21.4	<21.6
Benzo(a)pyrene	1,000	1,000	1,000	<48.3	<21.4	<21.5	103	<21.4	<21.6
Benzo(b)fluoranthene	1,000	1,000	5,600	<48.3	<21.4	<21.5	97.2	<21.4	<21.6
Benzo(g,h,i)perylene	100,000	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Benzo(k)fluoranthene	NS	NS	NS	<48.3	<21.4	<21.5	108	<21.4	<21.6
Benzoic acid	800	3,900	56,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Benzyl alcohol	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Benzyl butyl phthalate	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Bis(2-chloroethoxy)methane	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Bis(2-chloroethyl)ether	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Bis(2-chloroisopropyl)ether	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Bis(2-ethylhexyl)phthalate	NS	NS	NS	<48.3	<21.4	<21.5	110	<21.4	<21.6
Caprolactam	NS	NS	NS	<96.4	<42.6	<43.0	<94.3	<42.7	<43.1
Carbazole	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Chrysene	1,000	3,900	56,000	<48.3	<21.4	<21.5	184	<21.4	<21.6
Dibenzo(a,h)anthracene	330	330	560	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Dibenzofuran	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Diethyl phthalate	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Dimethyl phthalate	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Di-n-butyl phthalate	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Di-n-octyl phthalate	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Fluoranthene	100,000	100,000	500,000	<48.3	<21.4	<21.5	207	<21.4	<21.6
Fluorene	30,000	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Hexachlorobenzene	33	12	60	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Hexachlorobutadiene	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Hexachlorocyclopentadiene	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Hexachloroethane	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Indeno(1,2,3-cd)pyrene	500	500	5,600	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Isophorone	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Naphthalene	12,000	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Nitrobenzene	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
N-Nitrosodimethylamine	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
N-nitroso-di-n-propylamine	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
N-Nitrosodiphenylamine	NS	NS	NS	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Pentachlorophenol	800	6,700	6,700	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Phenanthrene	100,000	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Phenol	330	100,000	500,000	<48.3	<21.4	<21.5	<47.3	<21.4	<21.6
Pyrene	100,000	100,000	500,000	60.1	<21.4	<21.5	231	<21.4	<21.6

Table 2 (Continued)									
Semi Volatile Organic Compounds in Soil (ug/kg-dry)									
EPA Method 8270									
148-28 Hillside Avenue									
Jamaica, NY 11435									
ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-5 (0-2') 11/18/15	SB-5 (13'-15') 6/24/15	SB-6 (0-2') 11/18/15	SB-6 (13'-15') 6/24/15	SB-7A (0-2') 11/18/15	SB-7B (10-12') 11/18/15
Sample Date									
1,1'-Biphenyl	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
1,2,4,5-Tetrachlorobenzene	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
1,2,4-Trichlorobenzene	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
1,2-Dichlorobenzene	100,000	100,000	500,000	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
1,2-Diphenylhydrazine (as Azobenzene)	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
1,3-Dichlorobenzene	17,000	49,000	280,000	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
1,4-Dichlorobenzene	980	13,000	130,000	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2,3,4,6-Tetrachlorophenol	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
2,4,5-Trichlorophenol	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2,4,6-Trichlorophenol	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2,4-Dichlorophenol	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2,4-Dimethylphenol	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2,4-Dinitrophenol	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
2,4-Dinitrotoluene	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2,6-Dinitrotoluene	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2-Chloronaphthalene	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2-Chlorophenol	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2-Methylnaphthalene	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	73.0	<44.4
2-Methylphenol	330	100,000	500,000	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
2-Nitroaniline	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
2-Nitrophenol	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
3- & 4-Methylphenols	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
3,3'-Dichlorobenzidine	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
3-Nitroaniline	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
4,6-Dinitro-2-methylphenol	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
4-Bromophenyl phenyl ether	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
4-Chloro-3-methylphenol	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
4-Chloroaniline	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
4-Chlorophenyl phenyl ether	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
4-Nitroaniline	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
4-Nitrophenol	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
Acenaphthene	20,000	100,000	500,000	<46.9	<21.9	<47.1	<22.2	296	<44.4
Acenaphthylene	100,000	100,000	500,000	<46.9	<21.9	<47.1	<22.2	68.6	<44.4
Acetophenone	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Aniline	48,000	10,000	500,000	<187	<87.4	<188	<88.8	<183	<178
Anthracene	100,000	100,000	500,000	<46.9	<21.9	<47.1	<22.2	839	<44.4
Atrazine	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Benzaldehyde	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Benzidine	NS	NS	NS	<187	<87.4	<188	<88.8	<183	<178
Benzo(a)anthracene	1,000	1,000	5,600	176	<21.9	65.3	<22.2	1,550	<44.4
Benzo(a)pyrene	1,000	1,000	1,000	148	<21.9	<47.1	<22.2	481	<44.4
Benzo(b)fluoranthene	1,000	1,000	5,600	157	<21.9	<47.1	<22.2	589	<44.4
Benzo(g,h,i)perylene	100,000	100,000	500,000	73.3	<21.9	<47.1	<22.2	244	<44.4
Benzo(k)fluoranthene	NS	NS	NS	162	<21.9	<47.1	<22.2	582	<44.4
Benzoic acid	800	3,900	56,000	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Benzyl alcohol	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Benzyl butyl phthalate	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Bis(2-chloroethoxy)methane	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Bis(2-chloroethyl)ether	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Bis(2-chloroisopropyl)ether	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Bis(2-ethylhexyl)phthalate	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Caprolactam	NS	NS	NS	<93.6	<43.6	<93.9	<44.3	<91.3	<88.6
Carbazole	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	441	<44.4
Chrysene	1,000	3,900	56,000	200	<21.9	84.8	<22.2	1,560	<44.4
Dibenzo(a,h)anthracene	330	330	560	<46.9	<21.9	<47.1	<22.2	211	<44.4
Dibenzofuran	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	193	<44.4
Diethyl phthalate	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Dimethyl phthalate	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Di-n-butyl phthalate	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Di-n-octyl phthalate	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Fluoranthene	100,000	100,000	500,000	276	<21.9	119	<22.2	2,640	<44.4
Fluorene	30,000	100,000	500,000	<46.9	<21.9	<47.1	<22.2	328	<44.4
Hexachlorobenzene	33	12	60	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Hexachlorobutadiene	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Hexachlorocyclopentadiene	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Hexachloroethane	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Indeno(1,2,3-cd)pyrene	500	500	5,600	68.1	<21.9	<47.1	<22.2	306	<44.4
Isophorone	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Naphthalene	12,000	100,000	500,000	<46.9	<21.9	<47.1	<22.2	119	<44.4
Nitrobenzene	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
N-Nitrosodimethylamine	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
N-nitroso-di-n-propylamine	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
N-Nitrosodiphenylamine	NS	NS	NS	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Pentachlorophenol	800	6,700	6,700	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Phenanthrene	100,000	100,000	500,000	<46.9	<21.9	<47.1	<22.2	2,200	<44.4
Phenol	330	100,000	500,000	<46.9	<21.9	<47.1	<22.2	<45.7	<44.4
Pyrene	100,000	100,000	500,000	257	<21.9	203	<22.2	2,940	<44.4

Semi Volatile Organic Compounds in Soil (ug/kg-dry)
EPA Method 8270
148-28 Hillside Avenue
Jamaica, NY 11435

Sample ID (Depth) Sample Date	UUSCO ¹	RRSCO ²	CSCO ³	SB-8A (0-2') 11/18/15	SB-8B (10-12') 11/18/15	SB-9 (0-2') 11/19/15	SB-9 (10-12') 11/19/15	SB-10 (0-2') 11/19/15	SB-10 (10-12') 11/19/15
1,1'-Biphenyl	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
1,2,4,5-Tetrachlorobenzene	NS	NS	NS	<96.3	<85.8	<89.6	<85.3	<87.5	<86.1
1,2,4-Trichlorobenzene	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
1,2-Dichlorobenzene	100,000	100,000	500,000	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
1,2-Diphenylhydrazine (as Azobenzene)	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
1,3-Dichlorobenzene	17,000	49,000	280,000	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
1,4-Dichlorobenzene	980	13,000	130,000	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2,3,4,6-Tetrachlorophenol	NS	NS	NS	<96.3	<85.8	<89.6	<85.3	<87.5	<86.1
2,4,5-Trichlorophenol	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2,4,6-Trichlorophenol	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2,4-Dichlorophenol	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2,4-Dimethylphenol	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2,4-Dinitrophenol	NS	NS	NS	<96.3	<85.8	<89.6	<85.3	<87.5	<86.1
2,4-Dinitrotoluene	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2,6-Dinitrotoluene	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2-Chloronaphthalene	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2-Chlorophenol	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2-Methylnaphthalene	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	168	<43.1
2-Methylphenol	330	100,000	500,000	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
2-Nitroaniline	NS	NS	NS	<96.3	<85.8	<89.6	<85.3	<87.5	<86.1
2-Nitrophenol	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
3- & 4-Methylphenols	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
3,3'-Dichlorobenzidine	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<438	<43.1
3-Nitroaniline	NS	NS	NS	<96.3	<85.8	<89.6	<85.3	<87.5	<86.1
4,6-Dinitro-2-methylphenol	NS	NS	NS	<96.3	<85.8	<89.6	<85.3	<87.5	<86.1
4-Bromophenyl phenyl ether	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
4-Chloro-3-methylphenol	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
4-Chloroaniline	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
4-Chlorophenyl phenyl ether	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
4-Nitroaniline	NS	NS	NS	<96.3	<85.8	<89.6	<85.3	<87.5	<86.1
4-Nitrophenol	NS	NS	NS	<96.3	<85.8	<89.6	<85.3	<87.5	<86.1
Acenaphthene	20,000	100,000	500,000	<48.3	<43.0	<44.9	<42.7	50.3	<43.1
Acenaphthylene	100,000	100,000	500,000	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
Acetophenone	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
Aniline	48,000	10,000	500,000	<193	<172	<180	<171	<175	<172
Anthracene	100,000	100,000	500,000	<48.3	<43.0	<44.9	<42.7	123	<43.1
Atrazine	NS	NS	NS	<48.3	<43.0	<44.9	<42.7	<43.8	<43.1
Benzaldehyde	NS								

Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006
 Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
 Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
 Bolded values signify detection above method detection limit
 Highlighted values signify exceedance of Commercial Soil Cleanup Values
 NS = No Standard

Table 3 PCBs and Pesticides in Soil EPA Method 8081/8082 148-28 Hillside Avenue Jamaica, NY 11435 ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-1 (0-2') 11/18/15	SB-3 (0-3') 11/18/15	SB-5 (0-2') 11/18/15	SB-6 (0-2') 11/18/15	SB-7A (0-2') 11/18/15	SB-7B (10-12') 11/18/15
Sample Date									
Aldrin	5	19	680	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
alpha-BHC	20	97	3,400	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
beta-BHC	36	72	3,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
delta-BHC	40	100,000	500,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
gamma-BHC	100	280	9,200	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
gamma-Chlordane	NS	NS	NS	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
alpha-Chlordane	NS	NS	NS	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Chlordane, total	NS	NS	NS	<114	<112	<111	<111	<108	<105
4,4'-DDD	3.3	2,600	92,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
4,4'-DDE	3.3	1,800	62,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
4,4'-DDT	3.3	1,700	47,000	3.82	<2.80	<2.78	5.06	<2.71	<2.63
Dieldrin	5	39	1,400	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Endosulfan I	2,400	4,800	200,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Endosulfan II	2,400	4,800	200,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Endosulfan sulfate	2,400	4,800	200,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Endrin	14	2,200	89,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Endrin aldehyde	NS	NS	NS	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Endrin ketone	NS	NS	NS	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Heptachlor	42	420	15,000	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Heptachlor epoxide	NS	NS	NS	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Methoxychlor	NS	NS	NS	<2.86	<2.80	<2.78	<2.79	<2.71	<2.63
Toxaphene	NS	NS	NS	<286	<280	<278	<279	<271	<263
Aroclor 1016	100	1,000	1,000	<0.0289	<0.0283	<0.0280	<0.0281	<0.0273	<0.0266
Aroclor 1221	100	1,000	1,000	<0.0289	<0.0283	<0.0280	<0.0281	<0.0273	<0.0266
Aroclor 1232	100	1,000	1,000	<0.0289	<0.0283	<0.0280	<0.0281	<0.0273	<0.0266
Aroclor 1242	100	1,000	1,000	<0.0289	<0.0283	<0.0280	<0.0281	<0.0273	<0.0266
Aroclor 1248	100	1,000	1,000	<0.0289	<0.0283	<0.0280	<0.0281	<0.0273	<0.0266
Aroclor 1254	100	1,000	1,000	<0.0289	<0.0283	<0.0280	<0.0281	<0.0273	<0.0266
Aroclor 1260	100	1,000	1,000	<0.0289	<0.0283	<0.0280	<0.0281	<0.0273	<0.0266

Table 3 (Continued) PCBs and Pesticides in Soil EPA Method 8081/8082 148-28 Hillside Avenue Jamaica, NY 11435 ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-8A (0-2') 11/18/15	SB-8B (10-12') 11/18/15	SB-9 (0-2') 11/19/15	SB-9 (10-12') 11/19/15	SB-10 (0-2') 11/19/15	SB-10 (10-12') 11/19/15
Sample Date									
Aldrin	5	19	680	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
alpha-BHC	20	97	3,400	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
beta-BHC	36	72	3,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
delta-BHC	40	100,000	500,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
gamma-BHC	100	280	9,200	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
gamma-Chlordane	NS	NS	NS	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
alpha-Chlordane	NS	NS	NS	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Chlordane, total	NS	NS	NS	<114	<102	<106	<101	<104	<102
4,4'-DDD	3.3	2,600	92,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
4,4'-DDE	3.3	1,800	62,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
4,4'-DDT	3.3	1,700	47,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Dieldrin	5	39	1,400	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Endosulfan I	2,400	4,800	200,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Endosulfan II	2,400	4,800	200,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Endosulfan sulfate	2,400	4,800	200,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Endrin	14	2,200	89,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Endrin aldehyde	NS	NS	NS	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Endrin ketone	NS	NS	NS	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Heptachlor	42	420	15,000	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Heptachlor epoxide	NS	NS	NS	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Methoxychlor	NS	NS	NS	<2.86	<2.55	<2.66	<2.53	<2.60	<2.55
Toxaphene	NS	NS	NS	<286	<255	<266	<253	<260	<255
Aroclor 1016	100	1,000	1,000	<0.0289	<0.0257	<0.0269	<0.0256	<0.0262	<0.0258
Aroclor 1221	100	1,000	1,000	<0.0289	<0.0257	<0.0269	<0.0256	<0.0262	<0.0258
Aroclor 1232	100	1,000	1,000	<0.0289	<0.0257	<0.0269	<0.0256	<0.0262	<0.0258
Aroclor 1242	100	1,000	1,000	<0.0289	<0.0257	<0.0269	<0.0256	<0.0262	<0.0258
Aroclor 1248	100	1,000	1,000	<0.0289	<0.0257	<0.0269	<0.0256	<0.0262	<0.0258
Aroclor 1254	100	1,000	1,000	<0.0289	<0.0257	<0.0269	<0.0256	<0.0262	<0.0258
Aroclor 1260	100	1,000	1,000	<0.0289	<0.0257	<0.0269	<0.0256	<0.0262	<0.0258

Pesticides reported in mg/kg (dry) and PCBs reported in mg/kg (dry).

¹ Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006

² Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006

³ Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006

Bolded values signify detection above method detection limit

Highlighted values signify exceedance of regulatory standard

NS = No Standard

Table 4 Metals in Soil (mg/kg-dry) EPA Method 6010 148-28 Hillside Avenue Jamaica, NY 11435 ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-1 (0-2')	SB-1 (13'-15')	SB-2B (13'-15')	SB-3 (0-3')	SB-3 (13'-15')	SB-4 (13'-15')
Sample Date				11/18/15	6/24/15	6/25/15	11/18/15	6/24/15	6/25/15
Arsenic	13	16	16	6.57	<1.02	<1.03	6.2	<1.02	<1.03
Barium	350	400	400	80.6	12.4	31.8	54.4	17.9	31.1
Cadmium	2.5	4.3	9.3	0.461	0.309	<0.309	0.522	0.336	0.671
Chromium	30	180	1,500	18.9	8.22	10.3	14.6	9.43	13.6
Lead	63	400	1,000	89.7	6.31	14.8	158	5.50	8.04
Selenium	3.9	180	1,500	2.15	3.67	3.28	1.88	2.14	7.18
Silver	2	180	1,500	<0.578	<0.511	<0.515	<0.565	<0.512	<0.517
Mercury	0.18	0.81	2.8	0.0749	<0.0307	<0.0309	0.095	<0.0307	<0.0310

Table 4 (Continued) Metals in Soil (mg/kg-dry) EPA Method 6010 148-28 Hillside Avenue Jamaica, NY 11435 ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-5 (0-2')	SB-5 (13'-15')	SB-6 (0-2')	SB-6 (13'-15')	SB-7A (0-2')	SB-7B (10-12')
Sample Date				11/18/15	6/24/15	11/18/15	6/24/15	11/18/15	11/18/15
Arsenic	13	16	16	4.78	<1.05	7.21	<1.06	5.15	1.45
Barium	350	400	400	61.7	17.7	111	44.3	102	24.3
Cadmium	2.5	4.3	9.3	<0.337	<0.314	0.648	0.786	<0.328	<0.319
Chromium	30	180	1,500	19.5	8.87	23.1	31.2	17.6	16.3
Lead	63	400	1,000	30.7	6.11	346	11.7	261	4.79
Selenium	3.9	180	1,500	2.7	3.83	2.69	7.01	2.07	2.53
Silver	2	180	1,500	<0.561	<0.523	<0.563	<0.532	<0.547	<0.531
Mercury	0.18	0.81	2.8	0.0952	<0.0314	0.217	<0.0319	0.206	<0.0351

Table 4 (Continued) Metals in Soil (mg/kg-dry) EPA Method 6010 148-28 Hillside Avenue Jamaica, NY 11435 ACT Project No.: 8346-JANY									
Sample ID (Depth)	UUSCO ¹	RRSCO ²	CSCO ³	SB-8A (0-2')	SB-8B (10-12')	SB-9 (0-2')	SB-9 (10-12')	SB-10 (0-2')	SB-10 (10-12')
Sample Date				11/18/15	11/18/15	11/19/15	11/19/15	11/19/15	11/19/15
Arsenic	13	16	16	7.29	<1.03	6.22	<1.02	4.55	<1.03
Barium	350	400	400	114	53	76.6	22.4	61	48.9
Cadmium	2.5	4.3	9.3	<0.346	<0.309	0.911	<0.307	<0.315	<0.310
Chromium	30	180	1,500	10.9	20.4	12	15.8	6.98	16.2
Lead	63	400	1,000	89.2	3.99	90.8	5.74	1100	5.94
Selenium	3.9	180	1,500	2.56	2.47	1.77	4.07	<1.05	4.18
Silver	2	180	1,500	<0.577	<0.514	<0.537	<0.511	<0.524	<0.516
Mercury	0.18	0.18	2.8	<0.0381	<0.0340	<0.0355	<0.0337	<0.0346	<0.0341

¹ Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006

² Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006

³ Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006

Bolded values signify detection above method detection limit

Highlighted values signify exceedance of regulatory standard

NS = No Standard

Highlighted values signify detection above guidance value
Bold values signify detection above method detection limit
Q is the Qualifier Column with definitions as follows:
U=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U=analyte not detected at or above the level indicated
~this indicates that no regulatory limit has been established for this analyte

Pesticides and PCBs in Water (ug/L)
EPA Method 8081/8082
148-28 Hillside Avenue
Jamaica, NY 11435

ACT Project No.: 8346-JANY

Sample ID		NYSDEC TOGS Standards and Guidance Values - GA	TW-1		TW-2		TW-3	
Sampling Date			12/2/16		12/2/16		12/2/16	
Compound	CAS Number		Result	Q	Result	Q	Result	Q
Pesticides, NJDEP/TCL/Part 375 List		ug/L	ug/L		ug/L		ug/L	
Dilution Factor			1		1		1	
4,4'-DDD	72-54-8	0.3	0.00400	U	0.00400	U	0.00400	U
4,4'-DDE	72-55-9	0.2	0.00400	U	0.00400	U	0.00400	U
4,4'-DDT	50-29-3	0.2	0.00400	U	0.00400	U	0.00400	U
Aldrin	309-00-2	~	0.00400	U	0.00400	U	0.00400	U
alpha-BHC	319-84-6	0.01	0.00400	U	0.00400	U	0.00400	U
alpha-Chlordane	5103-71-9	~	0.00400	U	0.00400	U	0.00400	U
beta-BHC	319-85-7	0.04	0.00400	U	0.00400	U	0.00400	U
Chlordane, total	57-74-9	0.05	0.0200	U	0.0200	U	0.0200	U
delta-BHC	319-86-8	0.04	0.00400	U	0.00400	U	0.00400	U
Dieldrin	60-57-1	0.004	0.00200	U	0.00200	U	0.00200	U
Endosulfan I	959-98-8	~	0.00400	U	0.00400	U	0.00400	U
Endosulfan II	33213-65-9	~	0.00400	U	0.00400	U	0.00400	U
Endosulfan sulfate	1031-07-8	~	0.00400	U	0.00400	U	0.00400	U
Endrin	72-20-8	~	0.00400	U	0.00400	U	0.00400	U
Endrin aldehyde	7421-93-4	5	0.0100	U	0.0100	U	0.0100	U
Endrin ketone	53494-70-5	5	0.0100	U	0.0100	U	0.0100	U
gamma-BHC (Lindane)	58-89-9	0.05	0.00400	U	0.00400	U	0.00400	U
gamma-Chlordane	5566-34-7	~	0.0100	U	0.0100	U	0.0100	U
Heptachlor	76-44-8	0.04	0.00400	U	0.00400	U	0.00400	U
Heptachlor epoxide	1024-57-3	0.03	0.00400	U	0.00400	U	0.00400	U
Methoxychlor	72-43-5	35	0.00400	U	0.00400	U	0.00400	U
Toxaphene	8001-35-2	0.06	0.100	U	0.100	U	0.100	U
Polychlorinated Biphenyls (PCB)		ug/L	ug/L		ug/L		ug/L	
Dilution Factor			1		1		1	
Aroclor 1016	12674-11-2	~	0.135		0.133		0.102	
Aroclor 1221	11104-28-2	~	0.0500	U	0.0500	U	0.0500	U
Aroclor 1232	11141-16-5	~	0.0500	U	0.0500	U	0.0500	U
Aroclor 1242	53469-21-9	~	0.0500	U	0.0500	U	0.0500	U
Aroclor 1248	12672-29-6	~	0.0500	U	0.0500	U	0.0500	U
Aroclor 1254	11097-69-1	~	0.0500	U	0.0500	U	0.0500	U
Aroclor 1260	11096-82-5	~	0.0500	U	0.0500	U	0.0500	U
Total PCBs	1336-36-3	0.09	0.135		0.133		0.102	

Highlighted values signify detection above guidance value
 Bold values signify detection above method detection limit
Q is the Qualifier Column with definitions as follows:
 U=analyte not detected at or above the level indicated
 ~=this indicates that no regulatory limit has been established for this analyte

Table 8

Metals in Water (ug/L)
EPA Method 8081/8082
148-28 Hillside Avenue
Jamaica, NY 11435

ACT Project No.: 8346-JANY

Highlighted values signify detection above guidance value
 Bold values signify detection above method detection limit
Q is the Qualifier Column with definitions as follows:
 U=analyte not detected at or above the level indicated
 ~~=this indicates that no regulatory limit has been established for this analyte

Volatile Organic Compounds in Soil Vapor (ug/m3)
EPA Method TO-15
148-28 Hillside Avenue
Jamaica, NY 11435

Sample ID	NYSDOH Soil Vapor Screening Level	USEPA Soil Vapor Guideline ²	SS-1	SS-2	SS-3	SV-4	SV-5	SV-6	SV-7
Sampling Date			6/25/15	6/25/15	6/25/15	6/25/15	6/25/15	6/25/15	11/21/16
1,1,1,2-Tetrachloroethane	NA	-	<8.2	<8.4	<6.9	<8.4	<7.1	<8.9	<15
1,1,1-Trichloroethane	100 ²	22,000	<13	<13	24	<13	<11	<14	<12
1,1,2,2-Tetrachloroethane	NA	0.42	<16	<17	<14	<17	<14	<18	<15
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	300000	<18	<19	<15	<19	<16	<20	<17
1,1,2-Trichloroethane	NA	1.5	<13	<13	<11	<13	<11	<14	<12
1,1-Dichloroethane	NA	5000	<9.7	<10	<8.2	<10	<8.3	<10	<8.9
1,1-Dichloroethylene	100 ²	2,000	<9.5	<9.7	<8.0	<9.7	<8.2	<10	<8.8
1,2,4-Trichlorobenzene	NA	2,000	<18	<18	<15	<18	<15	<19	<16
1,2,4-Trimethylbenzene	NA	60	50	41	45	50	31	30	<11
1,2-Dibromoethane	NA	0.11	<18	<19	<15	<19	<16	<20	<17
1,2-Dichlorobenzene	NA	2,000	<14	<15	<12	<15	<12	<16	<13
1,2-Dichloroethane	NA	0.94	<17	<10	<8.2	<10	<8.3	<10	<8.9
1,2-Dichloropropane	NA	40	<11	<11	<9.3	<11	<9.5	<12	<10
1,2-Dichlorotetrafluoroethane	NA	NA	<17	<17	<14	<17	<14	<18	<15
1,3,5-Trimethylbenzene	NA	60	15	12	14	13	<10	<13	<11
1,3-Butadiene	NA	0.09	<10	<11	<8.7	<11	<8.9	<11	<15
1,3-Dichlorobenzene	NA	1,100	<14	<15	<12	<15	<12	<16	<13
1,3-Dichloropropene	NA	6.1	<11	<11	<9.3	<11	<9.5	<12	<10
1,4-Dichlorobenzene	NA	8,000	<14	<15	<12	<15	<12	<16	<13
1,4-Dioxane	NA	NA	<8.6	<8.9	<7.3	<8.9	<7.4	<9.3	<16
2-Butanone	NA	10,000	1,000	1,100	820	62	130	100	<6.5
2-Hexanone	NA	NA	190	140	110	<20	<17	<21	<18
3-Chloropropene	NA	-	<7.5	<7.7	<6.3	<7.7	<6.4	<8.1	<35
4-Methyl-2-pentanone	NA	NA	<9.8	<10	<8.3	<10	<8.4	<11	<9.1
Acetone	NA	3,500	390	400	290	430	380	310	21
Acrylonitrile	NA	-	<5.2	<5.3	<4.4	<5.3	<4.5	<5.6	<4.8
Benzene	NA	3.1	14	17	7.7	<7.9	<6.6	12	<7.1
Benzyl Chloride	NA	50	<12	<13	<10	<13	<11	<13	<11
Bromodichloromethane	NA	1.4	<15	<15	<13	<15	<13	<16	<15
Bromodorm	NA	22	<25	<25	<21	<25	<21	<27	<23
Bromomethane	NA	NA	<9.3	<9.5	<7.8	<9.5	<8.0	<10	<8.6
Carbon disulfide	NA	7,000	7.5	23	<6.3	<7.7	19	<8.0	<6.9
Carbon tetrachloride	5 ¹	160	<3.8	<3.9	<3.2	<3.9	<3.2	<4.1	<3.5
Chlorobenzene	NA	600	<11	<11	<9.3	<11	<9.5	<12	<10
Chloroethane	NA	100,000	<6.3	<6.5	<5.3	<6.5	<5.4	<6.8	<5.8
Chloroform	NA	1.1	<12	<12	12	<12	31	<13	<11
Chloromethane	NA	24	<5.0	<5.1	<4.2	<5.1	<4.2	<5.3	<4.6
cis-1,2-Dichloroethylene	100 ²	-	<9.5	<9.7	<8.0	<9.7	<8.2	<10	<8.8
cis-1,3-Dichloropropylene	NA	-	<11	<11	<9.1	<11	<9.3	<12	<10
C									

² Matrix 2, NYSDOH "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (October 2006)

³ Draft Subsurface Vapor Intrusion Guidance, USEPA (November, 2002)

Bolded values signify detection above method detection limit

Highlighted values signify detection above NYSDOH screening level or USEPA guidance value.

NA = Not Available

APPENDIX 1

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and Chung Lam have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, Chung Lam will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Anna Brooks, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841.

Project Contact List: OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the Site Contact List on request. A copy of the Site Contact List is maintained by OER's project

manager. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at brownfields@cityhall.nyc.gov.

Repositories: A document repository is maintained online. Internet access to view OER's document repositories is available at public libraries. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. The library nearest the Site is:

Queens Library (Central)

89-11 Merrick Boulevard, Jamaica, NY 11432

(718) 990-0700

Hours of Operations

Monday:	9:00 am to 9:00 pm	Friday:	9:00 am to 7:00 pm
Tuesday:	9:00 am to 9:00 pm	Saturday:	10:00 am to 5:00 pm
Wednesday:	9:00 am to 9:00 pm	Sunday:	12:00 pm to 5:00 pm
Thursday:	9:00 am to 9:00 pm		

Digital Documentation: NYC OER requires the use of digital documents in our repository as a means of minimizing paper use while also increasing convenience in access and ease of use.

Issues of Public Concern: Chung Lam is required to identify whether there are specific issues of concern to stakeholders proximate to the project site. Such issues include but are not limited to interests of Environmental Justice communities..

Public Notice and Public Comment: Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be reviewed

and approved by OER prior to distribution and mailed by the Enrollee. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

Citizen Participation Milestones: Public notice and public comment activities occur at several steps during a typical NYC VCP project. These steps include:

- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.
- **Public Notice announcing the approval of the RAWP and the start of remediation:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.
- **Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.

APPENDIX 2

SUSTAINABILITY STATEMENT

This Sustainability Statement documents sustainable activities and green remediation efforts planned under this remedial action.

Reuse of Clean, Recyclable Materials and Reduced Consumption of Non-

Renewable Resources: Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction.

An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

Reduced Energy Consumption and Promotion of Greater Energy Efficiency:

Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings.

Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

Conversion to Clean Fuels: Use of clean fuel improves NYC's air quality by reducing harmful emissions.

Natural gas will be utilized for fuel in the new building.

An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

Recontamination Control: Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site. An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

Stormwater Retention: Stormwater retention improves water quality by lowering the rate of combined stormwater and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters. An estimate of the enhanced stormwater retention capability of the redevelopment project will be included in the RAR.

Linkage with Green Building: Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use. The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

Paperless Voluntary Cleanup Program: Chung Lam is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

Low-Energy Project Management Program: Chung Lam is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are

held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

Trees and Plantings: Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance. An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

APPENDIX 3

SOIL/MATERIALS MANAGEMENT PLAN

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the final remedial report. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of final signoff by OER.

1.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials.

Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event.

Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

1.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 Materials Excavation, Load-Out, and Departure

The PE/QEP overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior OER approval.

1.5 Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

Outbound truck transport routes are described in the remedial report. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing 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. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

1.6 Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York City under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the final remedial report.

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the final remedial report.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility). Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be

reported in the final remedial report. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the final remedial report. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), including transport to a Part 360-16 Registration Facility, a formal request will be made for approval by OER with an associated plan compliant with 6NYCRR Part 360-16. This request and plan will include the location, volume and a description of the material to be recycled, including verification that the material is not impacted by site uses and that the material complies with receipt requirements for recycling under 6NYCRR Part 360. This material will be appropriately handled on-Site to prevent mixing with impacted material.

1.7 Materials Reuse On-Site

Soil and fill that is derived from the property that meets the Soil Cleanup Objectives (SCOs) established in this plan may be reused on-Site. The SCOs for on-Site reuse are listed in Section 4.2 of this cleanup plan. 'Reuse on-Site' means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on land with comparable levels of contaminants in soil/fill material, compliant with applicable laws and regulations, and addressed pursuant to the NYC VCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this remedial plan are followed. The expected location for placement of reused material is shown in Section 4.2.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

1.8 Demarcation

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent

material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

1.9 Import of Backfill Soil From Off-Site Sources

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. Imported soils will not exceed groundwater protection standards established in Part 375. Imported soils for Track 1 remedial action projects will not exceed Track 1 SCO's.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

- All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this remedial plan. The final remedial report will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.
- All material will be subject to source screening and chemical testing.
- Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:
 - Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
 - The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
 - Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the final remedial report. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.10 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the

New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

1.11 Stormwater Pollution Prevention

Applicable laws and regulations pertaining to stormwater pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this remedial plan (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.12 Contingency Plan for Unknown Contamination Sources

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings

will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

1.13 Odor, Dust, and Nuisance Control

Odor Control

All necessary means will be employed to prevent on- and off-Site odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, 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. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying this remedial plan.

Dust Control

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all

dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying this remedial plan.

Other Nuisances

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

Rodent control will be provided during Site clearing and grubbing and during the remedial program, as necessary, to prevent nuisances.

APPENDIX 4

CONSTRUCTION HEALTH AND SAFETY PLAN



**CONSTRUCTION
HEALTH AND SAFETY PLAN**

**148-28 Hillside Avenue
Jamaica, NY 11435
Block 9694, Lots 17**

ACT Project No. 8346-JANY

December 22nd, 2016

Prepared for:

**Chung Lam
Hillside 168 Inc
148-28 Hillside Avenue
Jamaica, New York 11435**

Prepared by:

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1.0 INTRODUCTION

The construction of a 10-story mixed-use residential and commercial building with a cellar is being proposed at the property located at 148-28 Hillside Avenue, Jamaica, New York (“the Site”). This Construction Health and Safety Plan (CHASP) has been prepared to identify site-specific health and safety procedures to be followed by on-site contractors during remedial activities at the site. All activities performed under this CHASP are targeted to comply with Occupational Safety and Health Administration (OSHA) Regulations 29 CFR Part 1910, *et seq.*

1.1 Purpose

The purpose of this CHASP is to provide the contractors’ field personnel, and other visitors with an understanding of the potential chemical and physical hazards that exist or may arise while portions of this project are being performed. The primary objective is to ensure the well being of all field personnel and the community surrounding this site. A copy of this CHASP will be available to anyone that requests it. Visiting personnel (e.g. government officials, administrators, bank inspectors, assessors, etc.) that will have limited exposure to the site native soil/fill material during construction activities will be instructed on how to reduce the probability of exposure to site contaminants, but will not be required to read the CHASP.

All on-site personnel shall familiarize themselves with the contents of this CHASP and the remedial activities planned for the site. Personnel choosing not to comply with this CHASP will be removed from the worksite.

1.2 Site Description

The Site is located at 148-28 Hillside Avenue, Jamaica, NY in the central section of Queens County, New York and is identified as Block 9694 and Lots 17 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 17,450-square feet and is located along the southern side of Hillside Avenue between 148th Street to the west and 150th Street to the east. To the north of the property is Hillside Avenue followed by a two-story mixed-use building with apartments above commercial businesses. To the east of the property is a one-story commercial building



occupied by a supermarket. To the south, a six-story residential apartment building and a two-story religious building are located. To the west, is a two-story commercial building occupied by the National Organization of Industrial Trade Unions. A map of the site boundary is shown in Figure 1. Currently, the Site is a vacant commercial building.

1.3 Environmental Concerns

Advanced Cleanup Technologies completed a Phase I Environmental Site Assessment on July 14, 2015. The Phase I identifies the property as of 1888 contained a three-story residential building. By 1925, a one-story filling station with gasoline tanks had also been constructed. By 1942, the three-story building was identified as mixed-use and it was demolished by 1963. By 1967, the gasoline tanks were no longer identified, and by 1992 the building was identified as an auto repair shop. The property remained substantially unchanged through 2006.

According to ACT's Phase I Environmental Site Assessment dated July 14, 2015, five abandoned 550-gallon gasoline underground storage tanks were present in front of the building. One inactive 250-gallon waste oil underground storage tank was observed in the interior of the repair shop. According to the site contact, six underground storage tanks were removed from the property approximately 25 years ago. The GPR survey detected disturbed soil that likely was the former location of removed underground storage tanks.

In a Remedial Investigation Report prepared by Advanced Cleanup Technologies in October 2016, soil quality data was compared to Unrestricted and Restricted Residential Use Soil Cleanup Objectives (UUSCOs and RRSCOs) contained in NYSDEC 6 NYCRR Part 375. VOC compounds including acetone (maximum of 110 µg/kg) and tetrachloroethene (11,000 µg/kg) were detected above their Unrestricted Use SCOs in two shallow soil samples. Two SVOCs, Benzo(a)anthracene (1,550 µg/kg) and Chrysene (1,560 µg/kg) exceeded Unrestricted Use SCOs in one shallow soil sample. Benzo(a)anthracene also exceeded Restricted Residential Use SCOs. One Pesticide, 4,4'-DDT (max. of 5.06 µg/kg) exceeded its Unrestricted Use Soil Cleanup Objective. Several metals were identified and lead (1,100 mg/Kg) and selenium (7.18 mg/Kg) exceeded Unrestricted Use SCOs. Lead also exceeded Restricted Residential Use SCOs. Overall,



with the exception of PCE disposal, the soil chemistry is similar to sites with historic urban fill in New York City.

Soil vapor samples collected during the RI were compared to the compounds listed in Table 3.1 Air Guidance Values derived by the New York State Department of Health (NYSDOH) located in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006, updated June 2007 for the soil vapor/indoor air matrices, updated September 2013 for tetrachloroethylene (PCE), and updated August 2015 for trichloroethylene (TCE). Soil vapor sampling detected several petroleum related and chlorinated compounds. Highest concentrations were detected for 2-Butanone at 1,100 ug/m³. Petroleum related (BTEX) compounds were detected at a maximum concentration of 299 ug/m³. Chlorinated compound Tetrachloroethylene PCE was detected in all six samples and ranged in concentrations from 50 to 2,700 ug/m³, compared to a NYSDOH screening value of 30 ug/m³. Trichloroethylene was detected in one soil vapor sample in the east section of the site at 55 ug/m³, above the NYSDOH screening value of 2 ug/m³. Concentrations of PCE and TCE are above the NYSDOH guidance matrix and require mitigation.

2.0 SITE PERSONNEL

All on-site personnel shall have training in accordance with the regulations codified at 29 CFR 1910.20. The Site Supervisor will maintain proof that the qualifications of the on-site personnel comply with these regulations, prior to them being allowed to be included in the on-Site workforce.

All on-site personnel shall familiarize themselves with the contents of the CHASP, the scope of the Remedial Action Work Plan (RAWP) for the Site and attend a daily site specific health and safety briefing prior to the commencement of work activities. Personnel choosing not to comply with this CHASP will be removed from the worksite.

ACT's Site Supervisor will have oversight responsibility over the project to ensure that this CHASP is properly implemented and that ACT and its subcontractors adhere to all OSHA regulations and other established industry health and safety practices.



Each contractor will designate an on-site individual responsible for health and safety issues relating to excavation and construction activities. Each contractor will communicate to the Site Supervisor the name of this individual and what specific actions are to be taken by each contractor during that work day that will be required to comply with the CHASP.

The Site Supervisor will coordinate the activities of all other contractors on-site so as not to jeopardize the health and safety of any personnel on-site. In addition, the Site Supervisor will continually monitor and inspect personnel and equipment for compliance with established safe work practices.

A list of the pertinent personnel authorized to supervise site health and safety operations is presented below:

Title	Name	Telephone Number
Site Supervisor ACT	Tim Young	516-640-2947 (Mobile)
Project Manager ACT	Mark Gelband	516-441-5800, Ext. 104 718-577-7639 (Mobile)
Health and Safety Officer ACT	Yisong Yang	516-441-5800, Ext. 108 718-508-2970 (Mobile)

3.0 PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE) is divided into the following four categories based on the degree of protection afforded:

Level A: This PPE level will be selected when the greatest level of skin, respiratory, and



- eye protection is required. It includes positive pressure, full face-piece self-contained breathing apparatus (SCBA), or NIOSH-approved positive pressure supplied air respirator with escape SCBA and a totally-encapsulating chemical-protective suit.
- Level B: This PPE level will be selected when the highest level of respiratory protection is necessary but a lesser level of skin protection is needed. It includes positive pressure, full face-piece SCBA, or NIOSH-approved positive pressure supplied air respirator with escape SCBA and hooded chemical-resistant clothing such as overalls and long-sleeved jacket, coveralls, one or two-piece chemical-splash suit or disposable chemical-resistant overalls.
- Level C: This PPE level will be selected when the concentration(s) and type(s) of airborne substance(s) present in the work area is known and the criteria for using air purifying respirators are met. It includes full-face or half-mask, NIOSH-approved air purifying respirators and hooded chemical-resistant clothing such as overalls and long-sleeved jacket, coveralls, one or two-piece chemical-splash suit or disposable chemical-resistant overalls.
- Level D: This PPE level will be selected for nuisance contamination only. It includes coveralls, gloves, chemical-resistant steel toe and shank boots, safety glasses or chemical splash goggles, hard hat, escape mask and face shield.

PPE shall be selected in accordance with the site air monitoring program (Section 5.3), OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH-approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection.

Before site personnel are required to use any respirator with a negative or positive pressure tight-fitting face-piece, the personnel will be fit tested with the same make, model, style, and size of respirator that will be used. The fit test shall be administered using only an OSHA-accepted fit test



protocol. The OSHA-accepted fit test protocols and procedures provided for in 29 CFR 1910.120 are contained in Appendix B of this CHASP.

All Site workers will be required to participate in a comprehensive PPE program. The PPE program will consist of daily “Tailgate” Health and Safety meetings, proper inspection, donning, use, maintenance, storage and decontamination of protective clothing and equipment, use of protective equipment in temperature extremes and monitoring of co-workers and the work environment.

The Site Supervisor will determine the level of protection required for all field activities and whether the level of protection should be upgraded. It is anticipated that all on-site activities will be conducted in Level D PPE, unless otherwise upgraded by the Site Supervisor. Changes in the level of protection will be recorded in the dedicated site logbook along with the rationale for the changes.

4.0 HAZARD EVALUATION

4.1 Chemical Exposure

A list of chemicals including VOCs, SVOCs, metals and pesticides that are present in subsurface soil at the Site is provided in Table 1. These types of contaminants at the detected concentrations represent a low to moderate potential for exposure. The standards listed in the table represent Immediate Danger to Life and Health (IDLH), Time-Weighted Average (TWA) and Short-Term Exposure Limit (STEL).

The primary routes of exposure for these chemicals are inhalation, ingestion and absorption through the skin and mucous membranes. The health risks associated with the exposure to these substances during construction activities will be minimized through a combination of education, personal protection equipment (PPE) and dust control measures.

4.2 Temperature Hazards

4.2.1 Heat Exposure Hazards

Heat stress may occur even in moderate temperature areas and may present any or all of the following:



Heat Rash

Heat rash results from continuous exposure to heat, humid air, and chafing clothes. Heat rash is uncomfortable and decreases the ability to tolerate heat.

Heat Cramps

Cramps result from the inadequate replacement of body electrolytes lost through perspiration. Signs include severe spasms and pain in the extremities and abdomen.

Heat Exhaustion

Exhaustion results from increased stress on the vital organs of the body in the effort to meet the body's cooling demands. Signs include shallow breathing; pale, cool, moist skin; profuse sweating; and dizziness.

Heat Stroke

Heat stroke results from an overworked cooling system. Heat stroke is the most serious form of heat stress. Body surfaces must be cooled and medical help must be obtained immediately to prevent severe injury and/or death. Signs include red, hot, dry skin, absence of perspiration, nausea, dizziness and confusion, strong, rapid pulse, coma, and death.

The following procedures should be followed to prevent or control heat stroke:

- A. Replace body fluids (water and electrolytes) lost through perspiration. Solutions may include a 0.1% salt and water solution or commercial mixes such as "Gatorade". Employees must be encouraged to drink more than the amount required in order to satisfy thirst.
- B. Use cooling devices to aid the natural body ventilation. Cooling occurs through evaporation of perspiration and limited body contact with heat-absorbing protective clothing. Utilize fans and air conditioners to assist in evaporation. Long, cotton underwear is suggested to absorb perspiration and limit any contact with heat-absorbing protective clothing (i.e., coated Tyvek suits).



- C. Provide shelter against heat and direct sunlight to protect personnel. Take breaks in shaded areas.
- D. Rotate workers utilizing protective clothing during hot weather.
- E. Establish a work regime that will provide adequate rest periods, with personnel working in shifts.

4.2.2 Cold Exposure Hazards

Work schedules will be adjusted to provide sufficient rest periods in a heated area for warming up during operations conducted in cold weather. Also, thermal protective clothing such as wind and/or moisture resistant outerwear is recommended to be worn.

If work is performed continuously in the cold at or below -7 °C (20 °F), including wind chill factor, heated warming shelters (company vehicles, rest rooms, etc.) shall be made available nearby and the worker should be encouraged to use these shelters at regular intervals, the frequency depending on the severity of the environmental exposure. The onset of heavy shivering, frostnip, the feeling of excessive fatigue, drowsiness, irritability, or euphoria, are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing shall be removed and the remainder of the clothing loosened to permit sweat evaporation.

A change of dry work clothing shall be provided as necessary to prevent workers from returning to their work with wet clothing. Dehydration, or the loss of body fluids, occurs in the cold environment and may increase the susceptibility of the worker to cold injury due to a significant change in blood flow to the extremities. Warm sweet drinks and soups should be provided at the work site to provide caloric intake and fluid volume. The intake of coffee should be limited because of a diuretic and circulatory effect (adapted from TLV's and Biological Exposure Indices 1988-1989, ACGIH).

4.3 Fire Prevention

One portable fire extinguisher with a rating (ratio) of 20 pound A/B/C will be conspicuously and centrally located at the site. Portable extinguishers will be properly tagged with inspection dates and maintained in accordance with standard maintenance procedures for portable fire extinguishers.



The following fire prevention guidelines are to be followed:

- Only approved safety cans will be used to transport and store flammable liquids.
- All gasoline and diesel-driven engines requiring refueling must be shut down and allowed to cool prior to filling.
- Smoking is not allowed during any operations within the work area in which petroleum products or solvents in free-floating, dissolved, or vapor forms, or other flammable liquids may be present.
- No open flame or spark is allowed in any area containing petroleum products or other flammable liquids.

4.4 Operation of Heavy Equipment

When operating or working around heavy equipment, the Site Supervisor will ensure that site personnel conform to this CHASP to include the wearing of proper clothing such as hard hats and safety glasses. Any specific health and safety issues relating to the equipment to be used on-site that work day, will be covered in the daily health and safety briefing.

5.0 MANAGEMENT AND PLANNING

5.1 General Site Control

The Site Supervisor will establish a command post within the Site. A perimeter site fence, as required by the New York City Department of Buildings, will be erected to define the limits of the Site. All work must be performed within the site fence. Flagmen and traffic control will be provided as required at all times.

The Site will be left hazard-free at the end of each work day. In addition, all fence gates will be operable and locked in a closed position, all site fencing will be properly standing or braced and site lighting will be operational. The property owner will provide site security during off-work hours.



During site excavation, worker exposure to potential hazardous substances will be minimized through Health and Safety Communication (Section 5.2), Decontamination Procedures (Section 5.3) and Dust Control Methods (Section 5.3).

5.2 Health and Safety Communication

The relatively small size of the work area makes normal verbal communication the primary mode of communication for the project. In the event that verbal communication is impossible the following hand signals will be used.

Gripping a partners wrist = “Leave area immediately”

Hands on top of head = “ I need assistance”

Thumbs up = “OK; I’m alright; I understand”

Thumbs down = “No; Negative”

Daily Health and Safety Meetings will address a list of tasks to be performed that day, the equipment and machinery involved, and any hazards identified with this type of activity. Workers will be given the opportunity to list out additional perceived hazards, and discuss safe work practices while in these operations. The daily safety meeting will also be an opportunity to review the work performed the previous day, any hazards encountered, mitigating actions taken, and suggestions for future improvement.

5.3 Air Monitoring

This section of the CHASP discusses air monitoring that will be performed to address community and site personnel concerns of possible exposures due to airborne migration of suspected contaminants that may be encountered during on-site field activities.

Periodic air monitoring will be performed for VOCs at the perimeter of the work area once every two hours during field activities. Continuous air monitoring will be performed for VOCs during all ground intrusive activities such as soil excavation, loading and offsite transport. All ambient air readings will be recorded and provided as an appendix in the P.E.-certified Remedial



Closure Report.

5.3.1 Community Air Monitoring

Periodic air monitoring for VOCs at the perimeter of the work area will be accomplished as follows:

- VOCs will be monitored at the upwind perimeter of the work area at the start of each work day and periodically thereafter to establish background conditions. The monitoring will be performed utilizing a Photovac 2020 portable Photoionization Detector (PID) or equivalent equipped with a 10.6 eV lamp capable of detecting the types of contaminants known or suspected to be present.
- VOCs will be monitored at the downwind perimeter of the work area daily at 2 hour intervals. If ambient air concentrations of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background, work activities will be halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the work area or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15 minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

5.3.2 Activity-Specific Air Monitoring

Continuous air monitoring will be conducted inside the work area for VOC levels during all ground-intrusive activities, such as soil excavation, loading and offsite transport in accordance



with 29 CFR 1910.120(h). Continuous air monitoring will also be performed utilizing a Photovac 2020 PID or equivalent. Continuous air monitoring will be performed in the following manner:

- Volatile organic compounds will be monitored inside the work area of construction and health and safety personnel on a continuous basis. The PID will be programmed to calculate 15-minute running average concentrations. If ambient air concentrations of total organic vapors inside the work area exceed 5 ppm above background, work activities will be halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels inside the work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level inside the work area or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15 minute average.

5.4 Dust Control

Each contractor shall control any dust generated on-site that may be produced during work activities. Dust control measures will be employed to ensure that there is no off-site migration of dust into the community by use of a stream of water applied through a fine spray nozzle. The NYC hydrant used for a water source will be fitted with a RPZ control device to prevent inadvertent contamination of the public water supply. In addition, a solid barrier fence will be installed around the perimeter of the property to control any fugitive migration of dust.

5.5 Spill Control and Prevention

Spills associated with site activities may be attributed to project specific heavy equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can



be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material.

Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

5.6 Decontamination Procedures

Contaminants will be removed from personnel and equipment through a decontamination regiment. Workers will be required to remove any contaminated PPE before leaving the Site. Work boots, safety glasses, hard hats and work gloves will be washed in a two percent Alconox Solution, followed by three consecutive clean water rinses. All wash and rinse water will be containerized into a DOT drum. Gross contaminants will be brushed from worker's clothing before leaving the Site. A station for hand washing will also be set up.

Decontamination of heavy equipment will also be required before leaving the Site. Excavator buckets and vehicle wheels or tracks will be brushed clean with a broom, before being moved off-site. Reusable hand tools will be washed in a two percent Alconox solution, followed by a series of clean water rinses. All wash and rinse water will be containerized in appropriate steel drums for proper disposal.

5.7 Soil Disposal

Any contaminated soil (organic or inorganic constituents) encountered during the remedial activities will be segregated, stockpiled on-site onto polyethylene sheeting, and covered with polyethylene sheeting to prevent exposure to workers and the community until proper transportation and disposal in accordance with all NYSDEC Regulations is arranged.

6.0 EMERGENCY MEDICAL CARE AND PROCEDURES

If a personnel accident occurs on-site requiring emergency care, immediate care will be administered appropriate to the injury in accordance with established Red Cross procedures and



practices. In the event of serious injury to on-site personnel, the Emergency Medical Service of the City of New York (EMS) will be summoned to remove the injured individual to the nearest medical facility for treatment as follows.

Ambulance:	911
Emergency Medical:	911
Fire Department:	911
Jamaica Hospital Medical Center:	(718) 206-6066
Police Department:	911
Poison Control Center:	(516) 542-2323

The nearest emergency medical facility is 8900 Van Wyck Expressway, Jamaica, NY 11418, which is located 1.0 miles from the Site. A map of the route to this hospital is attached. The directions to this medical facility from the Site are as follows:

- **Head northeast on Hillside Avenue toward 150th Street;**
- **Turn Right on 150th Street;**
- **Turn Right on Jamaica Avenue;**
- **Turn Left on Van Wyck Expressway Service Road;**
- **Turn Right on 89th Avenue;**
- **Turn Left onto 135th Street;**
- **Jamaica Hospital Medical Center is located on the Left.**

OSHA approved First Aid Kits will be maintained on-Site along with a First Aid blanket for treating shock, and will be readily accessible to all workers if an emergency occurs. The emergency signal for evacuation of personnel from the Site will be three (3) long blasts of a vehicle horn with the off-site rallying point designated as the corner of 150th Street and Hillside Avenue. If in the event of a fire, explosion or other life-threatening incident on-site, the emergency signal above will be sounded and all personnel will evacuate the Site. The appropriate New York City emergency personnel (fire, police, etc.) will be immediately notified.



All injuries, no matter how slight, will be reported to the site safety supervisor immediately. The Site Supervisor will complete an accident report for all incidents. Some injuries, such as severe lacerations or burns, may require immediate treatment. Unless required due to immediate danger, seriously injured persons should not be moved without direction from attending medical personnel. The Site Supervisor will record occupational injuries and illnesses within 48 hours of occurrence, as required by statute.

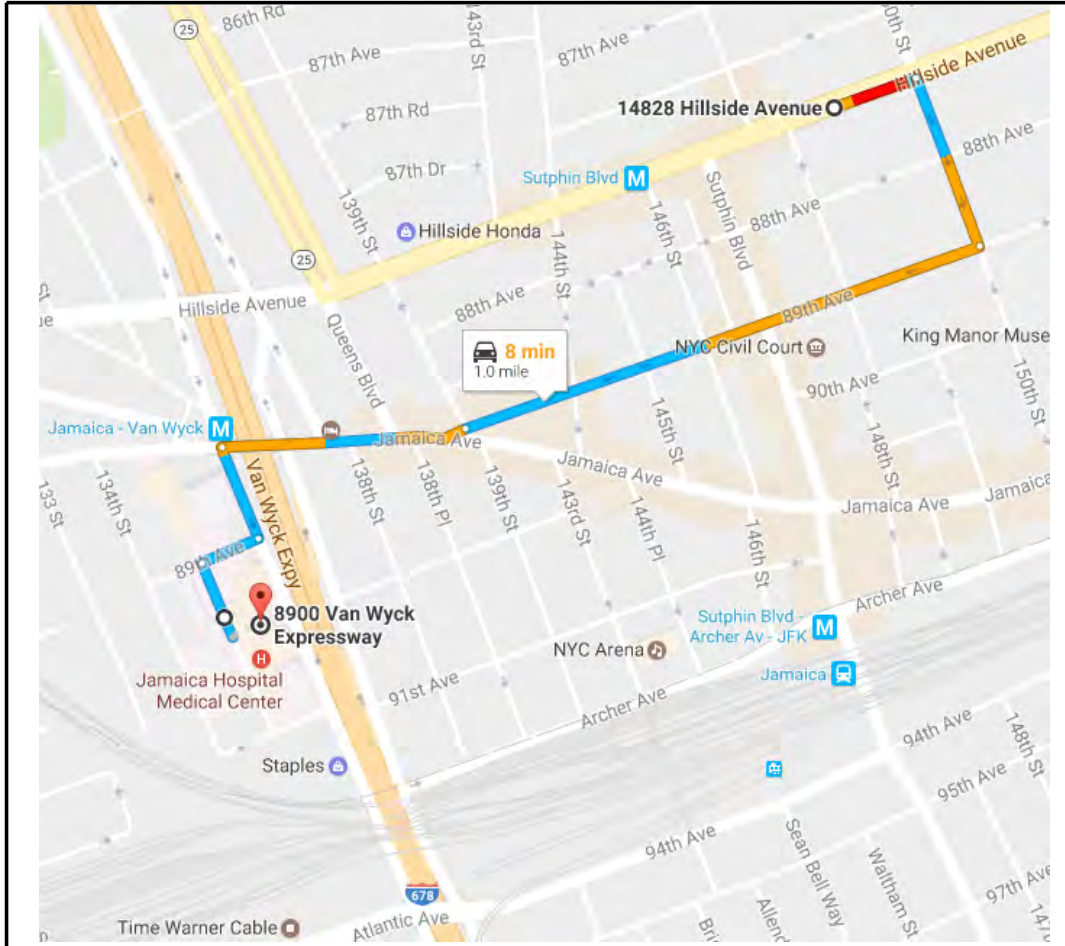
Table 1
NIOSH Exposure Limits

TABLE 1
NIOSH Exposure Limits (mg/m³)¹

Chemical	IDLH	TWA	STEL
Benzene	1625	1.63	8.13
Toluene	1900	375	560
Ethylbenzene	3530	435	545
Xylenes	3970	435	655
Naphthalene	1250	50	75
Acenaphthene	N.L.	N.L.	N.L.
Anthracene	N.L.	N.L.	N.L.
Pyrene	N.L.	N.L.	N.L.
Chrysene	N.L.	N.L.	N.L.
Benzo(b)Fluoranthene	N.L.	N.L.	N.L.
Benzo(a)Pyrene	N.L.	N.L.	N.L.
Benzo(ghi)Perylene	N.L.	N.L.	N.L.
Polychlorinated Biphenyl	5.0	0.5	N.L.
Aldrin	25	0.25	N.L.
Endrin	2	0.1	N.L.
Chlordane	100	0.5	N.L.
Toxaphene	200	0.5	N.L.
DDT	500	1	N.L.
Silver	10	0.01	N.L.
Barium	1100	0.5	N.L.
Cadmium	9	0.05	N.L.
Selenium	1	0.2	N.L.
Lead	100	0.05	N.L.
Mercury	10	0.05	N.L.
Arsenic	5	0.01	N.L.
Chromium	250	0.5	N.L.

¹ All values taken from NIOSH International Chemical Safety Cards
(<http://www.cdc.gov/niosh/ipcsneng/nengname.html>)
N.L..... None Listed

FIGURE 1
HOSPITAL ROUTE



Source: Google Maps



Hospital Route	
	
110 Main Street, Suite 103, Port Washington, New York 11050 Tel: 516-441-5800 Fax: 516-441-5511	
Project No.: 8346-JANY	Figure No.: 1
Date: 12/27/2016	Scale: Not To Scale

Appendix A
Chemical Safety Cards

International Chemical Safety Cards

BENZENE

ICSC: 0015



Cyclohexatriene
Benzol
C₆H₆
Molecular mass: 78.1

ICSC # 0015
CAS # 71-43-2
RTECS # CY1400000
UN # 1114
EC # 601-020-00-8
June 05, 2003 Validated



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

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

ICSC: 0015

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

International Chemical Safety Cards

BENZENE

ICSC: 0015

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation through the skin and by ingestion.
	PHYSICAL DANGERS: The vapour is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated.	INHALATION RISK: A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.
	CHEMICAL DANGERS: Reacts violently with oxidants, nitric acid, sulfuric acid and halogens causing fire and explosion hazard. Attacks plastic and rubber.	EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the eyes, the skin and the respiratory tract. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system, resulting in lowering of consciousness. Exposure far above the occupational exposure limit value may result in unconsciousness or death.
	OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.5 ppm as TWA 2.5 ppm as STEL (skin) AI BEI (ACGIH 2004). MAK: H Carcinogen category: 1 Germ cell mutagen group: 3A (DFG 2004). OSHA PEL: 1910.1028 TWA 1 ppm ST 5 ppm See Appendix F NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A NIOSH IDLH: Ca 500 ppm See: 71432	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The liquid defats the skin. The substance may have effects on the bone marrow immune system, resulting in a decrease of blood cells. This substance is carcinogenic to humans.
	PHYSICAL PROPERTIES	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2 Flash point: -11°C c.c. Auto-ignition temperature: 498°C Explosive limits, vol% in air: 1.2-8.0 Octanol/water partition coefficient as log Pow:
	Boiling point: 80°C Melting point: 6°C Relative density (water = 1): 0.88 Solubility in water, g/100 ml at 25°C: 0.18 Vapour pressure, kPa at 20°C: 10 Relative vapour density (air = 1): 2.7	

2.13	
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. 
NOTES	
Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient.	
Transport Emergency Card: TEC (R)-30S1114 / 30GF1-II NFPA Code: H2; F3; R0	
ADDITIONAL INFORMATION	
ICSC: 0015	BENZENE
(C) IPCS, CEC, 1994	
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TOLUENE

ICSC: 0078

 			
Methylbenzene Toluol Phenylmethane $C_6H_5CH_3$ / C_7H_8 Molecular mass: 92.1			
ICSC # 0078 CAS # 108-88-3 RTECS # XS5250000 UN # 1294 EC # 601-021-00-3 October 10, 2002 Validated			
			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• INHALATION	Cough. Sore throat. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
• EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in large spill!! Consult an expert in large spill!! Remove all ignition sources. Ventilation. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: self-contained breathing apparatus	Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-38-48/20-63-65-67 S: 2-36/37-46-62 UN Hazard Class: 3 UN Packing Group: II
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 0078 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values		

International Chemical Safety Cards

TOLUENE

ICSC: 0078

I M P O R T A N T I N F O R M A T I O N	PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
	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.	INHALATION RISK: A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.
	CHEMICAL DANGERS: Reacts violently with strong oxidants causing fire and explosion hazard.	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.
	OCCUPATIONAL EXPOSURE LIMITS: TLV: 50 ppm as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: Pregnancy risk group: C (DFG 2004). EU OEL: 192 mg/m ³ 50 ppm as TWA 384 mg/m ³ 100 ppm as STEL (skin) (EU 2006). OSHA PEL: TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak) NIOSH REL: TWA 100 ppm (375 mg/m ³) ST 150 ppm (560 mg/m ³) NIOSH IDLH: 500 ppm See: 108883	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	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

Vapour pressure, kPa at 25°C: 3.8 Relative vapour density (air = 1): 3.1		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. Card has been partly updated in October 2006: see section Occupational Exposure Limits.		
Transport Emergency Card: TEC (R)-30S1294 NFPA Code: H 2; F 3; R 0;		
ADDITIONAL INFORMATION		
ICSC: 0078		TOLUENE
(C) IPCS, CEC, 1994		
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

ETHYLBENZENE

ICSC: 0268

			
Ethylbenzol Phenylethane EB $C_8H_{10}/C_6H_5C_2H_5$ Molecular mass: 106.2			
ICSC # 0268 CAS # 100-41-4 RTECS # DA0700000 UN # 1175 EC # 601-023-00-4 November 23, 2007 Validated			
TYPES OF HAZARD/ EXPOSURE		ACUTE HAZARDS/ SYMPTOMS	
FIRE		Highly flammable.	
EXPLOSION		Vapour/air mixtures are explosive.	
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION		Cough. Sore throat. Dizziness. Drowsiness. Headache.	
•SKIN		Redness.	
•EYES		Redness. Pain. Irritation. Deleted at update Nov 07 - only at very high levels.	
•INGESTION		Burning sensation in the throat and chest. (Further see Inhalation).	
SPILLAGE DISPOSAL		STORAGE	
Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Collect leaking		Fireproof. Separated from strong oxidants. Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	
FIRST AID/ FIRE FIGHTING		PACKAGING & LABELLING	
Dry powder. Foam. Carbon dioxide.		F symbol Xn symbol R: 11-20	

liquid in covered 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.

S: 2-16-24/25-29
UN Hazard Class: 3
UN Packing Group: II
Signal: **Danger**
Flame-Excl mark-Health haz
Highly flammable liquid and vapour
May be harmful if swallowed
Harmful if inhaled vapour
Causes mild skin irritation
Causes eye irritation
Suspected of causing cancer
May cause respiratory irritation
May cause drowsiness or dizziness
May be harmful if swallowed and enters
airways
Toxic to aquatic life

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0268

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

International Chemical Safety Cards

ICSC: 0268

ETHYLBENZENE

I	PHYSICAL STATE: APPEARANCE:	ROUTES OF EXPOSURE:
M	COLOURLESS LIQUID, WITH AROMATIC ODOUR	The substance can be absorbed into the body by inhalation of its vapour, and by ingestion.
P	PHYSICAL DANGERS:	INHALATION RISK:
O	The vapour mixes well with air, explosive mixtures are easily formed.	A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.
R	CHEMICAL DANGERS:	EFFECTS OF SHORT-TERM EXPOSURE:
T	Reacts with strong oxidants. Attacks plastic and rubber.	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 above the OEL could cause lowering of consciousness.
A	OCCUPATIONAL EXPOSURE LIMITS:	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
N	TLV: 100 ppm as TWA 125 ppm as STEL A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2007).	This substance is possibly carcinogenic to humans. The substance may have effects on the kidneys and liver, resulting in impaired functions Repeated contact with skin may cause dryness and cracking.
T	EU OEL: 442 mg/m ³ 100 ppm as TWA 884 mg/m ³ 200 ppm as STEL (skin) (EU 2006).	
D	OSHA PEL: TWA 100 ppm (435 mg/m ³)	
A	NIOSH REL: TWA 100 ppm (435 mg/m ³) ST 125 ppm (545 mg/m ³)	
T	NIOSH IDLH: 800 ppm 10%LEL See: 100414	
A		
PHYSICAL PROPERTIES	Boiling point: 136°C Melting point: -95°C Relative density (water = 1): 0.9	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.03 Flash point: 18°C c.c.

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		Auto-ignition temperature: 432°C Explosive limits, vol% in air: 1.0-6.7 Octanol/water partition coefficient as log Pow: 3.1 Viscosity, mm²/s at 25 °C: 0.6	
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.		
NOTES			
The odour warning when the exposure limit value is exceeded is insufficient.			
Transport Emergency Card: TEC (R)-305 1135 or 30GF1- 1+H NFPA Code: H2; F3; R0			
ADDITIONAL INFORMATION			
ICSC: 0268		ETHYLBENZENE	
(C) IPCS, CEC, 1994			
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.		

International Chemical Safety Cards

ICSC: 0086

p-XYLENE



UNEP



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



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

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

possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)

R: 10-20/21-38
S: 2-25
UN Hazard Class: 3
UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0086

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

International Chemical Safety Cards

p-XYLENE

ICSC: 0086

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

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

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

Card has been partially updated in January 2008: see Occupational Exposure Limits.

ADDITIONAL INFORMATION

ICSC: 0086

(C) IPCS, CEC, 1994

p-XYLENE

IMPORTANT LEGAL NOTICE:

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International Chemical Safety Cards

NAPHTHALENE

ICSC: 0667



Naphthene
C₁₀H₈
Molecular mass: 128.18

ICSC # 0667

CAS # 91-20-3

RTECS # QJ0525000

UN # 1334 (solid); 2304 (molten)

EC # 601-052-00-2

April 21, 2005 Validated



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		STORAGE	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.		Separated from strong oxidants, food and feedstuffs. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 22-40-50/53 S: 2-36/37-46-60-61

UN Hazard Class: 4.1
UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0667

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

International Chemical Safety Cards

ICSC: 0667

NAPHTHALENE

I M P O R T A N T D A T A	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). OSHA PEL: TWA 10 ppm (50 mg/m ³) NIOSH REL: TWA 10 ppm (50 mg/m ³) ST 15 ppm (75 mg/m ³) NIOSH IDLH: 250 ppm See: <u>91203</u>	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.		
Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF 1 -II+III (solid); 41 S2304 (molten) NFPA Code: H2; F2; R0;		



ADDITIONAL INFORMATION	
ICSC: 0667	NAPHTHALENE
(C) IPCS, CEC, 1994	
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International Chemical Safety Cards

ACENAPHTHENE

ICSC: 1674








National Institute for
Occupational Safety and Health

1,2-Dihydroacenaphthylene
1,8-Ethylenenaphthalene
 $C_{12}H_{10}$
Molecular mass: 154.2

ICSC # 1674
CAS # 83-32-9
RTECS # AB1000000
UN # 3077
October 12, 2006 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system. dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See NOTES.	PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles	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.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Personal protection: P2 filter respirator for harmful particles. 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.		Separated from strong oxidants Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	UN Hazard Class: 9 UN Packing Group: III Signal: Warning Enviro Very toxic to aquatic life with long lasting effects

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1674

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

International Chemical Safety Cards

ACENAPHTHENE

ICSC: 1674

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: WHITE TO BEIGE CRYSTALS PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air. CHEMICAL DANGERS: On combustion, forms toxic gases including carbon monoxide. Reacts with strong oxidants OCCUPATIONAL EXPOSURE LIMITS: TLV not established. MAK not established.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion. INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed EFFECTS OF SHORT-TERM EXPOSURE: EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: See Notes.
PHYSICAL PROPERTIES	Boiling point: 279°C Melting point: 95°C Density: 1.2 g/cm³ Solubility in water, g/100 ml at 25°C: 0.0004	Vapour pressure, Pa at 25°C: 0.3 Relative vapour density (air = 1): 5.3 Flash point: 135°C o.c. Auto-ignition temperature: >450 °C Octanol/water partition coefficient as log Pow: 3.9 - 4.5
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. It is strongly advised that this substance does not enter the environment.	
NOTES		
Acenaphthene occurs as a pure substance and also as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.		
Transport Emergency Card: TEC (R)-90GM7-III		
ADDITIONAL INFORMATION		

ICSC: 1674**ACENAPHTHENE**

(C) IPCS, CEC, 1994

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LEGAL
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International Chemical Safety Cards

ANTHRACENE

ICSC: 0825



Anthracin
Paranaphthalene
 $C_{14}H_{10} / (C_6H_4CH)_2$
Molecular mass: 178.2

ICSC # 0825

CAS # 120-12-7

RTECS # CA9350000

March 24, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	in case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough. Sore throat.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles, face shield, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain.	Do not eat, drink, or smoke during work.	Rinse mouth. Rest. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles).		Separated from strong oxidants. Well closed.	
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0825		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CRC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

ANTHRACENE

ICSC: 0825

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: WHITE CRYSTALS OR FLAKES. PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air. CHEMICAL DANGERS: The substance decomposes on heating, under influence of strong oxidants producing acrid, toxic fume, causing fire and explosion hazard. OCCUPATIONAL EXPOSURE LIMITS: TLV not established.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation. INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. EFFECTS OF SHORT-TERM EXPOSURE: The substance slightly irritates the skin and the respiratory tract. EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis under the influence of UV light.
PHYSICAL PROPERTIES	Boiling point: 342°C Melting point: 218°C Density: 1.25-1.28 g/cm ³ Solubility in water, g/100 ml at 20 °C: 0.00013 Vapour pressure, Pa at 25°C: 0.08	Relative vapour density (air = 1): 6.15 Flash point: 121°C Auto-ignition temperature: 538°C Explosive limits, vol% in air: 0.6-? Octanol/water partition coefficient as log Pow: 4.5 (calculated)
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. 	
NOTES		
Green oil, Tetra-olive N2G are trade names. NFPA Code: H0; F1; R;		
ADDITIONAL INFORMATION		
ICSC: 0825 ANTHRACENE		
(C) IPCS, CEC, 1994		
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relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

PYRENE

ICSC: 1474



Benzo (d,e,f) phenanthrene
beta-Pyrene
C₁₆H₁₀
Molecular mass: 202.26

ICSC # 1474

CAS # 129-00-0

RTECS # UR2450000

November 27, 2003 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Water spray, carbon dioxide, dry powder, alcohol-resistant foam, foam.
EXPLOSION			
EXPOSURE			
•INHALATION		Avoid inhalation of dust	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety spectacles.	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.	Do NOT induce vomiting. Give plenty of water to drink. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers: if appropriate, moisten first to prevent dusting. Carefully collect remainder Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles.)		Separated from strong oxidants. Keep in a well-ventilated room.	Do not transport with food and feedstuffs.
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 1474		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

PYRENE

ICSC: 1474

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: YELLOW COLOURLESS SOLID IN VARIOUS FORMS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation through the skin and by ingestion
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.
	CHEMICAL DANGERS: The substance decomposes on heating producing irritating fumes	EFFECTS OF SHORT-TERM EXPOSURE: Exposure to sun may provoke an irritating effect of pyrene on skin and lead to chronic skin discoloration.
	OCCUPATIONAL EXPOSURE LIMITS: TLV not established. MAK not established.	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
PHYSICAL PROPERTIES	Boiling point: 404°C Melting point: 151°C Density: 1.27 g/cm ³	Solubility in water: 0.135 mg/l at 25°C Vapour pressure, Pa at °C: 0.08 Octanol/water partition coefficient as log Pow: 4.88
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in crustacea, in fish, in milk, in algae and in molluscs. It is strongly advised that this substance does not enter the environment.	
NOTES		
Pyrene is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, pyrene may be encountered as a laboratory chemical in its pure form. Health effects of exposure to the substance have not been investigated adequately. See ICSC 1415 Coal-tar pitch.		
ADDITIONAL INFORMATION		
ICSC: 1474		PYRENE
(C) IPCS, CEC, 1994		
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the	

irrelevant legislation in the country of use. The only modifications made to produce the U.S. version is
inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHRYSENE

ICSC: 1672



Benzoaphenanthrene
1,2-Benzophenanthrene
1,2,5,6-Dibenzonaphthalene
 $C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 1672
CAS # 218-01-9
RTECS # GC0700000
UN # 3077
EC # 601-048-00-0
October 12, 2006 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles	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.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Personal protection: P3 filter respirator for toxic particles. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.		Separated from strong oxidants, Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	T symbol N symbol R: 45-68-50/53 S: 53-45-60-61 UN Hazard Class: 9 UN Packing Group: III

		Signal: Warning Health haz-Enviro Suspected of causing cancer Very toxic to aquatic life Toxic to aquatic life with long lasting effects
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 1672	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values	

International Chemical Safety Cards

ICSC: 1672

CHRYSENE

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS TO BEIGE CRYSTALS OR POWDER	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed
	CHEMICAL DANGERS: The substance decomposes on burning producing toxic fumes. Reacts violently with strong oxidants.	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS: TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006). MAK: skin absorption (H); Carcinogen category: 2 (DFG 2007).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 448°C Melting point: 254 - 256°C Density: 1.3 g/cm³	Solubility in water: very poor Octanol/water partition coefficient as log Pow: 5.9
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment.	
NOTES		
Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. This substance does not usually occur as a pure substance but as a component of polycyclic aromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.		

Transport Emergency Card: TEC (R)-90GM7-III

Card has been partially updated in January 2008: see Occupational Exposure Limits.

ADDITIONAL INFORMATION

ICSC: 1672

CHRYSENE

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

ICSC: 0720

BENZO(b)FLUORANTHENE



Benz(e)acephenanthrylene
2,3-Benzofluoranthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene
C₂₀H₁₂
Molecular mass: 252.3

ICSC # 0720
CAS # 205-99-2
RTECS # CU1400000
EC # 601-034-00-4
March 25, 1999 Validated

March 25, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		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		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T syn 4501 N syn 4501 R: 45-50/53 S: 53-45-60-61	
SEE IMPORTANT INFORMATION ON BACK			

ICSC: 0720

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

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS: Upon heating, toxic fumes are formed.	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS: TLV: A2 (suspected human carcinogen); (ACGIH 2004).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans. May cause genetic damage in humans.
	MAK: Carcinogen category: 2; (DFG 2004).	
PHYSICAL PROPERTIES	Boiling point: 481°C Melting point: 168°C Solubility in water: none	Octanol/water partition coefficient as log Pow: 6.12
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality.	
NOTES Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m ³ . Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.		
ADDITIONAL INFORMATION		
ICSC: 0720		
BENZO(b)FLUORANTHENE		
(C) IPCS, CEC, 1994		

**IMPORTANT
LEGAL
NOTICE:**

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International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104

 			
Benz(a)pyrene 3,4-Benzopyrene Benzo(d,e,f)chrysene $C_{20}H_{12}$ Molecular mass: 252.3			
ICSC # 0104 CAS # 50-32-8 RTECS # DJ3675000 EC # 601-032-00-3 October 17, 2005 Validated			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM FOR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		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.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder,	Separated from strong oxidants.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61	

then remove to safe place.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0104

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

International Chemical Safety Cards

ICSC: 0104

BENZO(a)PYRENE

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: PALE-YELLOW CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.
	CHEMICAL DANGERS: Reacts with strong oxidants causing fire and explosion hazard.	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS: TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005). MAK: Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
	PHYSICAL PROPERTIES	Boiling point: 496°C Melting point: 178.1°C Density: 1.4 g/cm ³ Solubility in water: none (<0.1 g/100 ml) Vapour pressure: negligible Octanol/water partition coefficient as log Pow: 6.04
	ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.
NOTES		
Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.		
ADDITIONAL INFORMATION		

ICSC: 0104

BENZO(a)PYRENE

(C) IPCS, CEC, 1994

**IMPORTANT
LEGAL
NOTICE:**

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International Chemical Safety Cards

BENZO(ghi)PERYLENE

ICSC: 0739

 			
1,12-Benzoperylene 1,12-Benzperylene $C_{22}H_{12}$ Molecular mass: 276.3			
ICSC # 0739 CAS # 191-24-2 RTECS # <u>DI6200500</u> October 18, 1999 Validated			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions.	NO open flames.	In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST.	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles, or eye protection in combination with breathing protection if powder.	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.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into covered containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Well closed.		
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0739		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1991. No modifications to this international version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

BENZO(ghi)PERYLENE

ICSC: 0739

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: PALE YELLOW-GREEN CRYSTALS.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS: Upon heating, toxic fumes are formed.	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS: TLV not established.	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
PHYSICAL PROPERTIES	Boiling point: 550°C Melting point: 278°C Density: 1.3 g/cm ³	Solubility in water: none Octanol/water partition coefficient as log Pow: 6.58
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air and water.	
NOTES		
Benzo(ghi)perylene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. Data are insufficiently available on the effect of this substance on human health, therefore utmost care must be taken.		
ADDITIONAL INFORMATION		
ICSC: 0739		BENZO(ghi)PERYLENE
(C) IPCS, CEC, 1994		
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCOR 1254)

ICSC: 0939

			
Chlorobiphenyl (54% chlorine) Chlorodiphenyl (54% chlorine) PCB Molecular mass: 327 (average)			
ICSC # 0939 CAS # 11097-69-1 RTECS # T01360000 UN # 2315 EC # 602-039-00-4 October 20, 1999 Validated			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION		Ventilation.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		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	Headache, Numbness.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Consult an expert! Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: complete protective clothing including self-contained breathing apparatus.		Separated from food and feedstuffs. Cool. Dry. Keep in a well-ventilated room.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Severe marine pollutant. Note: C Xn symbol N symbol R: 33-50/53 S: 2-35-60-61 UN Hazard Class: 9 UN Packing Group: II
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0939		Prepared in the context of co-operation between the International Programme on Chemical Safety & the Commission of the European Communities (IC) (ICS CEC 1994). No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCOR 1254)

ICSC: 0939

I M	PHYSICAL STATE: APPEARANCE: LIGHT YELLOW VISCOUS LIQUID.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.
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P O R T A N T I N F O R M A T I O N	PHYSICAL DANGERS:	INHALATION RISK: A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C
	CHEMICAL DANGERS: The substance decomposes in a fire producing irritating and toxic gases	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.5 mg/m ³ as TWA (skin) A3 (ACGIH 2004). MAK: 0.05 ppm & 70 mg/m ³ H Peak Irritation category: II(3) Carcinogen category: 3B Pregnancy risk group: B (DFG 2004). OSHA PEL: TWA 0.5 mg/m ³ skin NIOSH REL*: Ca TWA 0.001 mg/m ³ See Appendix A *Note The REL also applies to other PCBs. NIOSH IDLH: Ca 5 mg/m ³ See IDLH INDEX	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

International Chemical Safety Cards

ALDRIN

ICSC: 0774

 			
1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-exo-1,4-endo-5,8-dimethanonaphthalene 1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4aß,5alpha,8alpha,8aß) HHDN $C_{12}H_8Cl_6$ Molecular mass: 364.9			
ICSC # 0774 CAS # 309-00-2 RTECS # IO2100000 UN # 2761 EC # 602-048-00-3 March 26, 1998 Validated			
			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	
•INHALATION	(See Ingestion).	Ventilation (not if powder).	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! See Ingestion.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Safety goggles, or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Convulsions. Dizziness. Headache. Nausea. Vomiting. Muscle twitching.	Do not eat, drink, or smoke during work. Wash hands before eating.	Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. (Extra personal protection: chemical protection suit including self-contained breathing apparatus).	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs and incompatible materials: See Chemical Dangers. Well closed. Keep in a well-ventilated room. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Severe marine pollutant. T symbol N symbol R: 24/25-40-48/24/25-50/53 S: 1/2-23-36/37-45-60-61 UN Hazard Class: 6.1 UN Packing Group: II
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 0774 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.		

International Chemical Safety Cards

ALDRIN

ICSC: 0774

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body through the skin and by ingestion.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.
	CHEMICAL DANGERS: The substance decomposes on heating producing toxic and corrosive fumes including hydrogen chloride. Reacts with acids and oxidants. Attacks many metals in presence of water.	EFFECTS OF SHORT-TERM EXPOSURE: The substance may cause effects on the central nervous system, resulting in convulsions. The effects may be delayed. Medical observation is indicated.
	OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.25 mg/m ³ (as TWA), A3 (skin) (ACGIH 1997). MAK: (Inhalable fraction) 0.25 mg/m ³ skin absorption (H); Peak limitation category: II(8) (DFG 2006). OSHA PEL: TWA 0.25 mg/m ³ skin NIOSH REL: Ca TWA 0.25 mg/m ³ skin See Appendix A NIOSH IDLH: Ca 25 mg/m ³ See: 309002	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance accumulates in the human body. Cumulative effects are possible: see Acute Hazards/Symptoms.
	PHYSICAL PROPERTIES	Boiling point at 0.27kPa: 145°C Melting point: 104-105°C Density: 1.6 g/cm ³ Solubility in water: none Vapour pressure, Pa at 20°C: 0.009 Octanol/water partition coefficient as log Pow: 7.4
	ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to birds, honey bees. In the food chain important to humans, bioaccumulation takes place, specifically in aquatic organisms. It is strongly advised not to let the chemical enter into the environment because it persists
		

in the environment. The substance may cause long-term effects in the aquatic environment. Avoid release to the environment in circumstances different to normal use.

NOTES

Other melting points: 49-60°C (technical grade). Depending on the degree of exposure, periodic medical examination is indicated. If the substance is formulated with solvent(s) also consult the card(s) (ICSC) of the solvent(s). Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. The recommendations on this Card also apply to ICSC 0787 (dieldrin). Aldrec, Aldrex, Aldrite, Aldron, Aldrosol, Algran, Alttox, Drinox, Octalene, Seedrin, and Toxadrin are trade names.

Transport Emergency Card: TEC (R)-61G41b.
NFPA Code: H2; F0; R0;

Card has been partially updated in August 2007: see Storage, Occupational Exposure Limits.

ADDITIONAL INFORMATION

ICSC: 0774

ALDRIN

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

ENDRIN

ICSC: 1023

			
		<chem>C12H8Cl6O</chem> Molecular mass: 380.9	
ICSC # 1023 CAS # 72-20-8 RTECS # 101575000 UN # 2761 EC # 602-051-00-X March 10, 2000 Validated			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	(See Ingestion).	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water (for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Dizziness. Weakness. Headache. Nausea. Vomiting. Convulsions.	Do not eat, drink, or smoke during work. Wash hands before eating.	Give a slurry of activated charcoal in water to drink. Rest. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection:		Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. Severe marine pollutant. T+ symbol N symbol R: 24-28-50/53

chemical protection suit including
self-contained breathing apparatus).

IS: 1/2-22-36/37-45-60-61
UN Hazard Class: 6.1
UN Packing Group: I

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1023

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

International Chemical Safety Cards

ICSC: 1023

ENDRIN

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: WHITE CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying or when dispersed, especially if powdered.
	CHEMICAL DANGERS: The substance decomposes on heating above 245°C, producing hydrogen chloride phosgene	EFFECTS OF SHORT-TERM EXPOSURE: The substance may cause effects on the central nervous system , resulting in convulsions and death. The effects may be delayed. Medical observation is indicated.
	OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.1 mg/m³ (skin) (ACGIH 2000). OSHA PEL: TWA 0.1 mg/m³ skin NIOSH REL: TWA 0.1 mg/m³ skin NIOSH IDLH: 2 mg/m³ See: 72208	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
PHYSICAL PROPERTIES	Decomposes below boiling point at 245°C Melting point: 200°C Density: 1.7 g/cm³	Solubility in water, g/100 ml at 25°C: none Vapour pressure, Pa at 25°C: negligible Octanol/water partition coefficient as log Pow: 5.34
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to honey bees birds mammals It is strongly advised not to let the chemical enter into the environment because it persists in the environment. In the food chain important to humans, bioaccumulation takes place, specifically in fish seafood Avoid release to the environment in circumstances different to normal use.	
NOTES		
If the substance is formulated with solvent(s) also consult the card(s) (ICSC) of the solvent(s). Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Transport Emergency Card: TEC (R)-61G41a		

NFPA Code: H3; F0; R; 0	
ADDITIONAL INFORMATION	
ICSC: 1023	ENDRIN
(C) IPCS, CEC, 1994	
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHLORDANE (TECHNICAL PRODUCT)

ICSC: 0740

 			
1,2,4,5,6,7,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene 1,2,4,5,6,7,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene $C_{10}H_6Cl_8$ Molecular mass: 409.8			
ICSC # 0740 CAS # 57-74-9 UN # 2996 EC # 602-047-00-8 March 26, 1998 Validated			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Alcohol-resistant foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	(See Ingestion).	Breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles 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	Confusion. Convulsions. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: chemical protection suit	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs bases and incompatible materials See Chemical Dangers. Well closed. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. Severe marine pollutant. Xn symbol N symbol	

including self-contained breathing apparatus.

R: 21/22-40-50/53
S: 2-36/37-60-61
UN Hazard Class: 6.1
UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0740

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

International Chemical Safety Cards

CHLORDANE (TECHNICAL PRODUCT)

ICSC: 0740

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: TECHNICAL: LIGHT YELLOW TO AMBER VISCOUS LIQUID PHYSICAL DANGERS: CHEMICAL DANGERS: The substance decomposes on burning, on contact with bases producing toxic fumes including phosgene hydrogen chloride Attacks iron, zinc, plastic, rubber and coatings. OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.5 mg/m³ as TWA (skin) A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2004). MAK: (Inhalable fraction) 0.5 mg/m³ Peak limitation category: II(8); skin absorption (H); Carcinogen category: 3B; (DFG 2004). OSHA PEL: TWA 0.5 mg/m³ skin NIOSH REL: Ca TWA 0.5 mg/m³ skin See Appendix A NIOSH IDLH: Ca 100 mg/m³ See: 57749	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion. INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying. EFFECTS OF SHORT-TERM EXPOSURE: Exposure at high levels may result in disorientation, tremors, convulsions, respiratory failure and death. Medical observation is indicated. EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the liver immune system, resulting in tissue lesions and liver impairment. This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point at 0.27kPa: 175°C Relative density (water = 1): 1.59-1.63 Solubility in water: none	Vapour pressure, Pa at 25°C: 0.0013 Octanol/water partition coefficient as log Pow: 2.78
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to soil organisms, honey bees. It is strongly advised that this substance does not enter the environment. The substance may cause long-term effects in the aquatic environment.	
NOTES If the substance is formulated with solvents also consult the ICSCs of these materials. Carrier solvents used in commercial formulations may change physical and toxicological properties. Belt, Chlor KII, Chlortox, Corodan, Gold Crest, Intox,		

Kypchlor, Niran, Octachlor, Sydan, Synklor, Termi-Ded, Topiclor, and Toxichlor are trade names. Also consult ICSC 0743 Heptachlor.

Transport Emergency Card: TEC (R)-61GT6-III

ADDITIONAL INFORMATION

ICSC: 0740

CHLORDANE (TECHNICAL PRODUCT)

(C) IPCS, CEC, 1994

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September 2005

NIOSH Pocket Guide to Chemical Hazards

[NPG Home](#) | [Introduction](#) | [Synonyms & Trade Names](#) | [Chemical Names](#) | [CAS Numbers](#) | [RTECS Numbers](#) | [Appendices](#) | [Search](#)

Chlorinated camphene

CAS 8001-35-2

$C_{10}H_{10}Cl_8$

RTECS [XW5250000](#)

Synonyms & Trade Names

Chlorocamphene, Octachlorocamphene, Polychlorocamphene, Toxaphene

DOT ID & Guide

2761 151

Exposure Limits

NIOSH REL: Ca [skin] See [Appendix A](#)

OSHA PEL†: TWA 0.5 mg/m³ [skin]

IDLH Ca [200 mg/m³] See:
[8001352](#)

Conversion

Physical Description

Amber, waxy solid with a mild, piney, chlorine- and camphor-like odor. [insecticide]

MW 413.8

BP: Decomposes

MLT: 149-194°F

Sol: 0.0003%

VP (77°F): 0.4 mmHg

IP: ?

Sp.Gr. 1.65

F.P. NA

UEL: NA

LEL: NA

Noncombustible Solid, but may be dissolved in flammable liquids.

Incompatibilities & Reactivities

Strong oxidizers [Note: Slightly corrosive to metals under moist conditions.]

Measurement Methods

NIOSH 5039

See: [NMAM](#) or [OSHA Methods](#)

Personal Protection & Sanitation (See [protection codes](#))

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See [procedures](#))

Eye: Irrigate immediately

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter. [Click here](#) for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus

[Important additional information about respirator selection](#)

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Nausea, confusion, agitation, tremor, convulsions, unconsciousness; dry, red skin; [potential occupational carcinogen]

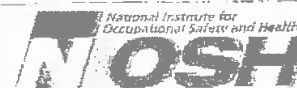
Target Organs central nervous system, skin

Cancer Site [in animals: liver cancer]

International Chemical Safety Cards

DDT

ICSC: 0034



Dichlorodiphenyltrichloroethane
 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane
 2,2-bis(p-Chlorophenyl)-1,1,1-trichloroethane
 1,1'-(2,2,2-Trichloroethyldiene)bis(4-chlorobenzene)
 p,p'-DDT
 $C_{14}H_9Cl_5$
 Molecular mass: 354.5

ICSC # 0034
 CAS # 50-29-3
 RTECS # KJ3325000
 UN # 2761
 EC # 602-045-00-7
 April 20, 2004 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames	Powder, water spray, foam, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
SKIN		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 if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
INGESTION	Tremors, Diarrhoea, Dizziness, Headache, Nausea, Numbness, Paresthesias, Hyperexcitability, Convulsions.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Rest. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Do NOT let this chemical enter the environment. Sweep spilled substance into sealable non-metallic containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.		Provision to contain effluent from fire extinguishing. Separated from iron, aluminum and its salts, food and feedsuffs. See Chemical Danger.	Do not transport with food and feedsuffs. Severe marine pollutant. H symbol. N symbol. R: 25-40-48/25-50/53. S: 1/2-22-36/37-45-60-61. UN Hazard Class: 6.1. UN Packing Group: III.
SEE IMPORTANT INFORMATION ON BACK			

ICSC: 0034

Prepared in the context of co-operation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1991. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

DDT

ICSC: 0034

See also: [INTRODUCTION](#) See [ICSC CARD: 0643](#)

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I M P O R T A N T A	PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS WHITE POWDER. TECHNICAL PRODUCT IS WAXY SOLID. PHYSICAL DANGERS: CHEMICAL DANGERS: On combustion, forms toxic and corrosive fumes including hydrogen chloride. Reacts with aluminium and iron. OCCUPATIONAL EXPOSURE LIMITS: TLV: 1 mg/m ³ as TWA A3 (ACGIH 2004). MAK: 1 mg/m ³ H Peak limitation category: II(8) (DFG 2003). OSHA PEL: TWA 1 mg/m ³ skin NIOSH REL: Ca TWA 0.5 mg/m ³ See Appendix A NIOSH IDLH: Ca 500 mg/m ³ See: 50293	ROUTES OF EXPOSURE: The substance can be absorbed into the body by ingestion. INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly especially if powdered. EFFECTS OF SHORT-TERM EXPOSURE: May cause mechanical irritation. The substance may cause effects on the central nervous system, resulting in convulsions and respiratory depression. Exposure at high levels may result in death. Medical observation is indicated. EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the central nervous system and liver. This substance is possibly carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 260°C Melting point: 109°C Density: 1.6 g/cm ³	Solubility in water: poor Octanol/water partition coefficient as log Pow: 6.36
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to birds. Bioaccumulation of this chemical may occur along the food chain, for example in milk and aquatic organisms. This substance does enter the environment under normal use. Great care, however, should be given to avoid any additional release, e.g. through inappropriate disposal.	
NOTES		
Depending on the degree of exposure, periodic medical examination is indicated. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Consult national legislation. Agritan, Azotox, Anofex, bodox, Gesapon, Gesarex, Gesarol, Guesapon, Clofenotane, Zeidane, Dicophane, Neocid are trade names.		
Transport Emergency Card: TEC (R)-61GT7-III		
ADDITIONAL INFORMATION		
ICSC: 0034		DDT
(C) IPCS, CEC, 1994		
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International Chemical Safety Cards

SILVER

ICSC: 0810



Argentium
C.I. 77820
Ag

ICSC # 0810
CAS # 7440-22-4
IRTECS # VW3500000
September 10, 1997 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible, except as powder.		
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Rinse skin with plenty of water or shower.
•EYES		Safety spectacles, or eye protection in combination with breathing protection if powder.	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		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.		Separated from ammonia, strong hydrogen peroxide solutions, strong acids.	
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0810		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values	

International Chemical Safety Cards

SILVER

ICSC: 0810

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: WHITE METAL. TURNS DARK ON EXPOSURE TO OZONE, HYDROGEN SULFIDE OR SULFUR. PHYSICAL DANGERS: CHEMICAL DANGERS: Shock-sensitive compounds are formed with acetylene. Reacts with acids causing fire hazard. Contact with strong hydrogen peroxide solution will cause violent decomposition to oxygen gas. Contact with ammonia may cause formation of compounds that are explosive when dry. OCCUPATIONAL EXPOSURE LIMITS: TLV (metal): 0.1 mg/m³ (ACGIH 1997). EU OEL: 0.1 mg/m³ as TWA (EU 2000). OSHA PEL: TWA 0.01 mg/m³ NIOSH REL: TWA 0.01 mg/m³ NIOSH IDLH: 10 mg/m³ (as Ag) See: <u>IDLH INDEX</u>	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion. INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. EFFECTS OF SHORT-TERM EXPOSURE: Inhalation of high amounts of metallic silver vapours may cause lung damage with pulmonary oedema. EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may cause a grey-blue discoloration of the eyes, nose, throat and skin (argyria/argyrosis).
PHYSICAL PROPERTIES	Boiling point: 2212°C Melting point: 962°C	Relative density (water = 1): 10.5 Solubility in water: none
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to aquatic organisms.	
NOTES		
Card has been partially updated in March 2008: see Occupational Exposure Limits.		
ADDITIONAL INFORMATION		
ICSC: 0810		
(C) IPCS, CEC, 1994		
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

BARIUM

ICSC: 1052



Ba
Atomic mass: 137.3

ICSC # 1052
CAS # 7440-39-3
RTECS # CO8370000
UN # 1400
October 20, 1999 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable. Many reactions may cause fire or explosion.	NO open flames, NO sparks, and NO smoking. NO contact with water.	Special powder, dry sand, NO hydrous agents. NO water.
EXPLOSION	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! STRICT HYGIENE!	
•INHALATION	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. 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		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT wash away into sewer.		Separated from halogenated solvents, strong oxidants, acids. Dry. Keep under inert gas, oil or oxygen-free liquid.	UN Hazard Class: 4.3 UN Packing Group: II
SEE IMPORTANT INFORMATION ON BACK			

ICSC: 1052

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

International Chemical Safety Cards

BARIUM

ICSC: 1052

I	PHYSICAL STATE; APPEARANCE:	ROUTES OF EXPOSURE:
M	YELLOWISH TO WHITE LUSTROUS SOLID IN VARIOUS FORMS.	The substance can be absorbed into the body by ingestion.
P	PHYSICAL DANGERS:	INHALATION RISK:
O	Dust explosion possible if in powder or granular form, mixed with air.	
R	CHEMICAL DANGERS:	EFFECTS OF SHORT-TERM EXPOSURE:
T	The substance may spontaneously ignite on contact with air (if in powder form). The substance is a strong reducing agent and reacts violently with oxidants and acids. Reacts violently with halogenated solvents. Reacts with water, forming flammable/explosive gas (hydrogen - see ICSC0001), causing fire and explosion hazard.	The substance irritates the eyes, the skin and the respiratory tract.
A		EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
N		
T		
D	OCCUPATIONAL EXPOSURE LIMITS:	
A	TLV: 0.5 mg/m ³ (as TWA) (ACGIH 1999).	
T		
A		
PHYSICAL PROPERTIES	Boiling point: 1640°C Melting point: 725°C Density: 3.6 g/cm ³	Solubility in water: reaction
ENVIRONMENTAL DATA		
NOTES		
Reacts violently with fire extinguishing agents such as water, bicarbonate, powder, foam, and carbon dioxide. Rinse contaminated clothes (fire hazard) with plenty of water.		
Transport Emergency Card: TEC (R)-43G12		
ADDITIONAL INFORMATION		
ICSC: 1052		BARIUM
(C) IPCS, CEC, 1994		
IMPORTANT LEGAL	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views	

NOTICE:

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International Chemical Safety Cards

ICSC: 0020

CADMIUM



Cd
Atomic mass: 112.4



ICSC # 0020
CAS # 7440-43-9
RTECS # EU9800000
UN # 2570
EC # 048-002-00-0
April 22, 2005 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable in powder form and spontaneously combustible in pyrophoric form. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with heat or acid(s).	Dry sand. Special powder. NO other agents.
EXPLOSION	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! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles or eye protection in combination with breathing protection.	Flush with plenty of water for several minutes (remove contact lenses if easily possible). Then take to a doctor.
•INGESTION	Abdominal pain. Diarrhoea. Headache. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place.		Fireproof. Dry. Keep under inert gas. Separated from ignition sources, oxidants acids, food and feedstuffs	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Note: E, T-symbols N symbol

R: 45-26-48/23/25-62-63-68-50/53

S: 53-45-60-61

UN Hazard Class: 6.1

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0020

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

International Chemical Safety Cards**CADMIUM**

ICSC: 0020

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: SOFT BLUE-WHITE METAL LUMPS OR GREY POWDER. MALLEABLE. TURNS BRITTLE ON EXPOSURE TO 80°C AND TARNISHES ON EXPOSURE TO MOIST AIR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.
	CHEMICAL DANGERS: Reacts with acids forming flammable/explosive gas (hydrogen - see ICSC0001). Dust reacts with oxidants, hydrogen azide, zinc, selenium or tellurium, causing fire and explosion hazard.	EFFECTS OF SHORT-TERM EXPOSURE: The fume is irritating to the respiratory tract. Inhalation of fume may cause lung oedema (see Notes). Inhalation of fumes may cause metal fume fever. The effects may be delayed. Medical observation is indicated.
	OCCUPATIONAL EXPOSURE LIMITS: TLV: (Total dust) 0.01 mg/m ³ (Respirable fraction) 0.002 mg/m ³ as TWA A2 (suspected human carcinogen); BEI issued (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may have effects on the kidneys, resulting in kidney impairment. This substance is carcinogenic to humans.
	OSHA PEL*: 1910.1027 TWA 0.005 mg/m ³ *Note: The PEL applies to all Cadmium compounds (as Cd).	
	NIOSH REL*: Ca See Appendix A *Note: The REL applies to all Cadmium compounds (as Cd).	
	NIOSH IDLH: Ca 9 mg/m ³ (as Cd) See: <u>IDLH INDEX</u>	
PHYSICAL PROPERTIES	Boiling point: 765°C Melting point: 321°C Density: 8.6 g/cm ³	Solubility in water: none Auto-ignition temperature: (cadmium metal dust) 250°C
ENVIRONMENTAL DATA		
NOTES		

Reacts violently with fire extinguishing agents such as water, foam, carbon dioxide and halons. Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Do NOT take working clothes home. Cadmium also exists in a pyrophoric form (EC No. 048-011-00-X), which bears the additional EU labelling symbol F, R phrase 17, and S phrases 7/8 and 43. UN numbers and packing group will vary according to the physical form of the substance.

ADDITIONAL INFORMATION**ICSC: 0020****CADMIUM**

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

SELENIUM

ICSC: 0072

 			
Se (powder)			
ICSC # 0072 CAS # 7782-49-2 RTECS # VS7700000 EC # 034-001-00-2 April 26, 1993 Validated			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with oxidants.	Powder, AFFF, foam, carbon dioxide. NO water
EXPLOSION	Risk of fire and explosion on contact with oxidants.		
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
•INHALATION	Irritation of nose. Cough. Dizziness. Headache. Laboured breathing. Nausea. Sore throat. Vomiting. Weakness. Symptoms may be delayed (see Notes).	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness. Skin burns. Pain. Discolouration.	Protective gloves. Protective clothing.	Rinse skin with plenty of water or shower. Refer for medical attention. Remove and isolate contaminated clothes.
•EYES	Redness. Pain. Blurred vision.	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	Metallic taste. Diarrhoea. Chills. Fever. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Do NOT wash away into sewer. Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	Fireproof. Separated from strong oxidants, strong acids, food and feedstuffs Dry.	Airtight. Do not transport with food and feedstuffs. T symbol R: 23/25-33-53 S: 1/2-20/21-28-45-61	

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0072

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

International Chemical Safety Cards

SELENIUM

ICSC: 0072

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: ODOURLESS SOLID IN VARIOUS FORMS. DARK RED-BROWN TO BLUISH-BLACK AMORPHOUS SOLID OR RED TRANSPARENT CRYSTALS OR METALLIC GREY TO BLACK CRYSTALS.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.
	CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts violently with oxidants strong acids Reacts with water at 50°C forming flammable/explosive gas (hydrogen - see ICSC0001) and selenious acids. Reacts with incandescence on gentle heating with phosphorous and metals such as nickel, zinc, sodium, potassium, platinum.	EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the eyes and the respiratory tract. Inhalation of dust may cause lung oedema (see Notes). Inhalation of fume may cause symptoms of asphyxiation, chills and fever and bronchitis. The effects may be delayed.
	OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.2 mg/m ³ as TWA (ACGIH 2004). MAK: (Inhalable fraction) 0.05 mg/m ³ Peak limitation category: II(4); Carcinogen category: 3B; Pregnancy risk group: C; (DFG 2004). OSHA PEL*: TWA 0.2 mg/m ³ *Note: The PEL also applies to other selenium compounds (as Se) except Selenium hexafluoride. NIOSH REL*: TWA 0.2 mg/m ³ *Note: The REL also applies to other selenium compounds (as Se) except Selenium hexafluoride. NIOSH IDLH: 1 mg/m ³ (as Se) See: 7782492	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the respiratory tract, gastrointestinal tract, and skin, resulting in nausea, vomiting, cough, yellowish skin discolouration, loss of nails, garlic breath and bad teeth.
	PHYSICAL PROPERTIES	Boiling point: 685°C Melting point: 170-217°C Relative density (water = 1): 4.8
	ENVIRONMENTAL DATA	Solubility in water: none Vapour pressure, Pa at 20°C: 0.1
	NOTES	
	Do NOT take working clothes home.	
	ADDITIONAL INFORMATION	

ICSC: 0072		SELENIUM
(C) IPCS, CEC, 1994		
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

LEAD

ICSC: 0052

 			
Lead metal Plumbum Pb (powder)			
ICSC # 0052 CAS # 7439-92-1 RTECS # QF7525000 August 10, 2002 Validated			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST; AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.		Separated from food and feedstuffs incompatible materials See Chemical Dangers.	

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0052

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

International Chemical Safety Cards

LEAD

ICSC: 0052

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.
	CHEMICAL DANGERS: On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.05 mg/m ³ as TWA A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development. This substance is probably carcinogenic to humans. fast track change Oct 06 - IARC 2A.
	MAK: Carcinogen category: 2; Germ cell mutagen group: 3A; (DFG 2006).	
	EU OEL: as TWA 0.15 mg/m ³ (EU 2002).	
	OSHA PEL*: 1910.1025 TWA 0.050 mg/m ³ <u>See Appendix C</u> *Note: The PEL also applies to other lead compounds (as Pb) – <u>see Appendix C</u> .	
	NIOSH REL*: TWA 0.050 mg/m ³ <u>See Appendix C</u> *Note: The REL also applies to other lead compounds (as Pb) – <u>see Appendix C</u> .	
	NIOSH IDLH: 100 mg/m ³ (as Pb) <u>See: 7439921</u>	
	PHYSICAL PROPERTIES	Boiling point: 1740°C Melting point: 327.5°C
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.	
NOTES		
Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. Card has been partly updated in April 2005. See section Occupational Exposure Limits. Card has been partly updated in October 2006: see section Occupational Exposure Limits, Effects Long Tem Exposure.		



ADDITIONAL INFORMATION	
ICSC: 0052	LEAD
(C) IPCS, CEC, 1994	
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

MERCURY

ICSC: 0056



Quicksilver
Liquid silver
Hg

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



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

sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.

IN symbol
R: 23-33-50/53
S: 1/2-7-45-60-61
UN Hazard Class: 8
UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0056

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

International Chemical Safety Cards

ICSC: 0056

MERCURY

I	PHYSICAL STATE; APPEARANCE: ODOURLESS, HEAVY AND MOBILE	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!
M	SILVERY LIQUID METAL.	
P	PHYSICAL DANGERS:	
O	CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.	INHALATION RISK: A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.
R		EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated.
T		
A	OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.025 mg/m ³ as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 0.1 mg/m ³ Sh Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the central nervous system, kidneys, resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.
N		
T		
D	OSHA PEL: C 0.1 mg/m ³ NIOSH REL: Hg Vapor: TWA 0.05 mg/m ³ skin Other: C 0.1 mg/m ³ skin NIOSH IDLH: 10 mg/m ³ (as Hg) See: 7439976	
A		
T		
A		
PHYSICAL PROPERTIES	Boiling point: 357°C Melting point: -39°C Relative density (water = 1): 13.5 Solubility in water: none	Vapour pressure: Pa at 20°C: 0.26 Relative vapour density (air = 1): 6.93 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. In the food chain, important to humans, bioaccumulation takes place, specifically in fish.	
NOTES		

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

ADDITIONAL INFORMATION

ICSC: 0056

MERCURY

(C) IPCS, CEC, 1994

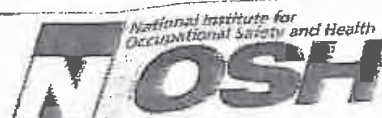
**IMPORTANT
LEGAL
NOTICE:**

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International Chemical Safety Cards

ARSENIC

ICSC: 0013



Grey arsenic
As
Atomic mass: 74.9

ICSC # 0013
CAS # 7440-38-2
RTECS # CG0525000
UN # 1558
EC # 033-001-00-X
October 18, 1999 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with strong oxidizers. NO contact with hot surfaces.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Risk of fire and explosion is slight when exposed to hot surfaces or flames in the form of fine powder or dust.	Prevent deposition of dust; closed system; dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Cough. Sore throat. Shortness of breath. Weakness. See Ingestion.	Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness.	Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Diarrhoea. Nausea. Vomiting. Burning sensation in the throat and chest. Shock or collapse. Unconsciousness.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING

Evacuate danger area! Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment.

Separated from strong oxidants, acids, halogens, food and feedstuffs. Well closed.

Do not transport with food and feedstuffs.
Marine pollutant.
T symbol
N symbol
R: 23/25-50/53
S: 1/2-20/21-28-45-60-61
UN Hazard Class: 6.1
UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0013

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

International Chemical Safety Cards

ARSENIC

ICSC: 0013

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly, when dispersed.
	CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens, causing fire and explosion hazard. Reacts with acids to produce	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 gastrointestinal tract cardiovascular system central nervous system kidneys, resulting in severe gastroenteritis, loss of fluid, and electrolytes, cardiac disorders shock convulsions and kidney impairment Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated.
	OCCUPATIONAL EXPOSURE LIMITS: OSHA PEL: 1910.1018 TWA 0.010 mg/m ³	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the mucous membranes, skin, peripheral nervous system liver bone marrow, resulting in pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment anaemia This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
	NIOSH REL: Ca C 0.002 mg/m ³ 15-minute <u>See Appendix A</u>	
	NIOSH IDLH: Ca 5 mg/m ³ (as As) <u>See: 7440382</u>	
	TLV: 0.01 mg/m ³ as TWA A1 (confirmed human carcinogen); BEI issued (ACGIH 2004).	
	MAK:	
	Carcinogen category: 1; Germ cell mutagen group: 3A: (DFG 2004).	
PHYSICAL PROPERTIES	Sublimation point: 613°C Density: 5.7 g/cm ³	Solubility in water: none

ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.	
NOTES		
The substance is combustible but no flash point is available in literature. Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. Refer also to cards for specific arsenic compounds, e.g., Arsenic pentoxide (ICSC 0377), Arsenic trichloride (ICSC 0221), Arsenic trioxide (ICSC 0378), Arsine (ICSC 0222). Transport Emergency Card: TEC (R)-61GT5-II		
ADDITIONAL INFORMATION		
ICSC: 0013		ARSENIC
(C) IPCS, CEC, 1994		
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

CHROMIUM

ICSC: 0029



Chrome
Cr
Atomic mass: 52.0
(powder)

ICSC # 0029

CAS # 7440-47-3

RTECS # GB4200000

October 27, 2004 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions.	No open flames if in powder form.	In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION		Prevent deposition of dust; closed system; dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST!	
• INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
• EYES	Redness.	Safety goggles.	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.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P2 filter respirator for harmful particles.			
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0029		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

ICSC: 0029

CHROMIUM

I M P O R T A N T D A T A	PHYSICAL STATE: APPEARANCE: GREY POWDER		ROUTES OF EXPOSURE:
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.		INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed.
	CHEMICAL DANGERS: Chromium is a catalytic substance and may cause reaction in contact with many organic and inorganic substances, causing fire and explosion hazard.		EFFECTS OF SHORT-TERM EXPOSURE: May cause mechanical irritation to the eyes and the respiratory tract.
	OCCUPATIONAL EXPOSURE LIMITS: TLV: (as Cr metal, Cr(III) compounds) 0.5 mg/m ³ as TWA A4 (ACGIH 2004). MAK not established.		EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
	OSHA PEL*: TWA 1 mg/m ³ See Appendix C		
	*Note: The PEL also applies to insoluble chromium salts.		
	NIOSH REL: TWA 0.5 mg/m ³ See Appendix C		
	NIOSH IDLH: 250 mg/m ³ (as Cr) See: 7440473		
PHYSICAL PROPERTIES		Solubility in water: none	
ENVIRONMENTAL DATA			
NOTES			
The surface of the chromium particles is oxidized to chromium(III)oxide in air. See ICSC 1531 Chromium(III) oxide.			
ADDITIONAL INFORMATION			
CHROMIUM			
ICSC: 0029		(C) IPCS, CEC, 1994	
IMPORTANT LEGAL NOTICE:		Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

Appendix B
Respirator Fit Test Procedures

Appendix A to Sec. 1910.120--Personal Protective Equipment Test Methods

This appendix sets forth the non-mandatory examples of tests which may be used to evaluate compliance with Sec. 1910.120 (g) (4) (ii) and (iii). Other tests and other challenge agents may be used to evaluate compliance.

A. Totally-encapsulating chemical protective suit pressure test

1.0--Scope

1.1 This practice measures the ability of a gas tight totally-encapsulating chemical protective suit material, seams, and closures to maintain a fixed positive pressure. The results of this practice allow the gas tight integrity of a totally-encapsulating chemical protective suit to be evaluated.

1.2 Resistance of the suit materials to permeation, penetration, and degradation by specific hazardous substances is not determined by this test method.

2.0--Definition of terms

2.1 Totally-encapsulated chemical protective suit (TECP suit) means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, legs and respirator; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves and boots.

2.2 Protective clothing material means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.

2.3 Gas tight means, for the purpose of this test method, the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.

3.0--Summary of test method

3.1 The TECP suit is visually inspected and modified for the test. The test apparatus is attached to the suit to permit inflation to

[[Page 392]]

the pre-test suit expansion pressure for removal of suit wrinkles and creases. The pressure is lowered to the test pressure and monitored for three minutes. If the pressure drop is excessive, the TECP suit fails the test and is removed from service. The test is repeated after leak location and repair.

4.0--Required Supplies

4.1 Source of compressed air.

4.2 Test apparatus for suit testing, including a pressure measurement device with a sensitivity of at least $\frac{1}{4}$ inch water gauge.

4.3 Vent valve closure plugs or sealing tape.

4.4 Soapy water solution and soft brush.

4.5 Stop watch or appropriate timing device.

5.0--Safety Precautions

5.1 Care shall be taken to provide the correct pressure safety devices required for the source of compressed air used.

6.0--Test Procedure

6.1 Prior to each test, the tester shall perform a visual inspection of the suit. Check the suit for seam integrity by visually examining the

6.1.4 Records shall be kept for each pressure test even if repairs are being made at the test location.

Caution

Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

B. Totally-encapsulating chemical protective suit qualitative leak test

1.0--Scope

1.1 This practice semi-qualitatively tests gas tight totally-encapsulating chemical protective suit integrity by detecting inward leakage of ammonia vapor. Since no modifications are made to the suit to carry out

[[Page 393]]

this test, the results from this practice provide a realistic test for the integrity of the entire suit.

1.2 Resistance of the suit materials to permeation, penetration, and degradation is not determined by this test method. ASTM test methods are available to test suit materials for these characteristics and the tests are usually conducted by the manufacturers of the suits.

2.0--Definition of terms

2.1 Totally-encapsulated chemical protective suit (TECP suit) means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, legs and respirator; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves, and boots.

2.2 Protective clothing material means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.

2.3 Gas tight means, for the purpose of this test method, the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.

2.4 Intrusion Coefficient means a number expressing the level of protection provided by a gas tight totally-encapsulating chemical protective suit. The intrusion coefficient is calculated by dividing the test room challenge agent concentration by the concentration of challenge agent found inside the suit. The accuracy of the intrusion coefficient is dependent on the challenge agent monitoring methods. The larger the intrusion coefficient the greater the protection provided by the TECP suit.

3.0--Summary of recommended practice

3.1 The volume of concentrated aqueous ammonia solution (ammonia hydroxide NH_4OH) required to generate the test atmosphere is determined using the directions outlined in 6.1. The suit is donned by a person wearing the appropriate respiratory equipment (either a positive pressure self-contained breathing apparatus or a positive pressure supplied air respirator) and worn inside the enclosed test room. The

exhaust of the ammonia test atmosphere after the test(s) are completed.
5.5 Individuals shall be medically screened for the use of respiratory protection and checked for allergies to ammonia before participating in this test procedure.

6.0--Test procedure

6.1.1 Measure the test area to the nearest foot and calculate its volume in cubic feet. Multiply the test area volume by 0.2 milliliters of concentrated aqueous ammonia solution per cubic foot of test area volume to determine the approximate volume of concentrated aqueous ammonia required to generate 1000 ppm in the test area.

6.1.2 Measure this volume from the supply of concentrated aqueous ammonia and place it into a closed plastic container.

6.1.3 Place the container, several high range ammonia detector tubes, and the pump in the clean test pan and locate it near the test area entry door so that the suited individual has easy access to these supplies.

6.2.1 In a non-contaminated atmosphere, open a pre-sealed ammonia indicator strip and fasten one end of the strip to the inside of the suit face shield lens where it can be seen by the wearer. Moisten the indicator strip with distilled water. Care shall be taken not to contaminate the detector part of the indicator paper by touching it. A small piece of masking tape or equivalent should be used to attach the indicator strip to the interior of the suit face shield.

6.2.2 If problems are encountered with this method of attachment, the indicator strip can be attached to the outside of the respirator face piece lens being used during the test.

6.3 Don the respiratory protective device normally used with the suit, and then don the TECP suit to be tested. Check to be sure all openings which are intended to be sealed (zippers, gloves, etc.) are completely sealed. DO NOT, however, plug off any venting valves.

6.4 Step into the enclosed test room such as a closet, bathroom, or test booth, equipped with an exhaust fan. No air should be exhausted from the chamber during the test because this will dilute the ammonia challenge concentrations.

6.5 Open the container with the pre-measured volume of concentrated aqueous ammonia within the enclosed test room, and pour the liquid into the empty plastic test pan. Wait two minutes to allow for adequate volatilization of the concentrated aqueous ammonia. A small mixing fan can be used near the evaporation pan to increase the evaporation rate of the ammonia solution.

6.6 After two minutes a determination of the ammonia concentration within the chamber should be made using the high range colorimetric detector tube. A concentration of 1000 ppm ammonia or greater shall be generated before the exercises are started.

6.7 To test the integrity of the suit the following four minute exercise protocol should be followed:

6.7.1 Raising the arms above the head with at least 15 raising motions completed in one minute.

6.7.2 Walking in place for one minute with at least 15 raising motions of each leg in a one-minute period.

6.7.3 Touching the toes with a least 10 complete motions of the arms from above the head to touching of the toes in a one-minute period.

6.7.4 Knee bends with at least 10 complete standing and squatting motions in a one-minute period.

6.8 If at any time during the test the colorimetric indicating paper should change colors, the test should be stopped and section 6.10 and 6.12 initiated (See 4.2).

Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

APPENDIX 5

MANUFACTURER'S SPECIFICATION OF VAPOR BARRIER

VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

RAVEN
INDUSTRIES

Product Description

VaporBlock® Plus™ 20 is a seven-layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission. VaporBlock® Plus™ 20 is a highly resilient underslab / vertical wall barrier designed to restrict naturally occurring gases such as radon and/or methane from migrating through the ground and concrete slab. VaporBlock® Plus™ 20 is more than 100 times less permeable than typical high-performance polyethylene vapor retarders against Methane, Radon and other harmful VOCs.

VaporBlock® Plus™ 20 is one of the most effective underslab gas barriers in the building industry today far exceeding ASTM E-1745 (Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs) Class A, B and C requirements. Available in a 20 (Class A) mil thicknesses designed to meet the most stringent requirements. VaporBlock® Plus™ 20 is produced within the strict guidelines of our ISO 9001:2008 Certified Management System.

Product Use

VaporBlock® Plus™ 20 resists gas and moisture migration into the building envelop when properly installed to provide protection from toxic/harmful chemicals. It can be installed as part of a passive or active control system extending across the entire building including floors, walls and crawl spaces. When installed as a passive system it is recommended to also include a ventilated system with sump(s) that could be converted to an active control system with properly designed ventilation fans.

VaporBlock® Plus™ 20 works to protect your flooring and other moisture-sensitive furnishings in the building's interior from moisture and water vapor migration, greatly reducing condensation, mold and degradation.

Size & Packaging

VaporBlock® Plus™ 20 is available in 10' x 150' rolls to maximize coverage. All rolls are folded on heavy-duty cores for ease in handling and installation. Other custom sizes with factory welded seams are available based on minimum volume requirements. Installation instructions and ASTM E-1745 classifications accompany each roll.



Under-Slab Vapor/Gas Retarder

Product

Part

VaporBlock Plus 20 VBP 20

APPLICATIONS

Radon Barrier	Under-Slab Vapor Retarder
Methane Barrier	Foundation Wall Vapor Retarder
VOC Barrier	

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier



ISO 9001:2008
CERTIFIED MANAGEMENT SYSTEM

		VAPORBLOCK PLUS 20	
PROPERTIES	TEST METHOD	IMPERIAL	METRIC
APPEARANCE		White/Gold	
THICKNESS, NOMINAL		20 mil	0.51 mm
WEIGHT		102 lbs/MSF	498 g/m ²
CLASSIFICATION	ASTM E 1745	CLASS A, B & C	
TENSILE STRENGTH LBF/IN (N/CM) AVERAGE MD & TD (NEW MATERIAL)	ASTM E 154 Section 9 (D-882)	58 lbf	102 N
IMPACT RESISTANCE	ASTM D 1709	2600 g	
MAXIMUM USE TEMPERATURE		180° F	82° C
MINIMUM USE TEMPERATURE		-70° F	-57° C
PERMEANCE (NEW MATERIAL)	ASTM E 154 Section 7 ASTM E 96 Procedure B	0.0098 Perms grains/(ft ² ·hr·in·Hg)	0.0064 Perms g/(24hr·m ² ·mm Hg)
(AFTER CONDITIONING) PERMS (SAME MEASUREMENT AS ABOVE PERMEANCE)	ASTM E 154 Section 8, E96 Section 11, E96 Section 12, E96 Section 13, E96	0.0079 0.0079 0.0097 0.0113	0.0052 0.0052 0.0064 0.0074
WVTR	ASTM E 96 Procedure B	0.0040 grains/hr·ft ²	0.0028 gm/hr·m ²
RADON DIFFUSION COEFFICIENT	K124/02/95	< 1.1 x 10 ⁻¹³ m ² /s	
METHANE PERMEANCE	ASTM D 1434	< 1.7 x 10 ⁻¹⁰ m ² /d·atm 0.32 GTR (Gas Transmission Rate) ml/m ² ·D·ATM	

VaporBlock® Plus™ Placement

All instructions on architectural or structural drawings should be reviewed and followed.

Detailed installation instructions accompany each roll of VaporBlock® Plus™ and can also be located on our website.

ASTM E-1643 also provides general installation information for vapor retarders.

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VaporBlock® Plus™ is a seven-layer co-extruded barrier made using high quality virgin-grade polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission.

Note: To the best of our knowledge, unless otherwise stated, these are typical property values and are intended as guides only, not as specification limits. Chemical resistance, odor transmission, longevity as well as other performance criteria is not implied or given and actual testing must be performed for applicability in specific applications and/or conditions. RAVEN INDUSTRIES MAKES NO WARRANTIES AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage. Limited Warranty available at www.RavenEFD.com



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1/11 EFD 1125



Scan QR Code to download
current technical data sheets
via the Raven website.

Grace Below Grade Waterproofing

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:

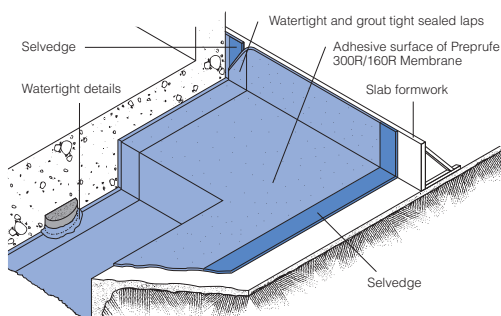
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe 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.



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 selvage 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 selvage. 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 clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvage 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 selvage 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/mm²) 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

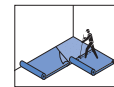
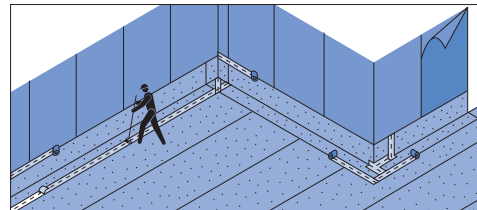
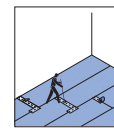


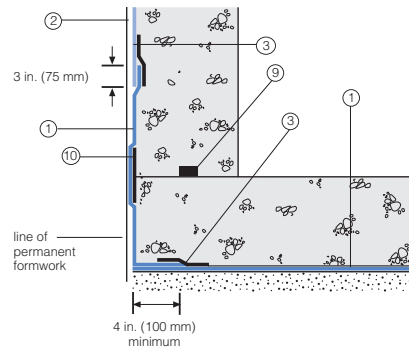
Figure 3



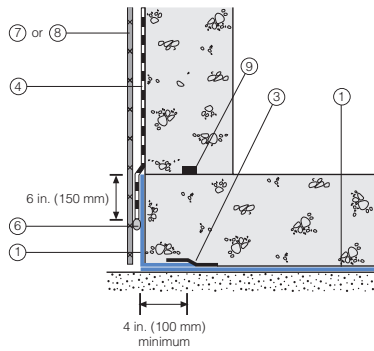
Detail Drawings

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).

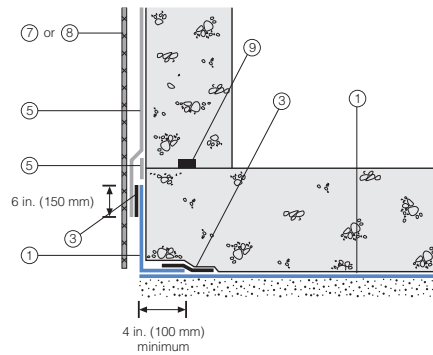
Wall base detail against permanent shutter



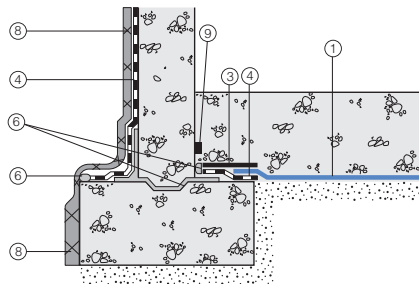
Bituthene wall base detail (Option 1)



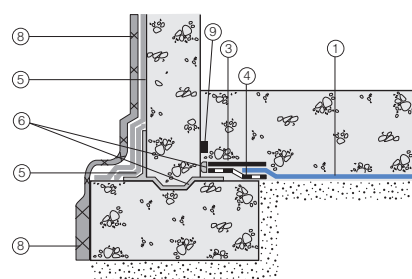
Procor wall base detail (Option 1)



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 ft ² (36 m ²)	460 ft ² (42 m ²)	
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)) 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 m ²))	0.01 perms (0.6 ng/(Pa x s x m ²))	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.

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PF-111H Printed in U.S.A. 07/12

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PREPRUFE®

Structural Waterproofing Solutions

A New World-class Music Center Employs An Innovative Waterproofing Solution



The Green Music Center under construction at Sonoma State University
Rohnert Park, California

When you think of a world-class music center, excellent acoustics and soundproofing may come to mind. With its smart design, the 1,400-seat Green Music Center at Sonoma State University more than meets those requirements. But perhaps surprisingly, one of the most innovative aspects of the concert hall isn't its soundproofing, but its waterproofing system.

That's because while the concert hall entrance sits at ground level, the hall slopes downward, below grade, toward the stage. In addition, several feet of space required for the building's air supply below the floor extend the depth even farther. With a high water table just a few feet below the surface, some clever design and construction was needed – to create both a temporary underground dewatering system during construction, and a long-term waterproofing solution to keep the concert hall dry for years to come.

"We specify Preprufe® and Bituthene® on pretty much all of our projects. It's an easy choice as far as we're concerned, because we've had so much success using Grace waterproofing."

Bill Bussey
A.C. Martin Partners

"We knew that the water table would create a real challenge, so temporary wells were created around the perimeter foundation that collect water for pumping during construction," explained Bill Bussey of A.C. Martin Partners, the architects for the concert hall.

During construction, with the high water table, water pumps were moving thousands of gallons of water per day and operating constantly. With energy and noise concerns, it became apparent that a more efficient long-term solution was needed. As a result, a sub-surface diversion system for the groundwater was created around the perimeter of the entire building.

In addition to the dewatering system, waterproofing was essential to the success of the project. With the guidance of their specialized waterproofing consultants, A.C. Martin Partners specified Grace waterproofing products based on the architectural firm's long-term track record using them in these types of applications. Grace's Preprufe® 300R was utilized in the sump pit, where despite muddy conditions, the pre-applied waterproofing membrane's aggressive pressure-sensitive adhesive formed a tight adhesive bond to the concrete to prevent ingress or migration of water around the structure. To waterproof the exterior basement walls, Bituthene® System 4000 was applied. A pre-formed waterproofing membrane, Bituthene® System 4000 incorporates a super tacky self-adhesive membrane with a latex surface primer to provide a long-term waterproofing solution.

"With the high water table presenting a challenge, a smart solution was proposed that supported our building design and enabled the project to move forward successfully."

Bryce Tanner, Arup

"We're pleased with the overall solution," said Bill Bussey. "The basement is dry with no complaints." To isolate the concert hall from any noise created by the water pumps, the facility is completely sound insulated to



Surrounded by scenic views, the world-class music center rising in Sonoma County.



Managing the site's high water table required some clever design and construction.

ensure the finest acoustics. And now, the entire hall is waterproofed just as effectively.

For all participants in this project, realizing a successful outcome to this unusual waterproofing challenge was music to their ears.

PROJECT CREDITS:

Owner: Sonoma State University, Rohnert Park, CA

Executive Architect: A.C. Martin Partners, Los Angeles, CA

Concert Hall Architect: BAR Architects, San Francisco, CA

Design Architect: William Rawn Associates, Boston, MA

Engineering: Arup, San Francisco, CA

Construction Manager: Rudolph and Sletten, Inc., Redwood City, CA

Waterproofing Installation: Lawson Roofing Company, San Francisco CA

Waterproofing: Grace Construction Products

www.graceconstruction.com

North America Customer Service: 1-866-333-3SBM (3726)

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10/08

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Section 071324 Pre-Applied Sheet Membrane Waterproofing

PART 1 — GENERAL

1.01 SUMMARY

- A. The Work of this Section includes, but is not limited to, pre-applied sheet membrane waterproofing that forms an integral bond to poured concrete for the following applications:
 - 1. Vertical Applications: Membrane applied against soil retention system prior to placement of concrete foundation walls;
 - 2. Horizontal Applications: Membrane applied on prepared subbase prior to placement of concrete slabs.
- B. Related sections include, but are not limited to, the following:
 - 1. Section 031000 - Concrete Forming
 - 2. Section 312000 – Earth Moving
 - 3. Section 031500 – Concrete Accessories
 - 4. Section 031500 – Hydrophilic Waterstop
 - 5. Section 316200 - Driven Piles
 - 6. Section 316400 - Caissons
 - 1. Section 032000 - Concrete Reinforcing
 - 2. Section 033000 – Cast-In-Place Concrete

NOTE TO SPECIFIER: For vertical applications, coordinate with concrete formwork section to require one-sided wall forming system to minimize punctures to the sheet membrane waterproofing during formwork installation.

1.02 SUBMITTALS

- A. Submit manufacturer's product data, installation instructions and membrane samples for approval.

1.03 REFERENCE STANDARDS

- A. The following standards and publications are applicable to the extent referenced in the text.
- B. American Society for Testing and Materials (ASTM):
 - C 836 Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
 - D 412 Standard Test Methods for Rubber Properties in Tension
 - D 570 Standard Test Method for Water Absorption of Plastics
 - D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 - D 1876 Standard Test Method for Peel Release of Adhesives (T-Peel)
 - D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection

- D 3767 Standard Practice for Rubber - Measurements of Dimensions
- D 5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
- E 96 Standard Test Methods for Water Vapor Transmission of Materials
- E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.04 QUALITY ASSURANCE

- A. Manufacturer: Sheet membrane waterproofing system shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past 5 years.
- B. Installer: A firm which has at least 3 years experience in work of the type required by this section.
- C. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.
- D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.
- E. Schedule Coordination: Schedule work such that membrane will not be left exposed to weather for longer than that recommended by the manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's instructions. Protect from damage from weather, excessive temperature and construction operations. Remove and dispose of damaged material in accordance with applicable regulations.

1.06 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

1.07 WARRANTY

- A. Sheet Membrane Waterproofing: Provide written five year material warranty issued by the membrane manufacturer upon completion of work.

PART 2 — PRODUCTS

2.01 MATERIALS

- A. Pre-applied Integrally Bonded Sheet Waterproofing Membrane: Preprufe® 300R Membrane [or Preprufe 300LT Membrane for application temperatures between 25°F (-4°C) and 60°F (+16°C)] by Grace Construction Products, a 1.2mm (0.046 in) nominal thickness composite sheet membrane comprising 0.8 mm (0.030 in.) of high density polyethylene film, and layers of specially formulated synthetic adhesive layers. The membrane shall form an integral and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

NOTE TO SPECIFIER: Preprufe 300R and Preprufe 300LT can both be installed at temperatures 25°F (-4°C) and above. For temperatures 25°F (-4°C) to 55°F (13°C) Grace Technical Bulletin #16 states the use of Preprufe LT Tape is recommended at all sidelaps when using Preprufe 300R. Alternatively, contractors may elect the use of Preprufe 300LT which does not require the use of Preprufe LT Tape at sidelaps in temperature ranges 25°F (-4°C) to 55°F (13°C). For this reason, Grace suggests that both products be incorporated into the specification.

PHYSICAL PROPERTIES FOR PREPRUFE 300R (or 300LT) MEMBRANE:

Property	Test Method	Typical Value
Color		White
Thickness	ASTM D 3767 Method A	1.2 mm (0.046 in.) nominal
Lateral Water Migration Resistance	ASTM D 5385 Modified ¹	Pass at 71 m (231 ft) of hydrostatic head pressure
Low Temperature Flexibility	ASTM D 1970	Unaffected at -29°C (-20°F)
Elongation	ASTM D 412 Modified ²	500%
Crack Cycling at -23°C (-9.4°F), 100 Cycles	ASTM C 836	Unaffected, Pass
Tensile Strength, film	ASTM D 412	27.6 MPa (4,000 lbs/in. ²)
Peel Adhesion to Concrete	ASTM D 903 Modified ³	880 N/m (5.0 lbs/in.)
Lap Adhesion	ASTM D 1876 Modified ⁴	880 N/m (5.0 lbs/in.)
Resistance to Hydrostatic Head	ASTM D 5385 Modified ⁵	71 m (231 ft)
Puncture Resistance	ASTM E 154	990 N (221 lbs)
Permeance	ASTM E 96 Method B	0.6 ng/Pa × s × m ² (0.01 perms)
Water Absorption	ASTM D 570	0.5%

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 blind side waterproofing membrane. A hydrostatic head pressure of 71 m (231 ft) of water is the limit of the apparatus.
2. Elongation of membrane is run at a rate of 50 mm (2 in.) per minute.
3. Concrete is cast against the protective coating surface of the membrane and allowed to cure (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm (2 in.) per minute at room temperature.
4. The test is conducted 15 minutes after the lap is formed as per manufacturer's instructions and run at a rate of 50 mm (2 in.) per minute.
5. Hydrostatic head tests are performed by casting concrete against the membrane with a lap. Before the concrete sets a 3 mm (0.125 in.) 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 a head of 71 m (231 ft) of water which is the limit of the apparatus.

- B. Pre-applied Integrally Bonded Sheet Waterproofing Membrane: Preprufe® 160R Membrane [or Preprufe 160LT Membrane for application temperatures between 25°F (-4°C) and 60°F (+16°C)] by Grace Construction Products, a 1.0mm (0.032 in.) nominal thickness composite sheet membrane comprising 0.4 mm (0.016 in.) of high density polyethylene film, and layers of specially formulated synthetic adhesive layers. The membrane shall form an integral and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

NOTE TO SPECIFIER: Preprufe 160R and Preprufe 160LT can both be installed at temperatures 25°F (-4°C) and above. For temperatures 25°F (-4°C) to 55°F (13°C) Grace Technical Bulletin #16 states the use of Preprufe LT Tape is recommended at all sidelaps when using Preprufe 160R. Alternatively, contractors may elect the use of Preprufe 160LT which does not require the use of Preprufe LT Tape at sidelaps in temperature ranges 25°F (-4°C) to 55°F (13°C). For this reason, Grace suggests that both products be incorporated into the specification.

PHYSICAL PROPERTIES FOR PREPRUFE 160R (or 160LT) MEMBRANE:

Property	Test Method	Typical Value
Color		White
Thickness	ASTM D 3767 Method A	1.0 mm (0.032 in.) nominal
Lateral Water Migration Resistance	ASTM D5385, Modified ¹	Pass at 71 m (231 ft) of hydrostatic head pressure
Low Temperature Flexibility	ASTM D 1970	Unaffected at -29°C (-20°F)
Elongation	ASTM D 412 Modified ²	500%
Crack Cycling at -23°C (-9.4°F), 100 Cycles	ASTM C 836	Unaffected, Pass
Tensile Strength, film	ASTM D 412	27.6 MPa (4,000 lbs/in. ²)
Peel Adhesion to Concrete	ASTM D 903 Modified ³	880 N/m (5.0 lbs/in.)
Lap Adhesion	ASTM D 1876 Modified ⁴	880 N/m (5.0 lbs/in.)
Resistance to Hydrostatic Head	ASTM D 5385 Modified ⁵	Pass at 71 m (231 ft)
Puncture Resistance	ASTM E 154	445 N (100 lbs)
Permeance	ASTM E 96 Method B	0.6 ng/Pa × s × m ² (0.01 perms)
Water Absorption	ASTM D 570	0.5%

Footnotes:

- 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 blind side waterproofing membrane. A hydrostatic head pressure of 71 m (231 ft) of water is the limit of the apparatus.*
- Elongation of membrane is run at a rate of 50 mm (2 in.) per minute.*
- Concrete is cast against the protective coating surface of the membrane and allowed to cure (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm (2 in.) per minute at room temperature.*
- The test is conducted 15 minutes after the lap is formed as per manufacturer's instructions and run at a rate of 50 mm (2 in.) per minute.*
- Hydrostatic head tests are performed by casting concrete against the membrane with a lap. Before the concrete sets a 3 mm (0.125 in.) 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 a head of 71 m (231 ft) of water which is the limit of the apparatus.*

- C. Waterstop: Adcor™ ES hydrophilic non-bentonite waterstop by Grace Construction Products for non-moving concrete construction joints.

PHYSICAL PROPERTIES FOR GRACE ADCOR™ ES HYDROPHYLIC WATERSTOP:

Property	Typical Value
Color	Green
Size	1.0 in. x ½ in. x 16 ft. rolls (25.4 mm x 12.7 mm x 4.9 m)
Hydrostatic Head Resistance	70 m (231 ft)
Wet - Dry Cycling [25 Cycles @ 231 ft. (70 m)]	No Effect
Adhesion to Concrete using Adcor ES Adhesive	Excellent

- D. Preformed Soil Retention Wall Tieback Cover: Preprufe Tieback Cover by Grace Construction Products as a prefabricated detail for soil retention wall tiebacks.
- E. Preformed Inside and Outside Corners: Preprufe Preformed Corners by Grace Construction Products as prefabricated inside and outside corners.
- F. Tape for covering cut edges, roll ends, penetrations and detailing: Preprufe Tape LT (for temperatures between 25°F (-4°C) and 86°F (+30°C)) and Preprufe Tape HC (for use in Hot Climates, minimum 50°F (10°C))
- G. Miscellaneous Materials: accessories specified or acceptable to manufacturer of pre-applied waterproofing membrane.

PART 3 — EXECUTION

3.01 EXECUTION

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 SUBSTRATE PREPARATION

- A. 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.
1. Horizontal Surfaces - 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.
 2. Vertical Surfaces - 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.

3.03 INSTALLATION, HORIZONTAL APPLICATIONS

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
 - 1. 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.
 - 2. Leave the plastic release liner in position until overlap procedure is completed.
 - 3. 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.
 - 4. 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.
 - 5. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

3.04 INSTALLATION, VERTICAL APPLICATIONS

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
 - 1. Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length.
 - 2. Fastening through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps.
 - 3. Immediately remove the plastic release liner.
 - 4. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap.
 - 5. Roll firmly to ensure a watertight seal.
 - 6. 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.
 - 7. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap edges and roll firmly.
 - 8. Immediately remove printed plastic release liner from the tape.

3.05 WATERSTOP INSTALLATION

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
 - 1. Secure Adcor ES using masonry nails 1½ in. - 2 in. (40 mm – 50 mm) long with a washer ¾ in. (20 mm) in diameter. Hilti EM6-20-12 FP8 shot fired fixings with ¼ in. (6 mm) nuts and ¾ in. (20 mm) diameter washers may also be used. Fixings should be spaced at a maximum of 12 in. (300 mm) centers with a minimum spacing that ensures proper contact to substrate.
 - 2. On irregular concrete faces, or on vertical surfaces, apply a ½ in. (12 mm) bead of Adcor ES Adhesive as bedding for Adcor ES.

3. Adcor ES joints should overlap a minimum of 4 in. (100 mm), ensuring full contact between jointed pieces.

3.06 PROTECTION

- A. Protect membrane in accordance with manufacturer's recommendations until placement of concrete. Inspect for damage just prior to placement of concrete and make repairs in accordance with manufacturer's recommendations.

END OF SECTION

W.R. Grace & Co.-Conn. 62 Whittemore Avenue Cambridge, MA 02140

Preprufe and Hydroduct 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, W. R. Grace & Co. Canada, Ltd. 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

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March 7, 2018

New York City Office of Environmental Remediation
City Voluntary Cleanup Program
c/o Shaminder Chawla
100 Gold Street, 2nd Floor
New York, NY 10038

Re: VCP # 17CVCP044Q
[E-Designation # 17EH-N076Q
148-28 Hillside Avenue, Jamaica, NY 11435
Remedial Action Work Plan (RAWP) Stipulation List

Dear Mr. Chawla:

Advanced Cleanup Technologies, Inc. hereby submits a Remedial Action Plan (RAWP) Stipulation List for the Site to the New York City Office of Environmental Remediation (OER) on behalf of Chung Lam. This letter serves as an addendum to the RAWP to stipulate additional content, requirements, and procedures that will be followed during the site remediation. The contents of this list are added to the RAWP and will supersede the content in the RAWP where there is a conflict in purpose or intent. The additional requirements/procedures include the following Stipulation List below:

1. The criterion attached in **Appendix 1** will be utilized if additional petroleum containing tank or vessel is identified during the remedial action or subsequent redevelopment excavation activities. All petroleum spills will be reported to the NYSDEC hotline as required by applicable laws and regulations. This contingency plan is designed for heating oil tanks and other small or moderately sized storage vessels. If larger tanks, such as gasoline storage tanks are identified, OER will be notified before this criterion is utilized.
2. A pre-construction meeting is required prior to start of remedial excavation work at the site. A pre-construction meeting will be held at the site and will be attended by OER, the developer or developer representative, the consultant, excavation/general contractor, and if applicable, the soil broker.



3. A Historic Fill Transfer and Disposal Notification Form to each disposal facility and a pre-approval letter from all disposal facilities will be provided to OER prior to any soil/fill material removal from the site. The Historic Fill Transfer and Disposal Notification Form template is attached in **Appendix 2**. Documentation specified in the RAWP - Appendix 3 - Section 1.6 “Materials Disposal Off-Site” will be provided to OER. If a different disposal facility for the soil/fill material is selected, OER will be notified immediately.
4. Signage for the project will include a sturdy placard mounted in a publically accessible right of way to building and other permits signage will consist of the NYC VCP Information Sheet (attached **Appendix 3**) announcing the remedial action. The Information sheet will be laminated and permanently affixed to the placard.
5. If the site contains hazardous waste that will be excavated and disposed of offsite, OER will work with the development team to seek an exemption for the property from the state Hazardous Waste Program Fee (\$130/ton) and Special Assessment on Hazardous Waste (up to \$27/ton). To qualify for an exemption, the site must be enrolled in the city Voluntary Cleanup Program; hazardous waste must result from remedial action set forth in a cleanup plan approved by OER; and OER must oversee the cleanup. It is the applicant’s responsibility to notify the OER Project Manager, copying the supervising Project Manager and OER Deputy Director Shaminder Chawla, before hazardous waste is shipped from the site. Unless the Department of Environmental Conservation is notified before waste is shipped from the site, the project may not receive an exemption from the fee. This exemption does not cover, and the project remains responsible for, a Hazardous Waste Annual Report to be filed with DEC and Quarterly Returns for Special Assessments on Hazardous Waste to be filed with the state Department of Taxation and Finance. **Appendix 4** includes additional information about the exemption from the Hazardous Waste Program Fee and the Special Assessment on Hazardous Waste.
6. Collection and analysis of 8 end-point samples from the bottom of the excavation to evaluate the performance of the remedy with respect to attainment of Track 4 SCO. A map indicating end-point sampling locations is attached in **Appendix 5**. Samples will be analyzed for contaminants of concern [VOCs, SVOCs, TAL Metals, PCBs, and Pesticides]. One end-point sample (EP-3) will be collected to verify removal of a PCE hotspot. The hotspot end-point sample will be analyzed for VOCs.
7. OER requires parties seeking City Brownfield Incentive Grants to carry insurance. For a cleanup grant, both the excavator and the trucking firm(s) that handle removal of soil must carry or be covered under a commercial general liability (CGL) policy that provides \$1 million per claim in coverage. OER recommends that excavators and truckers also carry contractors pollution liability (CPL) coverage, also providing \$1 million per claim in coverage. The CGL policy, and the CPL policy if obtained, must name the City of New York, the NYC Economic Development Corporation, and Brownfield Redevelopment Solutions as additional insureds, and be in force during the period when the party excavates and disposes of soil. For an investigation grant, an environmental consultant must be a qualified vendor in the BIG program and carry \$1 million of



8. professional liability (PL) coverage. A fact sheet regarding insurance is attached as **Appendix 6**.
9. Monthly reports are required on the project's status and schedule to the OER project manager after RAWP/RAP is approved/NTP issued until Remedial Action Report/Remedial Closure Report is received. This is your (Environmental Consultant's) responsibility to provide this report. If you (environmental consultant) are no longer retained for continuation of project, you are required to notify OER about this. After excavation work is completed, monthly reports are still required and will be provided by the consultant or owner/developer for the duration of the construction period. Monthly report template is attached in **Appendix 8**.
10. Daily reports will be provided during active excavation work. If no work is performed for extended time period, daily report frequency will be reduced to weekly basis. Daily report template is attached in **Appendix 7**.
11. Trucking log sheets will be utilized as trucks are transported from sites, and completed logs should be attached to the Remedial Action Report (RAR) as an appendix. The goal of this log is to clearly document the destination of material leaving the site, the parties responsible for its transfer, and other pertinent details. The trucking log template is provided in **Appendix 9**.
12. A 20-mil Vaporblock Plus vapor barrier manufactured by Raven Industries will be installed beneath the structure's slab and a 1.2 mm nominal thickness Preprufe® Model numbers 300R and 160R blindside waterproofing system manufactured by Grace Construction Products will be installed along foundation sidewalls. **Appendix 10** provides manufactures specifications and PE/RA certified building plans with the extent of the vapor barrier installation details (penetrations, joints, etc.) with respect to the proposed foundation, footings, etc.
13. An engineered composite site cover will be placed over the entire footprint of the Site. The composite cover system will be comprised of concrete foundation/slabs. Drawings of the composite site cover are provided as **Appendix 11**.
14. Drawings of the active SSDS to be installed beneath the proposed building are provided as **Appendix 12**.
15. Truck route is included in **Appendix 13**.
16. Dewatering will be performed in full compliance with applicable laws, rules and regulations. Dewatering permit will be obtained from NYCDEP prior to construction activities.
17. The signed RIR certification page and stamped/signed RAWP certification page is included in **Appendix 14**.
18. Development plans are attached in **Appendix 15**.



19. If there is active SSDS, a post construction meeting is required with consultant, developer and building superintendent.

Sincerely,

Paul P. Stewart, QEP

Cc: Anna Brooks, NYCOER

Appendix 1

Generic Procedures for Management of Underground Storage Tanks Identified under the NYC VCP

Prior to Tank removal, the following procedures should be followed:

- Remove all fluid to its lowest draw-off point.
- Drain and flush piping into the tank.
- Vacuum out the “tank bottom” consisting of water product and sludge.
- Dig down to the top of the tank and expose the upper half.
- Remove the fill tube and disconnect the fill, gauge, product, vent lines and pumps. Cap and plug open ends of lines.
- Temporarily plug all tank openings, complete the excavation, remove the tank and place it in a secure location.
- Render the tank safe and check the tank atmosphere to ensure that petroleum vapors have been satisfactorily purged from the tank.
- Clean tank or remove to storage yard for cleaning.
- If the tank is to be moved, it must be transported by licensed waste transporter. Plug and cap all holes prior to transport leaving a 1/8 inch vent hole located at the top of the tank during transport.
- After cleaning, the tank must be made acceptable for disposal at a scrap yard, cleaning the tanks interior with a high pressure rinse and cutting the tank in several pieces.

During the tank and pipe line removal, the following field observations should be made and recorded:

- A description and photographic documentation of the tank and pipe line condition (pitting, holes, staining, leak points, evidence of repairs, etc.).
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.).
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation, with a calibrated photoionization detector (PID).

Impacted Soil Excavation Methods

The excavation of the impacted soil will be performed following the removal of the existing tanks. Soil excavation will be performed in accordance with the procedures described under Section 5.5 of Draft DER-10 as follows:

- A description and photographic documentation of the excavation.
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.).
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation, with calibrated photoionization detector (PID).

Final excavation depth, length, and width will be determined in the field, and will depend on the horizontal and vertical extent of contaminated soils as identified through physical examination (PID response, odor, staining, etc.). Collection of verification samples will be performed to evaluate the success of the removal action as specified in this document.

The following procedure will be used for the excavation of impacted soil (as necessary and appropriate):

- Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.

- Prior to excavation, ensure that the area is clear of utility lines or other obstructions. Lay plastic sheeting on the ground next to the area to be excavated.
- Using a rubber-tired backhoe or track mounted excavator, remove overburden soils and stockpile, or dispose of, separate from the impacted soil.
- If additional UST's are discovered, the NYSDEC will be notified and the best course of action to remove the structure should be determined in the field. This may involve the continued trenching around the perimeter to minimize its disturbance.
- If physically contaminated soil is present (e.g., staining, odors, sheen, PID response, etc.) an attempt will be made to remove it, to the extent not limited by the site boundaries or the bedrock surface. If possible, physically impacted soil will be removed using the backhoe or excavator, segregated from clean soils and overburden, and staged on separated dedicated plastic sheeting or live loaded into trucks from the disposal facility. Removal of the impacted soils will continue until visibly clean material is encountered and monitoring instruments indicate that no contaminants are present.
- Excavated soils which are temporarily stockpiled on-site will be covered with tarp material while disposal options are determined. Tarp will be checked on a daily basis and replaced, repaired or adjusted as needed to provide full coverage. The sheeting will be shaped and secured in such a manner as to drain runoff and direct it toward the interior of the property.

Once the site representative and regulatory personnel are satisfied with the removal effort, verification of confirmatory samples will be collected from the excavation in accordance with DER-10.

Appendix 2
Historic Fill Transfer and Disposal Notification Form

Historic Fill & Soil Disposal Notification Form
New York City Office of Environmental Remediation

Date: March 7, 2018

To operators and representatives of disposal facilities and government regulators:

The New York City Office of Environmental Remediation (OER) operates several environmental remediation regulatory programs in New York City that manage light to moderately contaminated properties that are planned for redevelopment. These projects commonly involve the removal of historical fill and soil from properties for development and other purposes. As with any environmental regulatory program, lawful transport and disposal of historic fill and soil is mandatory. It is also our highest priority.

Disposal facilities, recycling facilities and clean fill facilities (collectively, “receiving facilities”) for historic fill and soil may be located in New York or neighboring states. Our research has indicated that a wide range of facility types and a complex set of regulatory requirements and obligations for a receiving facility operation exist within each jurisdiction. Receiving facilities are required to comply with applicable laws and regulations and may operate under state and local authority via permits, licenses, registrations, agreements and other legal instruments that dictate requirements for the material they can receive. Operating requirements may include adherence to applicable chemical standards, guidance levels, criteria, policy or other bases to determine the suitability for receipt of historical fill or soil at a receiving facility. Such requirements may also specify sample frequency, location, sampling method, chemical analytes, or analytical methods. Receiving facility soil/fill sampling requirements often differ from standard remedial investigation protocol performed in the original environmental study of the property.

Given the variability of data requirements for receiving facilities, the wide range of receiving facility types, and the complexity of regulatory requirements and obligations, OER is seeking to assist government regulators and facility operators and their technical representatives to achieve compliance with regulatory requirements for disposal of historic fill and soil at receiving facilities for projects we administer. Further, we seek to ensure that all of the data and information that is developed in OER’s regulatory programs (for instance, site environmental history and soil chemistry) is available to government regulators and to facility managers when making decisions on suitability for disposal to a receiving facility.

This document provides formal notification from OER of the availability of environmental information regarding the physical and chemical content of historical fill and soil that is proposed for transfer to a disposal, recycling or clean fill facility from a property located at:

148-28 Hillside Avenue, Queens, New York
OER Site 17CVCP044Q

The above referenced property has undergone regulated environmental investigation and is the subject of remedial action work plan under the authority of OER. All environmental data and information generated during this regulatory process is available online in OER’s Document Repository listed below. Be advised that many properties are also regulated under state environmental law, and additional data may be available from state agencies. OER reserves the right to share this information with applicable state regulators.

<http://www.nyc.gov/html/oer/html/document-repository/document-repository.shtml>

Note: when logged on to above URL, select the borough for the site (listed in the address above) and scroll through the list and select the address for the site (listed above). All documents are available in PDF format.

According to New York State DER-10 Technical Guidance for Site Investigation and Remediation, historical fill is non-indigenous fill material deposited on a property to raise its topographic elevation. The origin of historical fill is unknown but it is commonly known to contain ash from wood and coal combustion, slag, clinker, construction debris, dredge spoils, incinerator residue, and demolition debris. Historic fill is a regulated solid waste in the State of New York. Prior to making a determination regarding the suitability of historic fill and/or soil from this property for disposal at this receiving

facility, **we strongly recommend that you review all of the data and information available for this property in our Document Repository** listed above. The repository includes:

- A Phase 1 history of use of the property;
- A Remedial Investigation Report for the property which includes:
 - Boring logs that describe physical observations of the historical fill material made by a trained environmental professional;
 - Chemical data for grab samples of historical fill collected during the remedial investigation;
- A Remedial Action Work Plan for the property.

If you have any questions, please contact Horace Zhang at (212) 788-8484 or H Zhang@dep.nyc.gov for more information.

Appendix 3
NYC VCP Signage



NYC Voluntary Cleanup Program

148-28 Hillside Avenue, Queens, New York
Site No: 17CVCP044Q

This property is enrolled in the New York City Voluntary Cleanup Program for environmental remediation. This is a voluntary program administered by the NYC Office of Environmental Remediation.

For more information,
log on to: www.nyc.gov/oer

Or scan with smart phone:



If you have questions or would like more information,
please contact:

Shaminder Chawla at (212) 442-3007
or email us at brownfields@cityhall.nyc.gov

Appendix 4
Hazardous Waste Exemptions Fact Sheet



**Exemptions from the state
Hazardous Waste Program
Fee & Special Assessment**

If your site is enrolled in the city Voluntary Cleanup Program (VCP) and contains hazardous waste that will be excavated and disposed of offsite, OER can work with your development team to exempt your property from the \$130/ton state Hazardous Waste Program Fee and the Special Assessment on Hazardous Waste.

Exemption from the Hazardous Waste Program Fee

To qualify for an exemption from the Hazardous Waste Program Fee:

1. A site must be enrolled in the city Voluntary Cleanup Program;
2. Hazardous waste must result from remedial action set forth in a cleanup plan approved by OER; and
3. OER must oversee the cleanup.

Process for obtaining a Hazardous Waste Program Fee exemption:

For each VCP site, OER will submit three certifications to the New York State Department of Environmental Conservation (DEC):

1. OER will prepare a Notice of Potential Generation of Hazardous Waste after a soil test shows a site contains hazardous waste. To prepare this Notice, you must provide your OER project manager with:

- the site's EPA generator ID number;
- the date of the soil test confirming hazardous waste;
- the quantity of hazardous waste, in tons, anticipated to be shipped; and
- the anticipated dates for the start and completion of remediation.

**For further information,
please contact:**

Michelle Sarro
Assistant General Counsel
(212) 341-2015
MSarro@dep.nyc.gov

DEC must receive this form **before** hazardous waste is shipped from your site. Otherwise, your claim for an exemption may be denied.

2. After hazardous waste has been removed from the site, you must notify your OER project manager that removal is complete. OER will then distribute a Certification of Hazardous Waste Generation to your project team which, when filled out, documents how the hazardous waste was managed. Once completed, it must be signed by the generator (or site owner) and the site's Qualified Environmental Professional and returned to your OER project manager with a copy to Michelle Sarro, msarro@dep.nyc.gov.

Upon receipt of the Certification of Hazardous Waste Generation, OER will issue a **\$10/ton fee** for services to obtain the exemption from the state Hazardous Waste Program Fee.

3. OER will then issue a Certification of Remedial Action that Generated Hazardous Waste to DEC representing OER's approval of how a site managed its hazardous waste.

DEC will make its determination after receiving the last two certifications. OER will then notify the project of the exemption.

Exemption from the Special Assessment on Hazardous Waste

VCP sites are also eligible for an exemption from the Special Assessment on Hazardous Waste, which can cost projects up to \$27/ton.

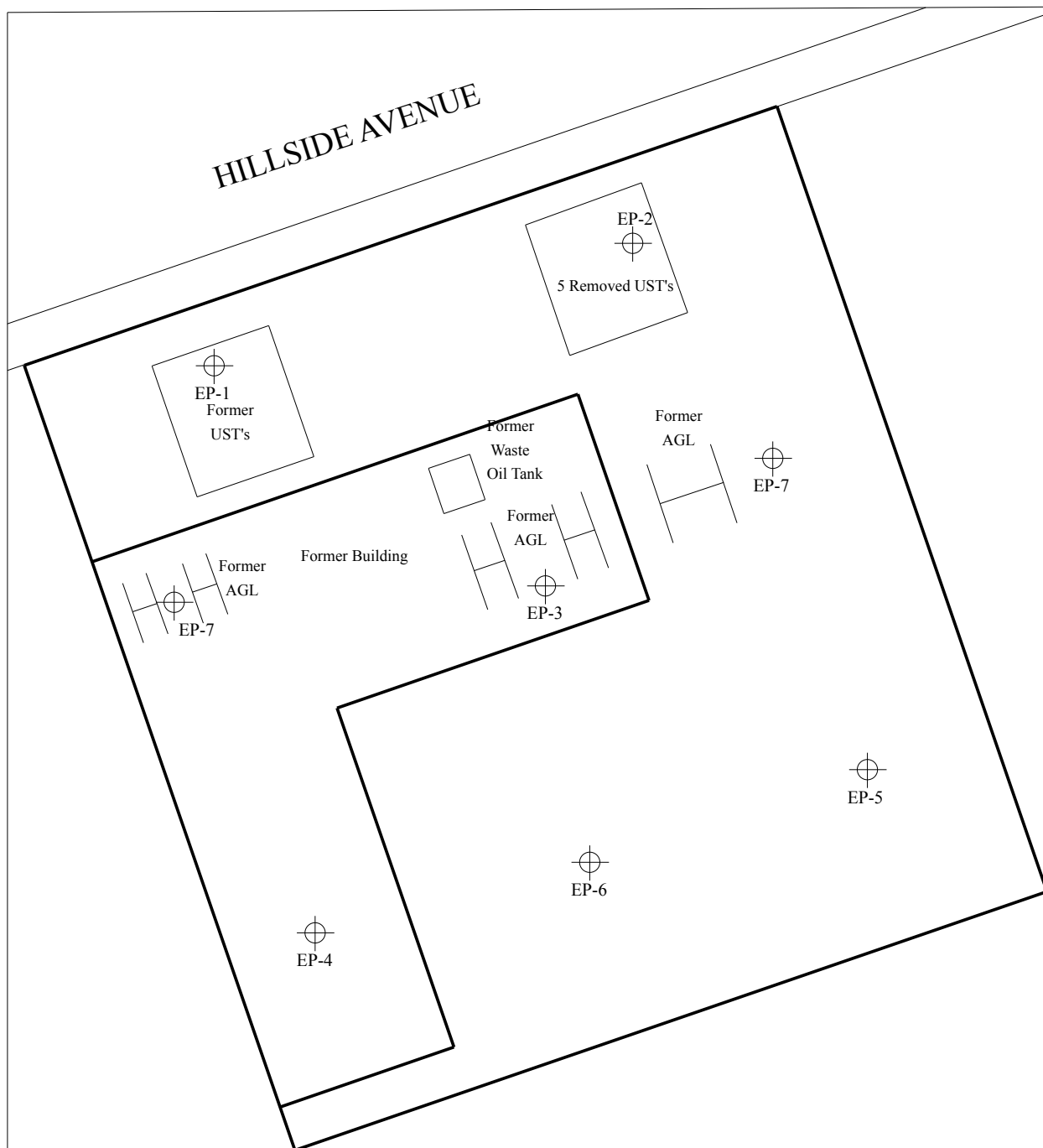
It is advised that you assert your interest in obtaining the Special Assessment exemption when you file a TP-550 Quarterly Return for Special Assessments on Hazardous Waste Generated in New York State form with the state Department of Taxation and Finance within 20 days of the end of the calendar quarter in which the waste was generated. In line item 3 on the form, indicate the number of tons of hazardous waste that were generated in New York State under an order of, or agreement or contract with, DEC. For access to the TP-550 form and further instructions see <http://www.tax.ny.gov/bus/haz/hzrdwste.htm>.

Ongoing Obligations

Regardless of the exemptions from the Hazardous Waste Program Fee and Special Assessment on Hazardous Waste, parties must:

- File a Hazardous Waste Annual Report with DEC by March 1 of each year if your site generated 15 tons or more of hazardous waste in the prior calendar year. For details, see <http://www.dec.ny.gov/chemical/8770.html>. To set forth the basis for an exemption from the Hazardous Waste Program Fee, put an X in the Exempt Remedial box in Box H of Section 1 of the Waste Generation and Management (GM) form and in the Comments Box (at the bottom of the form) include "New York City Voluntary Cleanup Program, VCP Site Number _____"; and
- File a TP-550 Quarterly Return for Special Assessments on Hazardous Waste Generated in New York State form with the state Department of Taxation and Finance within 20 days of the end of the calendar quarter in which the waste was generated. For access to the TP-550 form and further instructions see <http://www.tax.ny.gov/bus/haz/hzrdwste.htm>.

Appendix 5
End-Point Sampling Map



Legend



EP-1

Proposed Endpoint Sample Locations



Endpoint Sample Locations	
	
110 Main Street, Suite 103, Port Washington, New York 11050 Tel: 516-441-5800 Fax: 516-441-5511	
Project No.: 8346-JANY	Figure No.: 5
Date: 03/07/2018	Scale: Not To Scale

Appendix 6
BIG Program Insurance Fact Sheet



FACT SHEET – BIG PROGRAM INSURANCE REQUIREMENTS

Investigation Grants – for a developer or site owner to be eligible for a BIG investigation grant, its environmental consultant(s) must be:

- a Qualified Vendor in the BIG Program; and
- maintain Professional Liability (PL) insurance of \$1M per claim and annual aggregate.

Cleanup Grants – for a developer or site owner to be eligible for a BIG cleanup grant:

- Its general contractor or excavation/foundation contractor hired to perform remedial work must maintain Commercial General Liability (CGL) insurance of at least \$1M per occurrence and \$2M in the general aggregate. It is recommended that the general contractor or excavation/foundation contractor also maintain a Contractors Pollution Liability policy (CPL) of at least \$1M per occurrence.
- Its subcontractors who are hired by the general contractor etc. to perform remedial work at a site, including soil brokers and truckers, must also maintain a CGL policy in the amount and with the terms set forth above. It is recommended that subcontractors also maintain a CPL policy in the amount and with the terms set forth above.

The CGL policy, and the CPL policy if in force, must list the city, EDC and BRS as additional insureds, include completed operations coverage and be primary and non-contributory to any other insurance the additional insureds may have.

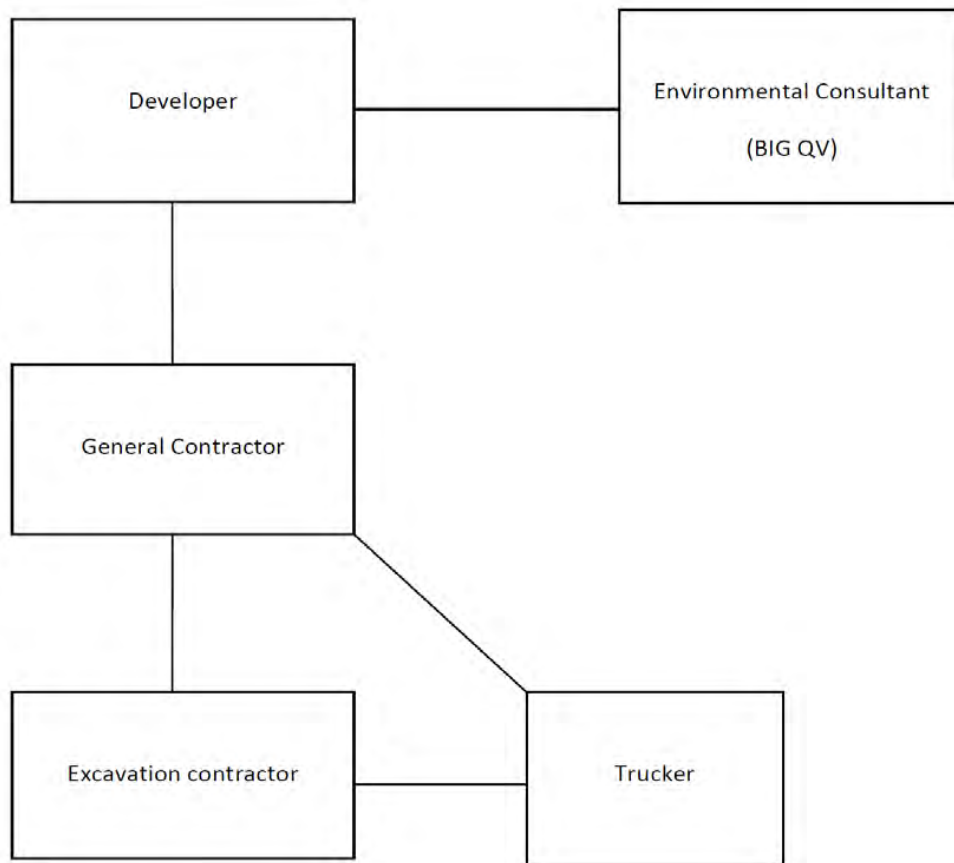
- Its environmental consultant(s) hired to oversee the cleanup must be:
 - a. a BIG Qualified Vendor; and
 - b. maintain Professional Liability (PL) insurance of \$1M per claim and annual aggregate.

If, in the alternative, the developer hires its environmental consultant to perform the cleanup, the environmental consultant must maintain CGL insurance in the amount and with the terms set forth above. It is recommended that the environmental consultant also maintain CPL coverage in the amount and with the terms set forth in the first two bulleted items listed above.

A schematic presenting the contractual relationships described above appears on page 2. Parties who must be named as Additional Insureds on Cleanup Grant insurance policies (CGL and CPL) are presented on page 3.

Example of Contractual Relationships for Cleanup Work

The Office of Environmental Remediation's Voluntary Cleanup Plan program requires applicants to identify the parties who are engaged in active remediation of their sites including: the General Contractor hired to remediate and/or the excavation contractor hired to excavate soil from the site and the trucking firm(s) that remove soil from the site for disposal at approved facilit(ies).



The chart above shows contractual relationships that typically exist for projects that are enrolled in the Voluntary Cleanup Program.

BIG Program Additional Insureds

The full names and addresses of the additional insureds required under the Required CGL Policy and recommended CPL Policy are as follows:

“City and its officials and employees”

New York City Mayor’s Office of Environmental Remediation
253 Broadway, 14th Floor
New York, NY 10007

“NYC EDC and its officials and employees”

New York City Economic Development Corporation
110 William Street
New York, NY 10038

“BIG Grant Administrator and its officials and employees”

Brownfield Redevelopment Solutions, Inc.
739 Stokes Road, Units A & B
Medford, NJ 08055

Appendix 7
Daily Report Template



Daily Status Report Template Version 1.4

Generic Template for Daily Status Report

Instructions

The Daily Status Report submitted to OER should adhere to the following conventions:

- Remove this cover sheet prior to editing.
- Remove all the **red text** and replace with site-specific information.
- Submit the final version as a Word or PDF file.

Daily Status Reports

Daily status reports providing a general summary of activities for each day of *active remedial work* will be emailed to the OER Project Manager by the end of the following day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP excursions, if any;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

DAILY STATUS REPORTPrepared By: Enter Your Name Here

WEATHER	Snow		Rain		Overcast		Partly Cloudy	X	Bright Sun	
TEMP.	< 32		32-50		50-70	X	70-85		>85	

VCP Project No.:	16CVCP000M	E-Number Project No.:	16EHAN000M	Date:	01/01/2016
Project Name:	Name or Address				

Consultant: Person(s) Name and Company Name	Safety Officer: Person(s) Name and Company Name
General Contractor: Person(s) Name and Company Name	Site Manager/ Supervisor: Person(s) Name and Company Name
Work Activities Performed (Since Last Report): Provide details about the work activities performed.	
Working In Grid #: A1, B1, C1	
Samples Collected (Since Last Report): No samples collected or provide details	
Air Monitoring (Since Last Report): No air monitoring performed or provide details Prestart Conditions – PID = 0.0 ppm, Dust = 0.000 High Conditions – PID = 0.0 ppm, Dust = 0.000	
Problems Encountered: No problems encountered or provide details	
Planned Activities for the Next Day/ Week: Provide details about the work activities planned for the next day/ week.	

Example:

Facility # Name/ Location Type of Waste Solid <u>Or</u> Liquid	Facility # Name Location Type of Waste Solid <u>Or</u> Liquid		Facility # Name Location Type of Waste Solid <u>Or</u> Liquid		Facility # Name Location Type of Waste Solid <u>Or</u> Liquid		Facility # Name Location Type of Waste Solid <u>Or</u> Liquid		##### ABC Facility New York, NY petroleum soils Solid	
(Trucks, Cu.Yds. <u>Or</u> Gallons)	Trucks	Cu. Yds. <u>Or</u> Gallons	Trucks	Cu. Yds. <u>Or</u> Gallons	Trucks	Cu. Yds. <u>Or</u> Gallons	Trucks	Cu. Yds. <u>Or</u> Gallons	Trucks	Cu. Yds.
Today									5	120
Total									25	600

NYC Clean Soil Bank		Receiving Facility: Name/ Address (Approved by OER)			
Tracking No.:	16CCSB000				
Today	Trucks 5	Cu. Yds. 25	Total	Trucks 120	Cu. Yds. 600

Site Grid Map
Insert the site grid map here

Photo Log

Photo 1 – provide a caption	Insert Photo Here – Photo of the entire site
Photo 2 – provide a caption	Insert Photo Here – Photo of the work activities performed
Photo 3 – provide a caption	Insert Photo Here – Photo of the work activities performed

Appendix 8
Weekly / Monthly Report Template

WEEKLY / MONTHLY STATUS REPORT

Prepared By: Enter Your Name Here

VCP Project No.:	16CVCP000M	E-Number Project No.:	16EHAN000M	Date:	01/01/2016
------------------	------------	-----------------------	------------	-------	------------

Project Name:	Name or Address
Project Updates (Since Last Report): Provide details about the work activities performed.	
Problems Encountered: No problems encountered or provide details	
Planned Activities for the Next three months: Provide details about the future work activities.	

Photo Log

Photo 1 – provide a caption	Insert Photo Here – Photo of the entire site
Photo 2 – provide a caption	Insert Photo Here – Photo of the work activities performed
Photo 3 – provide a caption	Insert Photo Here – Photo of the work activities performed

Appendix 9
Soil Disposal and Trucking Log Sheet

Appendix 10
Vapor Barrier Specifications and Plans

VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

RAVEN
INDUSTRIES

Product Description

VaporBlock® Plus™ 20 is a seven-layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission. VaporBlock® Plus™ 20 is a highly resilient underslab / vertical wall barrier designed to restrict naturally occurring gases such as radon and/or methane from migrating through the ground and concrete slab. VaporBlock® Plus™ 20 is more than 100 times less permeable than typical high-performance polyethylene vapor retarders against Methane, Radon and other harmful VOCs.

VaporBlock® Plus™ 20 is one of the most effective underslab gas barriers in the building industry today far exceeding ASTM E-1745 (Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs) Class A, B and C requirements. Available in a 20 (Class A) mil thicknesses designed to meet the most stringent requirements. VaporBlock® Plus™ 20 is produced within the strict guidelines of our ISO 9001:2008 Certified Management System.

Product Use

VaporBlock® Plus™ 20 resists gas and moisture migration into the building envelop when properly installed to provide protection from toxic/harmful chemicals. It can be installed as part of a passive or active control system extending across the entire building including floors, walls and crawl spaces. When installed as a passive system it is recommended to also include a ventilated system with sump(s) that could be converted to an active control system with properly designed ventilation fans.

VaporBlock® Plus™ 20 works to protect your flooring and other moisture-sensitive furnishings in the building's interior from moisture and water vapor migration, greatly reducing condensation, mold and degradation.

Size & Packaging

VaporBlock® Plus™ 20 is available in 10' x 150' rolls to maximize coverage. All rolls are folded on heavy-duty cores for ease in handling and installation. Other custom sizes with factory welded seams are available based on minimum volume requirements. Installation instructions and ASTM E-1745 classifications accompany each roll.



Under-Slab Vapor/Gas Retarder

Product

Part

VaporBlock Plus 20 VBP 20

APPLICATIONS

Radon Barrier	Under-Slab Vapor Retarder
Methane Barrier	Foundation Wall Vapor Retarder
VOC Barrier	

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier



ISO 9001:2008
CERTIFIED MANAGEMENT SYSTEM

PROPERTIES	TEST METHOD	VAPORBLOCK PLUS 20	
		IMPERIAL	METRIC
APPEARANCE		White/Gold	
THICKNESS, NOMINAL		20 mil	0.51 mm
WEIGHT		102 lbs/MSF	498 g/m ²
CLASSIFICATION	ASTM E 1745	CLASS A, B & C	
TENSILE STRENGTH LBF/IN (N/CM) AVERAGE MD & TD (NEW MATERIAL)	ASTM E 154 Section 9 (D-882)	58 lbf	102 N
IMPACT RESISTANCE	ASTM D 1709	2600 g	
MAXIMUM USE TEMPERATURE		180° F	82° C
MINIMUM USE TEMPERATURE		-70° F	-57° C
PERMEANCE (NEW MATERIAL)	ASTM E 154 Section 7 ASTM E 96 Procedure B	0.0098 Perms grains/(ft ² ·hr·in·Hg)	0.0064 Perms g/(24hr·m ² ·mm Hg)
(AFTER CONDITIONING) PERMS (SAME MEASUREMENT AS ABOVE PERMEANCE)	ASTM E 154 Section 8, E96 Section 11, E96 Section 12, E96 Section 13, E96	0.0079 0.0079 0.0097 0.0113	0.0052 0.0052 0.0064 0.0074
WVTR	ASTM E 96 Procedure B	0.0040 grains/hr·ft ²	0.0028 gm/hr·m ²
RADON DIFFUSION COEFFICIENT	K124/02/95	< 1.1 x 10 ⁻¹³ m ² /s	
METHANE PERMEANCE	ASTM D 1434	< 1.7 x 10 ⁻¹⁰ m ² /d·atm 0.32 GTR (Gas Transmission Rate) ml/m ² ·D·ATM	

VaporBlock® Plus™ Placement

All instructions on architectural or structural drawings should be reviewed and followed.

Detailed installation instructions accompany each roll of VaporBlock® Plus™ and can also be located on our website.

ASTM E-1643 also provides general installation information for vapor retarders.

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VaporBlock® Plus™ is a seven-layer co-extruded barrier made using high quality virgin-grade polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission.

Note: To the best of our knowledge, unless otherwise stated, these are typical property values and are intended as guides only, not as specification limits. Chemical resistance, odor transmission, longevity as well as other performance criteria is not implied or given and actual testing must be performed for applicability in specific applications and/or conditions. RAVEN INDUSTRIES MAKES NO WARRANTIES AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage. Limited Warranty available at www.RavenEFD.com



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Sioux Falls, SD 57117-5107
Ph: (605) 335-0174 • Fx: (605) 331-0333

Toll Free: 800-635-3456
Email: efdsales@ravenind.com
www.ravenefd.com
1/11 EFD 1125



Scan QR Code to download
current technical data sheets
via the Raven website.

Grace Below Grade Waterproofing

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:

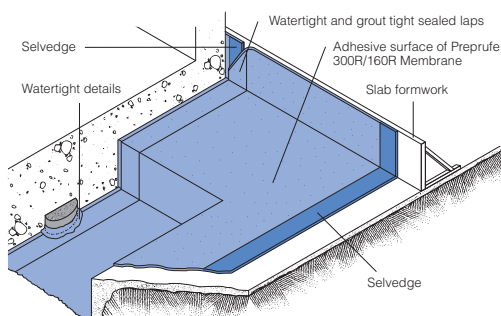
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe 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.



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 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/mm²) 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

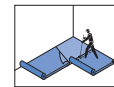
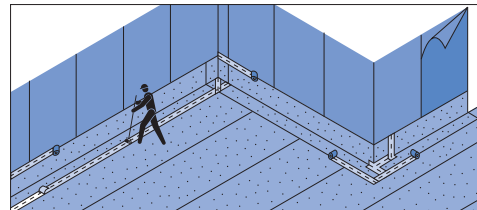
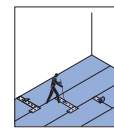


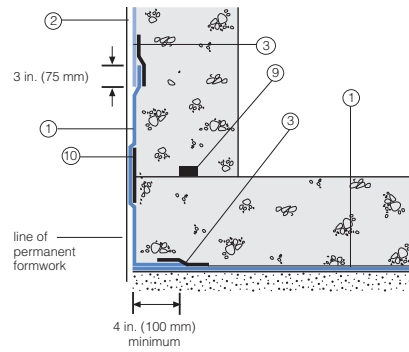
Figure 3



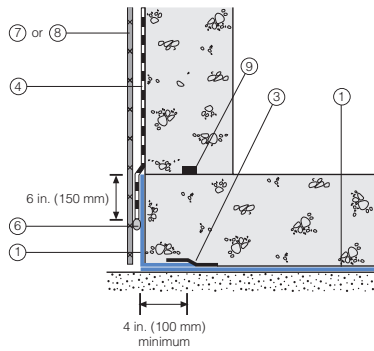
Detail Drawings

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).

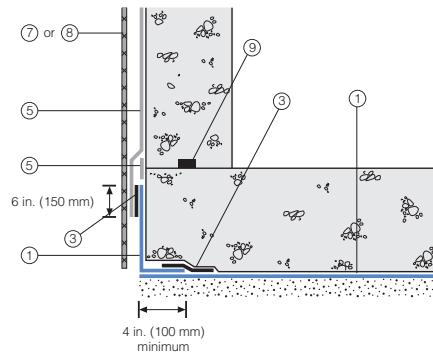
Wall base detail against permanent shutter



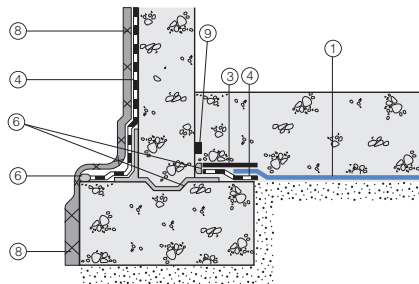
Bituthene wall base detail (Option 1)



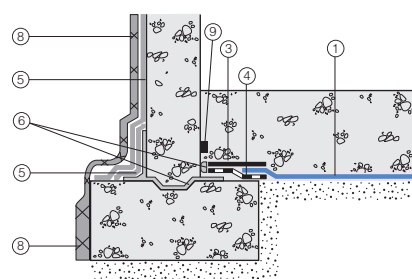
Procor wall base detail (Option 1)



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 ft ² (36 m ²)	460 ft ² (42 m ²)	
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)) 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 m ²))	0.01 perms (0.6 ng/(Pa x s x m ²))	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)

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GRACE

PREPRUFE®

Structural Waterproofing Solutions

A New World-class Music Center Employs An Innovative Waterproofing Solution



The Green Music Center under construction at Sonoma State University
Rohnert Park, California

When you think of a world-class music center, excellent acoustics and soundproofing may come to mind. With its smart design, the 1,400-seat Green Music Center at Sonoma State University more than meets those requirements. But perhaps surprisingly, one of the most innovative aspects of the concert hall isn't its soundproofing, but its waterproofing system.

That's because while the concert hall entrance sits at ground level, the hall slopes downward, below grade, toward the stage. In addition, several feet of space required for the building's air supply below the floor extend the depth even farther. With a high water table just a few feet below the surface, some clever design and construction was needed – to create both a temporary underground dewatering system during construction, and a long-term waterproofing solution to keep the concert hall dry for years to come.

"We specify Preprufe® and Bituthene® on pretty much all of our projects. It's an easy choice as far as we're concerned, because we've had so much success using Grace waterproofing."

Bill Bussey
A.C. Martin Partners

"We knew that the water table would create a real challenge, so temporary wells were created around the perimeter foundation that collect water for pumping during construction," explained Bill Bussey of A.C. Martin Partners, the architects for the concert hall.

During construction, with the high water table, water pumps were moving thousands of gallons of water per day and operating constantly. With energy and noise concerns, it became apparent that a more efficient long-term solution was needed. As a result, a sub-surface diversion system for the groundwater was created around the perimeter of the entire building.

In addition to the dewatering system, waterproofing was essential to the success of the project. With the guidance of their specialized waterproofing consultants, A.C. Martin Partners specified Grace waterproofing products based on the architectural firm's long-term track record using them in these types of applications. Grace's Preprufe® 300R was utilized in the sump pit, where despite muddy conditions, the pre-applied waterproofing membrane's aggressive pressure-sensitive adhesive formed a tight adhesive bond to the concrete to prevent ingress or migration of water around the structure. To waterproof the exterior basement walls, Bituthene® System 4000 was applied. A pre-formed waterproofing membrane, Bituthene® System 4000 incorporates a super tacky self-adhesive membrane with a latex surface primer to provide a long-term waterproofing solution.

"With the high water table presenting a challenge, a smart solution was proposed that supported our building design and enabled the project to move forward successfully."

Bryce Tanner, Arup

"We're pleased with the overall solution," said Bill Bussey. "The basement is dry with no complaints." To isolate the concert hall from any noise created by the water pumps, the facility is completely sound insulated to



Surrounded by scenic views, the world-class music center rising in Sonoma County.



Managing the site's high water table required some clever design and construction.

ensure the finest acoustics. And now, the entire hall is waterproofed just as effectively.

For all participants in this project, realizing a successful outcome to this unusual waterproofing challenge was music to their ears.

PROJECT CREDITS:

Owner: Sonoma State University, Rohnert Park, CA

Executive Architect: A.C. Martin Partners, Los Angeles, CA

Concert Hall Architect: BAR Architects, San Francisco, CA

Design Architect: William Rawn Associates, Boston, MA

Engineering: Arup, San Francisco, CA

Construction Manager: Rudolph and Sletten, Inc., Redwood City, CA

Waterproofing Installation: Lawson Roofing Company, San Francisco CA

Waterproofing: Grace Construction Products

www.graceconstruction.com

North America Customer Service: 1-866-333-3SBM (3726)

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Section 071324 Pre-Applied Sheet Membrane Waterproofing

PART 1 — GENERAL

1.01 SUMMARY

- A. The Work of this Section includes, but is not limited to, pre-applied sheet membrane waterproofing that forms an integral bond to poured concrete for the following applications:
 - 1. Vertical Applications: Membrane applied against soil retention system prior to placement of concrete foundation walls;
 - 2. Horizontal Applications: Membrane applied on prepared subbase prior to placement of concrete slabs.
- B. Related sections include, but are not limited to, the following:
 - 1. Section 031000 - Concrete Forming
 - 2. Section 312000 – Earth Moving
 - 3. Section 031500 – Concrete Accessories
 - 4. Section 031500 – Hydrophilic Waterstop
 - 5. Section 316200 - Driven Piles
 - 6. Section 316400 - Caissons
 - 1. Section 032000 - Concrete Reinforcing
 - 2. Section 033000 – Cast-In-Place Concrete

NOTE TO SPECIFIER: For vertical applications, coordinate with concrete formwork section to require one-sided wall forming system to minimize punctures to the sheet membrane waterproofing during formwork installation.

1.02 SUBMITTALS

- A. Submit manufacturer's product data, installation instructions and membrane samples for approval.

1.03 REFERENCE STANDARDS

- A. The following standards and publications are applicable to the extent referenced in the text.
- B. American Society for Testing and Materials (ASTM):
 - C 836 Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
 - D 412 Standard Test Methods for Rubber Properties in Tension
 - D 570 Standard Test Method for Water Absorption of Plastics
 - D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 - D 1876 Standard Test Method for Peel Release of Adhesives (T-Peel)
 - D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection

- D 3767 Standard Practice for Rubber - Measurements of Dimensions
- D 5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
- E 96 Standard Test Methods for Water Vapor Transmission of Materials
- E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.04 QUALITY ASSURANCE

- A. Manufacturer: Sheet membrane waterproofing system shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past 5 years.
- B. Installer: A firm which has at least 3 years experience in work of the type required by this section.
- C. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.
- D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.
- E. Schedule Coordination: Schedule work such that membrane will not be left exposed to weather for longer than that recommended by the manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's instructions. Protect from damage from weather, excessive temperature and construction operations. Remove and dispose of damaged material in accordance with applicable regulations.

1.06 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

1.07 WARRANTY

- A. Sheet Membrane Waterproofing: Provide written five year material warranty issued by the membrane manufacturer upon completion of work.

PART 2 — PRODUCTS

2.01 MATERIALS

- A. Pre-applied Integrally Bonded Sheet Waterproofing Membrane: Preprufe® 300R Membrane [or Preprufe 300LT Membrane for application temperatures between 25°F (-4°C) and 60°F (+16°C)] by Grace Construction Products, a 1.2mm (0.046 in.) nominal thickness composite sheet membrane comprising 0.8 mm (0.030 in.) of high density polyethylene film, and layers of specially formulated synthetic adhesive layers. The membrane shall form an integral and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

NOTE TO SPECIFIER: Preprufe 300R and Preprufe 300LT can both be installed at temperatures 25°F (-4°C) and above. For temperatures 25°F (-4°C) to 55°F (13°C) Grace Technical Bulletin #16 states the use of Preprufe LT Tape is recommended at all sidelaps when using Preprufe 300R. Alternatively, contractors may elect the use of Preprufe 300LT which does not require the use of Preprufe LT Tape at sidelaps in temperature ranges 25°F (-4°C) to 55°F (13°C). For this reason, Grace suggests that both products be incorporated into the specification.

PHYSICAL PROPERTIES FOR PREPRUFE 300R (or 300LT) MEMBRANE:

Property	Test Method	Typical Value
Color		White
Thickness	ASTM D 3767 Method A	1.2 mm (0.046 in.) nominal
Lateral Water Migration Resistance	ASTM D 5385 Modified ¹	Pass at 71 m (231 ft) of hydrostatic head pressure
Low Temperature Flexibility	ASTM D 1970	Unaffected at -29°C (-20°F)
Elongation	ASTM D 412 Modified ²	500%
Crack Cycling at -23°C (-9.4°F), 100 Cycles	ASTM C 836	Unaffected, Pass
Tensile Strength, film	ASTM D 412	27.6 MPa (4,000 lbs/in. ²)
Peel Adhesion to Concrete	ASTM D 903 Modified ³	880 N/m (5.0 lbs/in.)
Lap Adhesion	ASTM D 1876 Modified ⁴	880 N/m (5.0 lbs/in.)
Resistance to Hydrostatic Head	ASTM D 5385 Modified ⁵	71 m (231 ft)
Puncture Resistance	ASTM E 154	990 N (221 lbs)
Permeance	ASTM E 96 Method B	0.6 ng/Pa × s × m ² (0.01 perms)
Water Absorption	ASTM D 570	0.5%

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 blind side waterproofing membrane. A hydrostatic head pressure of 71 m (231 ft) of water is the limit of the apparatus.
2. Elongation of membrane is run at a rate of 50 mm (2 in.) per minute.
3. Concrete is cast against the protective coating surface of the membrane and allowed to cure (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm (2 in.) per minute at room temperature.
4. The test is conducted 15 minutes after the lap is formed as per manufacturer's instructions and run at a rate of 50 mm (2 in.) per minute.
5. Hydrostatic head tests are performed by casting concrete against the membrane with a lap. Before the concrete sets a 3 mm (0.125 in.) 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 a head of 71 m (231 ft) of water which is the limit of the apparatus.

- B. Pre-applied Integrally Bonded Sheet Waterproofing Membrane: Preprufe® 160R Membrane [or Preprufe 160LT Membrane for application temperatures between 25°F (-4°C) and 60°F (+16°C)] by Grace Construction Products, a 1.0mm (0.032 in.) nominal thickness composite sheet membrane comprising 0.4 mm (0.016 in.) of high density polyethylene film, and layers of specially formulated synthetic adhesive layers. The membrane shall form an integral and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

NOTE TO SPECIFIER: Preprufe 160R and Preprufe 160LT can both be installed at temperatures 25°F (-4°C) and above. For temperatures 25°F (-4°C) to 55°F (13°C) Grace Technical Bulletin #16 states the use of Preprufe LT Tape is recommended at all sidelaps when using Preprufe 160R. Alternatively, contractors may elect the use of Preprufe 160LT which does not require the use of Preprufe LT Tape at sidelaps in temperature ranges 25°F (-4°C) to 55°F (13°C). For this reason, Grace suggests that both products be incorporated into the specification.

PHYSICAL PROPERTIES FOR PREPRUFE 160R (or 160LT) MEMBRANE:

Property	Test Method	Typical Value
Color		White
Thickness	ASTM D 3767 Method A	1.0 mm (0.032 in.) nominal
Lateral Water Migration Resistance	ASTM D5385, Modified ¹	Pass at 71 m (231 ft) of hydrostatic head pressure
Low Temperature Flexibility	ASTM D 1970	Unaffected at -29°C (-20°F)
Elongation	ASTM D 412 Modified ²	500%
Crack Cycling at -23°C (-9.4°F), 100 Cycles	ASTM C 836	Unaffected, Pass
Tensile Strength, film	ASTM D 412	27.6 MPa (4,000 lbs/in. ²)
Peel Adhesion to Concrete	ASTM D 903 Modified ³	880 N/m (5.0 lbs/in.)
Lap Adhesion	ASTM D 1876 Modified ⁴	880 N/m (5.0 lbs/in.)
Resistance to Hydrostatic Head	ASTM D 5385 Modified ⁵	Pass at 71 m (231 ft)
Puncture Resistance	ASTM E 154	445 N (100 lbs)
Permeance	ASTM E 96 Method B	0.6 ng/Pa × s × m ² (0.01 perms)
Water Absorption	ASTM D 570	0.5%

Footnotes:

- 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 blind side waterproofing membrane. A hydrostatic head pressure of 71 m (231 ft) of water is the limit of the apparatus.*
- Elongation of membrane is run at a rate of 50 mm (2 in.) per minute.*
- Concrete is cast against the protective coating surface of the membrane and allowed to cure (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm (2 in.) per minute at room temperature.*
- The test is conducted 15 minutes after the lap is formed as per manufacturer's instructions and run at a rate of 50 mm (2 in.) per minute.*
- Hydrostatic head tests are performed by casting concrete against the membrane with a lap. Before the concrete sets a 3 mm (0.125 in.) 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 a head of 71 m (231 ft) of water which is the limit of the apparatus.*

- C. Waterstop: Adcor™ ES hydrophilic non-bentonite waterstop by Grace Construction Products for non-moving concrete construction joints.

PHYSICAL PROPERTIES FOR GRACE ADCOR™ ES HYDROPHYLIC WATERSTOP:

Property	Typical Value
Color	Green
Size	1.0 in. x ½ in. x 16 ft. rolls (25.4 mm x 12.7 mm x 4.9 m)
Hydrostatic Head Resistance	70 m (231 ft)
Wet - Dry Cycling [25 Cycles @ 231 ft. (70 m)]	No Effect
Adhesion to Concrete using Adcor ES Adhesive	Excellent

- D. Preformed Soil Retention Wall Tieback Cover: Preprufe Tieback Cover by Grace Construction Products as a prefabricated detail for soil retention wall tiebacks.
- E. Preformed Inside and Outside Corners: Preprufe Preformed Corners by Grace Construction Products as prefabricated inside and outside corners.
- F. Tape for covering cut edges, roll ends, penetrations and detailing: Preprufe Tape LT (for temperatures between 25°F (-4°C) and 86°F (+30°C)) and Preprufe Tape HC (for use in Hot Climates, minimum 50°F (10°C))
- G. Miscellaneous Materials: accessories specified or acceptable to manufacturer of pre-applied waterproofing membrane.

PART 3 — EXECUTION

3.01 EXECUTION

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 SUBSTRATE PREPARATION

- A. 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.
1. Horizontal Surfaces - 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.
 2. Vertical Surfaces - 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.

3.03 INSTALLATION, HORIZONTAL APPLICATIONS

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
 - 1. 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.
 - 2. Leave the plastic release liner in position until overlap procedure is completed.
 - 3. 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.
 - 4. 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.
 - 5. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

3.04 INSTALLATION, VERTICAL APPLICATIONS

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
 - 1. Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length.
 - 2. Fastening through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps.
 - 3. Immediately remove the plastic release liner.
 - 4. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap.
 - 5. Roll firmly to ensure a watertight seal.
 - 6. 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.
 - 7. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap edges and roll firmly.
 - 8. Immediately remove printed plastic release liner from the tape.

3.05 WATERSTOP INSTALLATION

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
 - 1. Secure Adcor ES using masonry nails 1½ in. - 2 in. (40 mm – 50 mm) long with a washer ¾ in. (20 mm) in diameter. Hilti EM6-20-12 FP8 shot fired fixings with ¼ in. (6 mm) nuts and ¾ in. (20 mm) diameter washers may also be used. Fixings should be spaced at a maximum of 12 in. (300 mm) centers with a minimum spacing that ensures proper contact to substrate.
 - 2. On irregular concrete faces, or on vertical surfaces, apply a ½ in. (12 mm) bead of Adcor ES Adhesive as bedding for Adcor ES.

3. Adcor ES joints should overlap a minimum of 4 in. (100 mm), ensuring full contact between jointed pieces.

3.06 PROTECTION

- A. Protect membrane in accordance with manufacturer's recommendations until placement of concrete. Inspect for damage just prior to placement of concrete and make repairs in accordance with manufacturer's recommendations.

END OF SECTION

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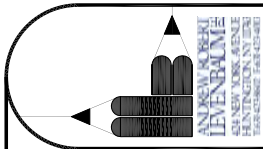
Document Code: GSWP-001B

Updated: 7/2012

Appendix 11
Composite Cover Diagram

Appendix 12

Sub-Slab Depressurization System Specifications and Plans



CONSULTANT:

NO.	DESCRIPTION	DATE

PROJECT NAME:
ALTERATIONS TO:
HILLSIDE AVENUE
QUEENS, NY

JOB NUMBER: 597/8346

DOB BSCAN:

DRAWING TITLE:
SURVEY

AROGUSKI
LAND SURVEYING, P.C.
60-17 HILLSIDE AVENUE, 11TH FLOOR
JAMAICA, NY 11435
TEL: (718) 980-3711 FAX: (718) 980-3711
E-MAIL: info@aroguski.com

LOCATED AT:
148-28 Hillside Avenue
County and Borough of Queens
City and State of New York
TAX DISG: Block 9694 Lot 17

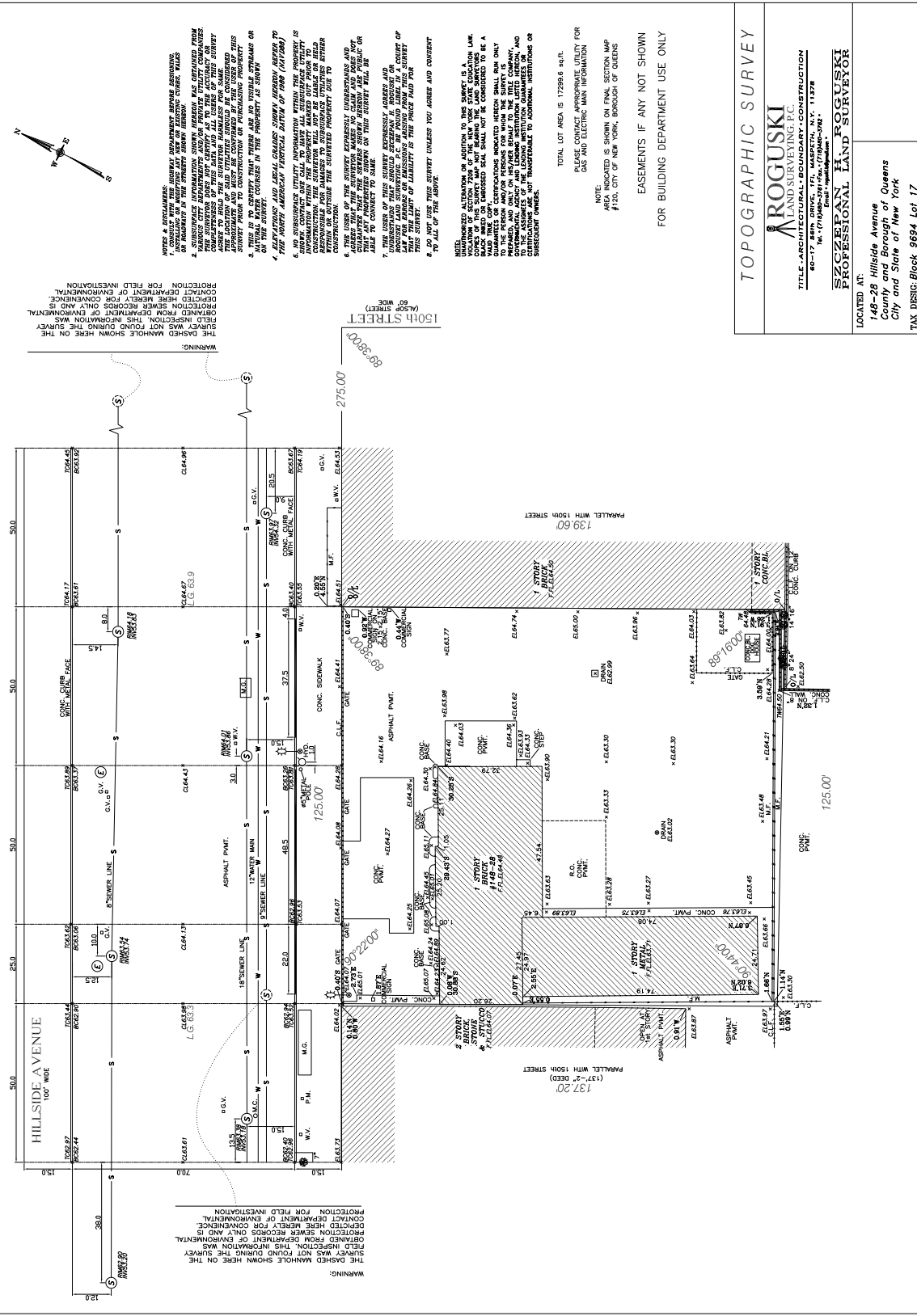
CERTIFIED TO:
Gary Chen

DATE: June 20, 2015
SCALE: 1"=20'

DRAWN BY: BB

SCALE(S) NOTED DATE: 11/20/17
X-100.00
1 of 11

Job No. RL1509381



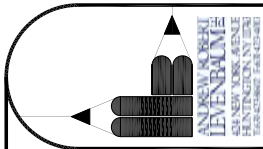
NOTES & DISCUSSION:
1. CONSULT WITH THE ADJACENT PROPERTY OWNERS BEFORE ANY CONSTRUCTION OF THE PROPOSED IMPROVEMENTS.
2. THE SURVEYOR HAS REVIEWED THE RECORD PLANS AND THE FIELD NOTES OF THE PREVIOUS SURVEY AND HAS FOUND THEM TO BE CORRECT.
3. THE SURVEYOR HAS REVIEWED THE RECORD PLANS AND THE FIELD NOTES OF THE PREVIOUS SURVEY AND HAS FOUND THEM TO BE CORRECT.
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SPREAD FOOTING SCHEDULE					TYPE AND DRAINAGE	FINISHES
MARK	LENGTH	WIDTH	THICKNESS	SECTION DETAIL AND DRAIN		
F01	8'-0"	7'-0"	22'-0"	10'-0"		
F02	8'-0"	8'-0"	22'-0"	10'-0"		
F03	10'-0"	10'-0"	3'-0"	13'-0"		
F04	10'-0"	10'-0"	3'-0"	10'-0"		
F05	12'-0"	12'-0"	3'-0"	13'-0"		
F06	14'-0"	14'-0"	3'-0"	10'-0"		
F07	16'-0"	16'-0"	3'-0"	20'-0"		
F08	20'-0"	20'-0"	3'-0"	20'-0"		
F09	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F10	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F11	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F12	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F13	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F14	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F15	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F16	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F17	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F18	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F19	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F20	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F21	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F22	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F23	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F24	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F25	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F26	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F27	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F28	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F29	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F30	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F31	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F32	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F33	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F34	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F35	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F36	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F37	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F38	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F39	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F40	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F41	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F42	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F43	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F44	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F45	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F46	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F47	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F48	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F49	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F50	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F51	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F52	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F53	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F54	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F55	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F56	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F57	SEE PLAN	SEE PLAN	3'-0"	10'-0"	10'-0"	10'-0"
F58	SEE PLAN	SEE PLAN	3'-0"			





CONSULTANTS:	
NO. DESCRIPTION DATE	
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2	SECTION 95-307 SCALE 1/2" = 1'-0"
3	SECTION 95-307 SCALE 1/2" = 1'-0"
4	SECTION 95-307 SCALE 1/2" = 1'-0"
5	SECTION 95-307 SCALE 1/2" = 1'-0"

PROJECT DATA:
ALTERATIONS TO:
PROJECT NAME: 333 HANFORD AVENUE
QUEENS, NY

JOB NUMBER: 597/8346

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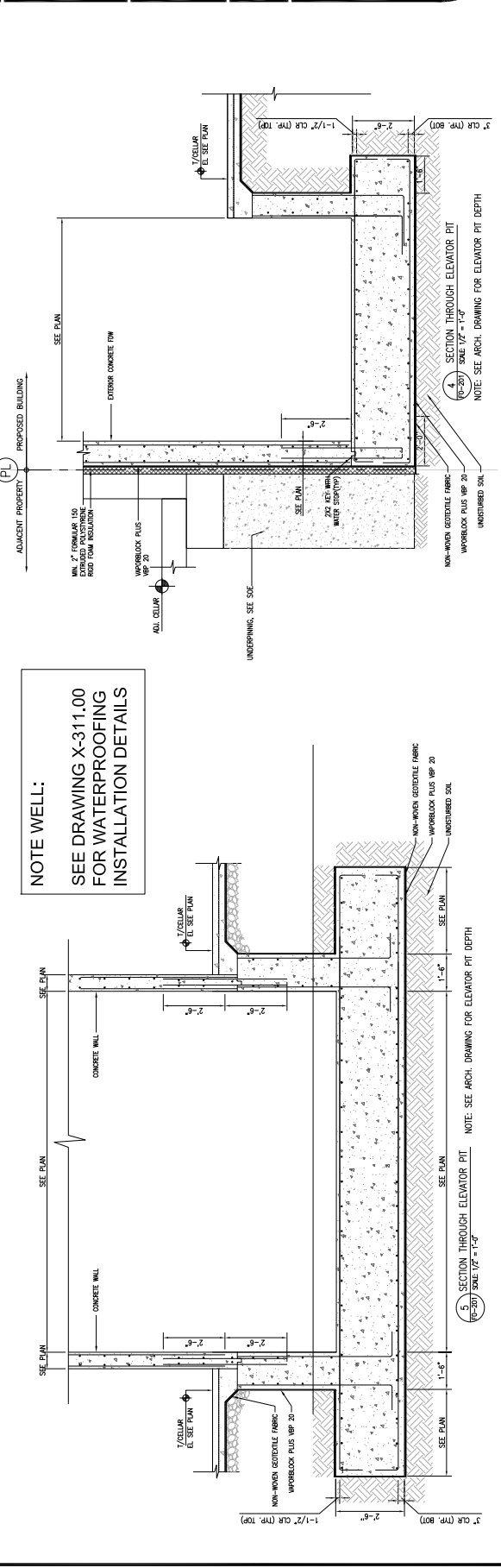
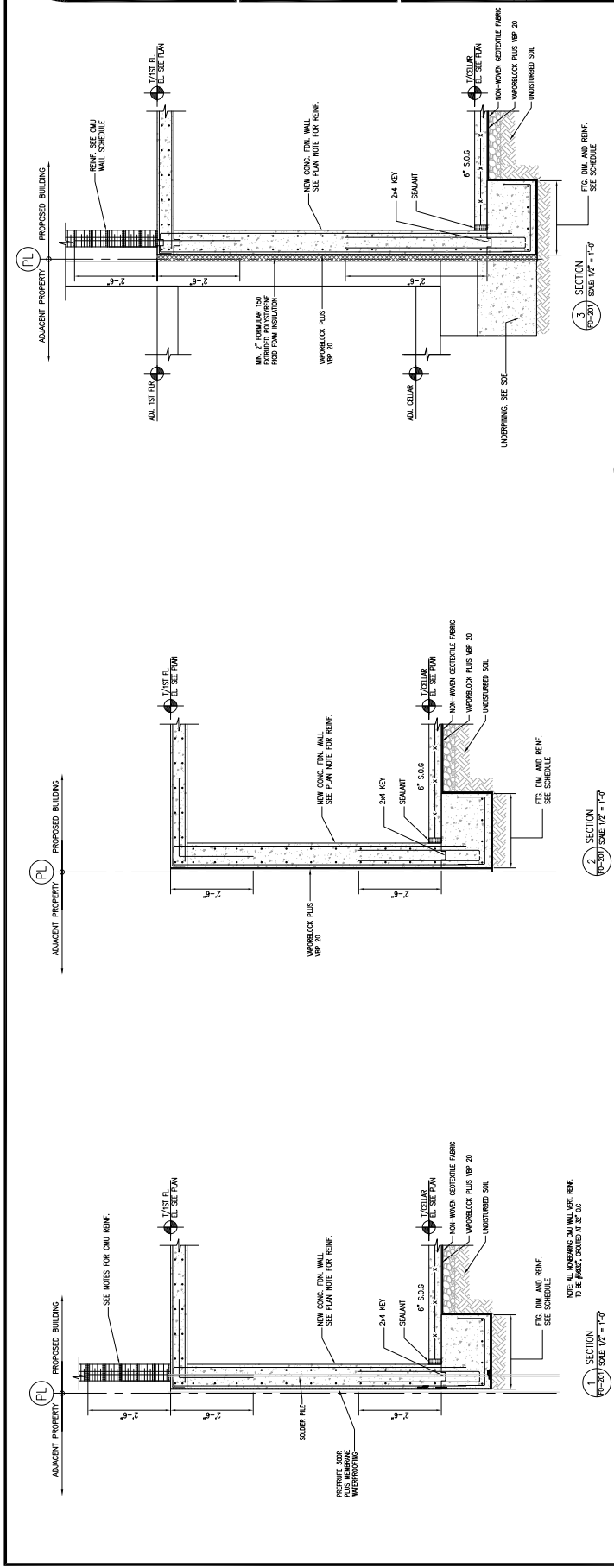
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FOUNDATION SECTIONS

APPROVED BY: JAH

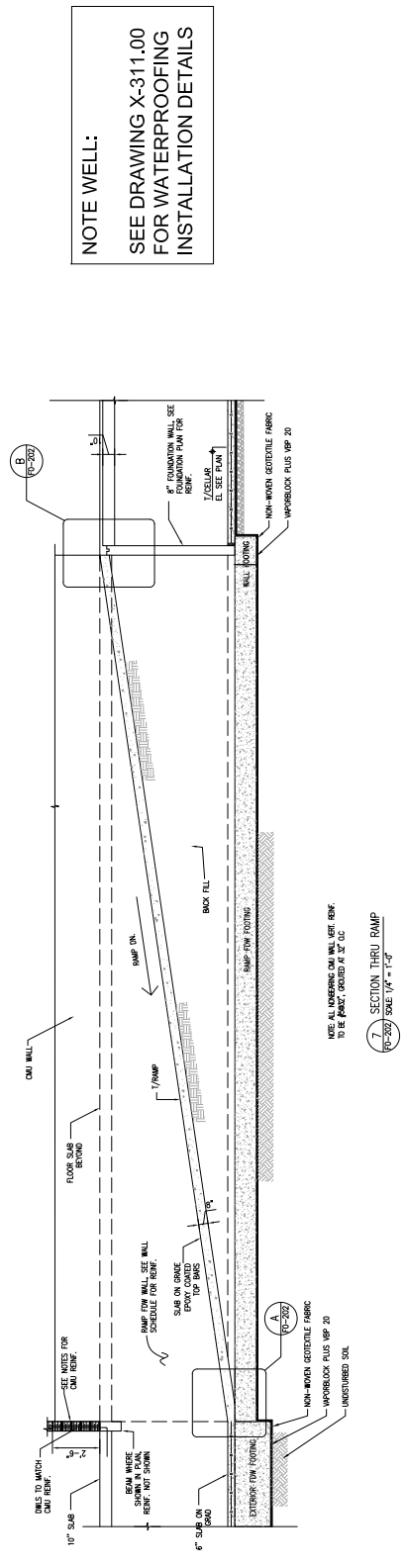
DATE: 11/20/17

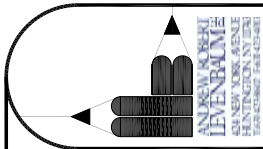
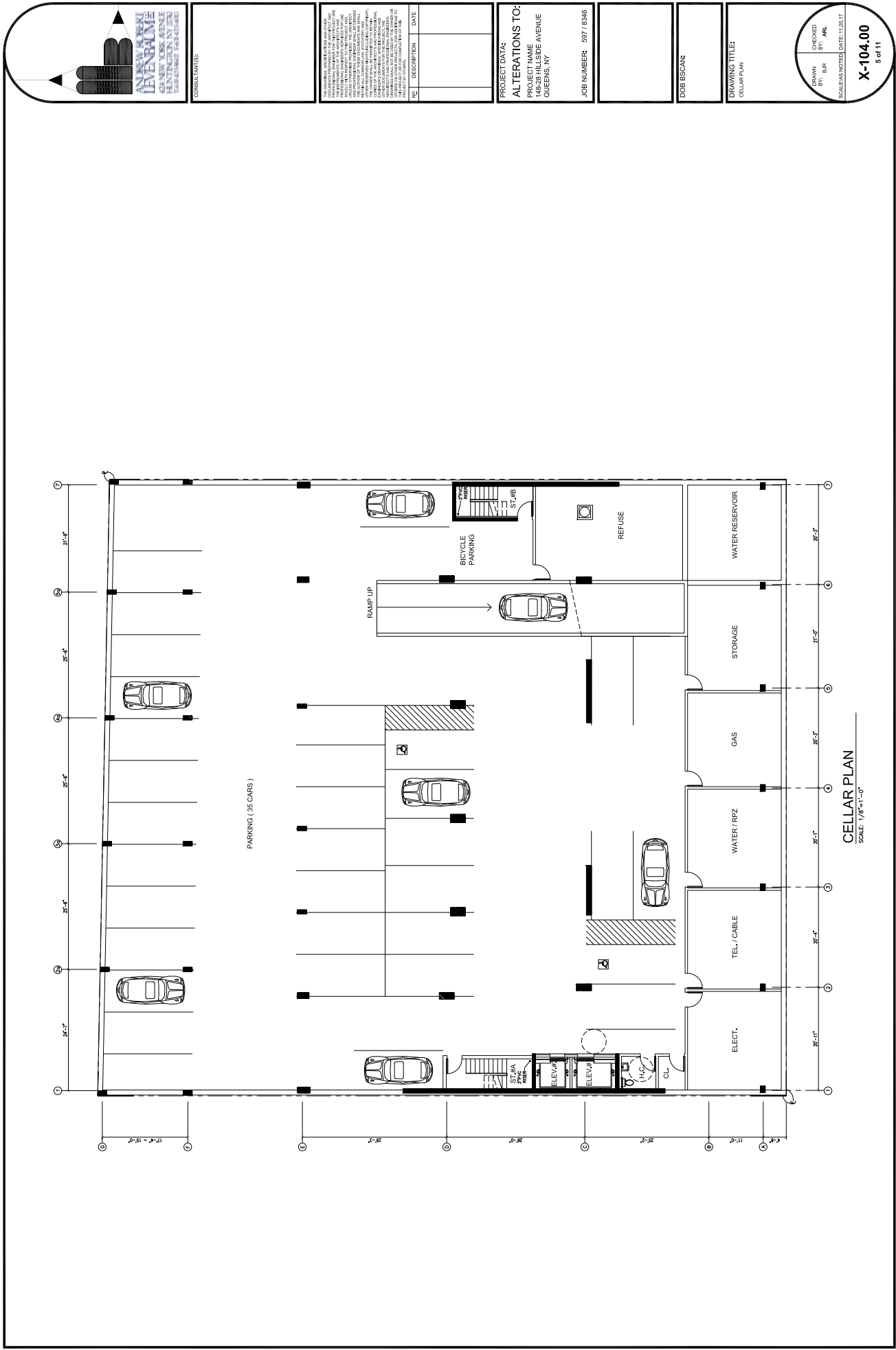
X-102.00

3 of 11



NOTE WELL:
SEE DRAWING X-311.00
FOR WATERPROOFING
INSTALLATION DETAILS





CONSULTANT'S:

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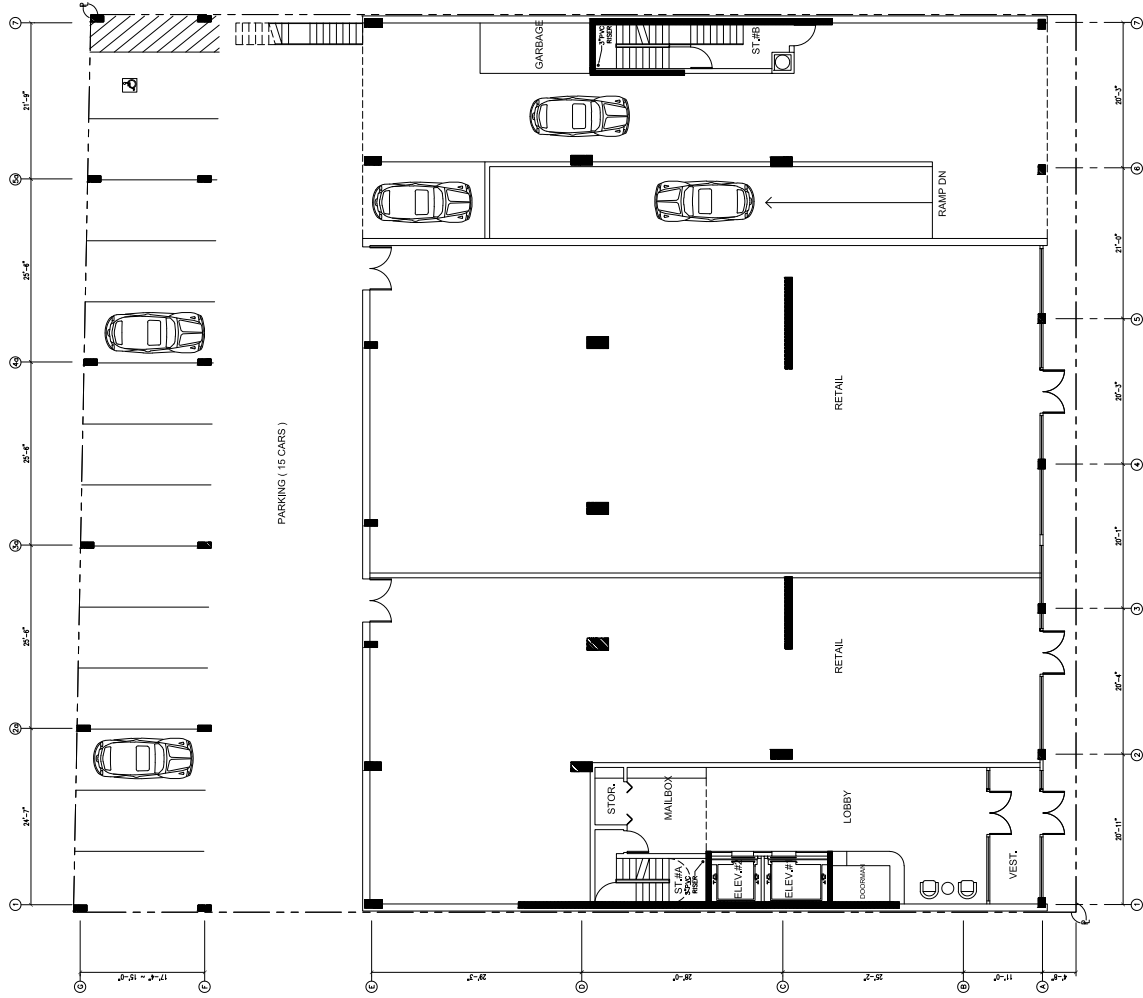
PROJECT DATA:
ALTERATIONS TO:
PROJECT NAME
HANFORD AVENUE
QUEENS, NY

JOB NUMBER: 597 / 8346

DOB BSCAN:

DRAWING TITLE:
CELLAR PLAN

DESIGNED BY: JH	CHECKED BY: JH
DRAWN BY: JH	DATE: 11/20/17
SCALE: 1/8"=1'-0"	
X-104.00	
5 of 11	



FIRST FLOOR PLAN
SCALE: 1/8"=1'-0"

DRAWN BY: BJR
CHECKED BY: ARL

X-105.00
6 of 11

CONSULTANT(S):

THE DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS PREPARED BY THE ARCHITECT AND ENGINEER SHALL BE THE PROPERTY OF THE ARCHITECT AND ENGINEER. THE ARCHITECT AND ENGINEER'S SERVICES FOR USE SOLELY WITH RESPECT TO THIS PROJECT, AND UNLESS OTHERWISE PROVIDED, THE ARCHITECT AND PROFESSIONAL ENGINEER SHALL BE DEEMED TO HAVE ASSIGNED TO THE ARCHITECT AND ENGINEER ALL RIGHTS IN ANY INVENTIONS OR OTHER CONCEPTS OR STATUTORY OR COMMON LAW RIGHTS IN ANY INVENTIONS OR OTHER CONCEPTS INCLUDING COPYRIGHT. THE OWNER SHALL BE PERMITTED TO RETAIN THE ARCHITECT'S AND PROFESSIONAL ENGINEER'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS FOR THE PROJECT. THE ARCHITECT AND ENGINEER SHALL NOT BE RESPONSIBLE FOR THE REUSE OF ANY OF THE ARCHITECT'S OR ENGINEER'S DRAWINGS OR OTHER DOCUMENTS FOR ANY OTHER PROJECTS. THE ARCHITECT AND ENGINEER SHALL NOT BE USED BY THE OWNER OR OTHERS ON OTHER PROJECTS, FOR ADDITIONAL

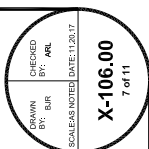
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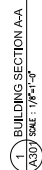
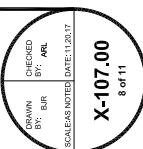
PROJECT DATA:
ALTERATIONS TO:
PROJECT NAME
148-28 HILLSIDE AVENUE
QUEENS, NY

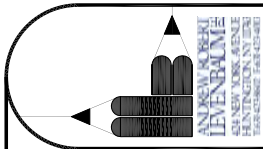
JOB NUMBER: 597 / 8346

DOB BSCAN:

DRAWING TITLE:
FIRST FLOOR PLAN







CONSULTANTS:

NO.		DESCRIPTION	DATE

PROJECT DATA:
ALTERATIONS TO:
PROJECT NAME
10000 LINDSE AVENUE
QUEENS, NY

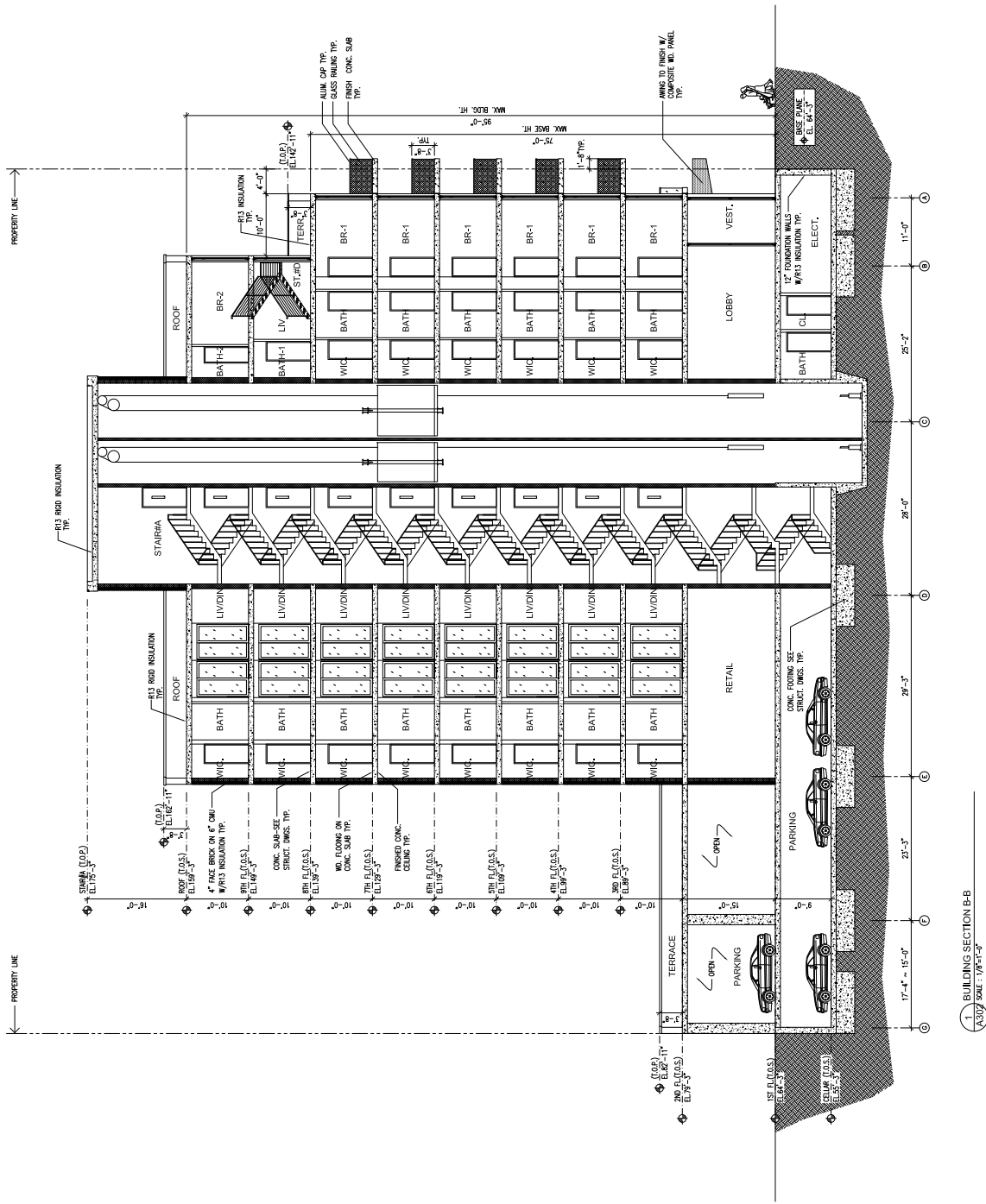
JOB NUMBER: 597 / 8346

DOB BSCAN:

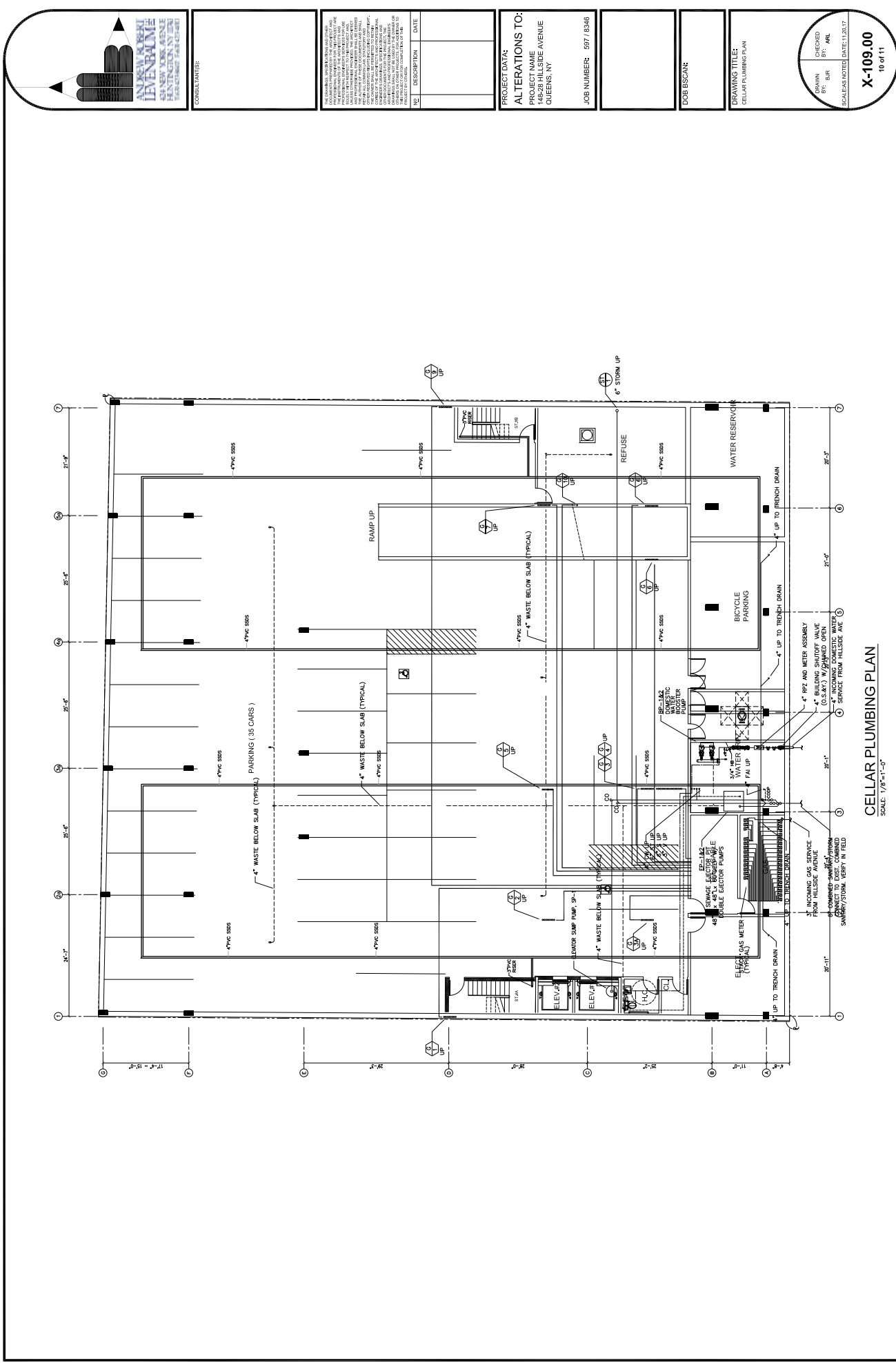
DRAWING TITLE:
BUILDING SECTION B-B

DRAWN BY:
CHECKED BY:
SCALE: AS NOTED DATE: 11/20/17

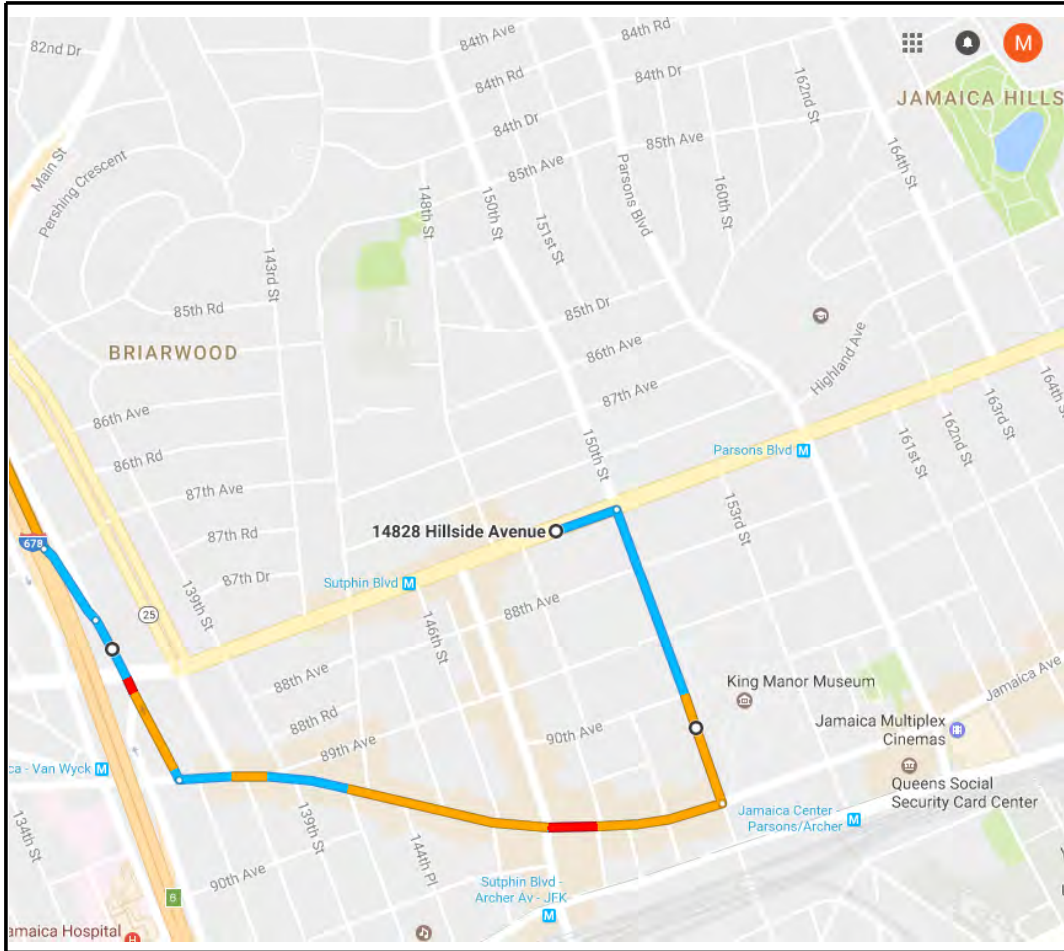
X-108.00
9 of 11



1 BUILDING SECTION B-B
AS NOTED SCALE: 1/4"=1'-0"



Appendix 13
Truck Route Map



Souce: Google Maps



Truck Route	
	
110 Main Street, Suite 103, Port Washington, New York 11050 Tel: 516-441-5800 Fax: 516-441-5511	
Project No.: 8346-JANY	Figure No.: 7
Date: 12/27/2016	Scale: Not To Scale

Appendix 14
RIR and RAWP Certification Pages

CERTIFICATION

I, Paul Stewart, am a Qualified Environmental Professional, as defined in RCNY § 43-1402(ar). I have primary direct responsibility for implementation of the Remedial Investigation for the Site located at 148-28 Hillside Avenue Jamaica, New York. I am responsible for the content of this Remedial Investigation Report (RIR), have reviewed its contents and certify that this RIR is accurate to the best of my knowledge and contains all available environmental information and data regarding the property.

Paul P. Stewart

10/28/2016



Qualified Environmental Professional

Date

Signature

CERTIFICATION

I, Andrew Levenbaum, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the site located at 148-28 Hillside Avenue, Jamaica, New York, OER site number 17TMP0097Q. I certify to the following:

- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Remedial Action Work Plan and are of sufficient detail to enable proper construction.
- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

ANDREW R. LEVENBAUM
Name

053854
PE License Number

[Signature]
Signature

6/8/2017
Date



I, Paul P. Stewart, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the site located at 148-28 Hillside Avenue, Jamaica, New York, OER site number 17TMP0097Q. I certify to the following:

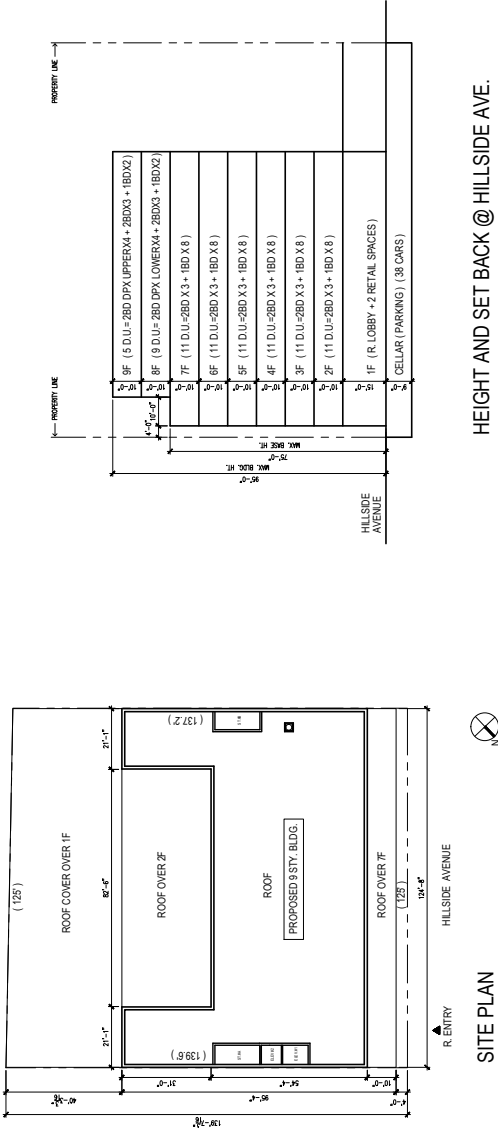
- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Paul P. Stewart
QEP Name

[Signature]
QEP Signature

6/8/2017
Date

Appendix 15
Redevelopment Plans



SITE PLAN

HEIGHT AND SET BACK @ HILLSIDE AVE.

APARTMENT @ R7A : TOTAL 80 R. UNITS (4) 2BD DUPLEX UNITS + (24) 2BD UNITS + (52) 1BD UNITS	
FLOOR	UNIT
9F (APARTMENT)	5 D.U.=2BD DPX UPPER X4 + 2BD X3 + 1BD X2
8F (APARTMENT)	9 D.U.=2BD DPX LOWER X4 + 2BD X3 + 1BD X2
7F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
6F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
5F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
4F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
3F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8
2F (APARTMENT)	11 D.U.=2BD X3 + 1BD X 8

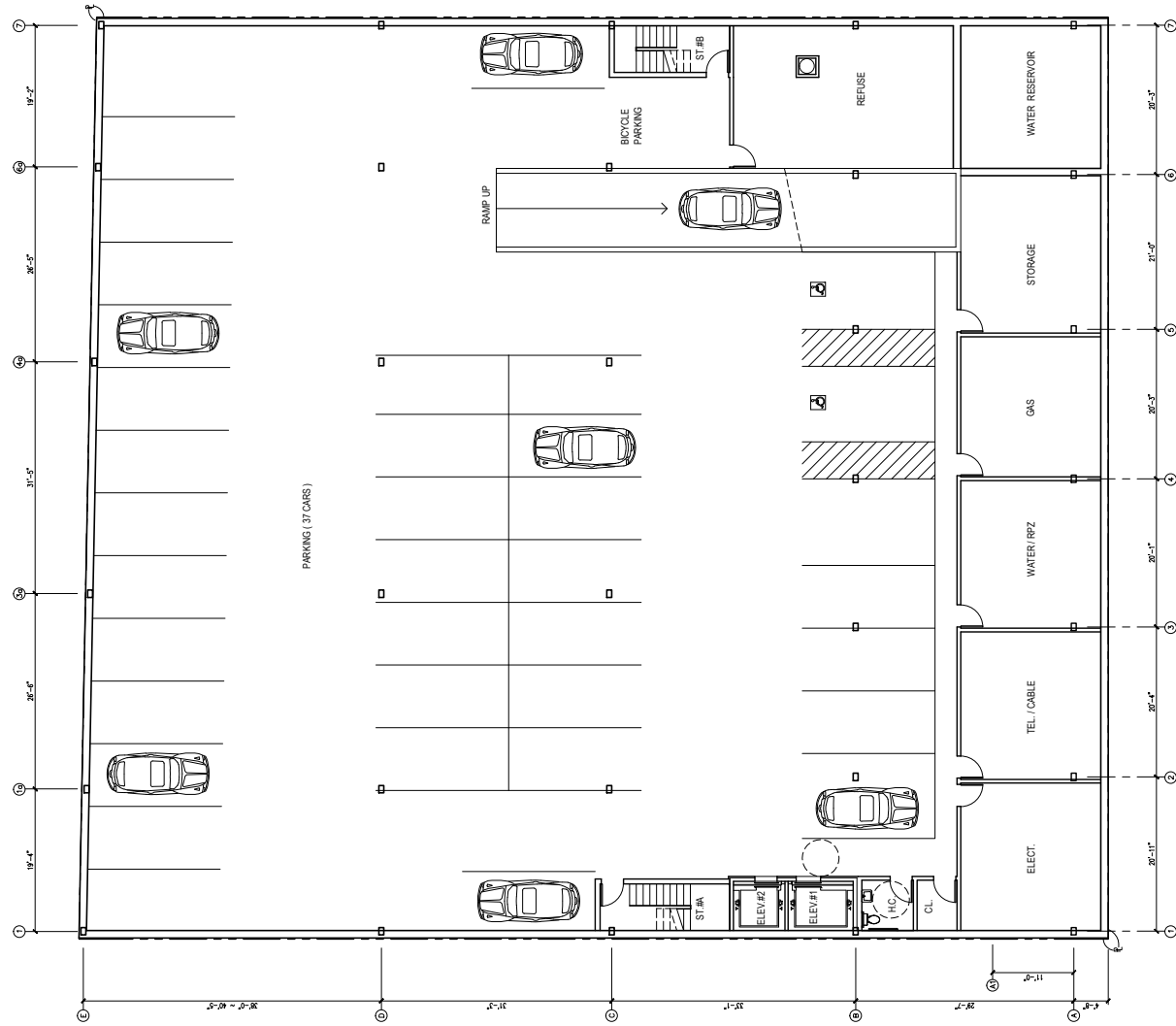
TOTAL UNITS :
80 D.U. + 2 C.U. + 52 CARS
4 - DUPLEX (2BD)
24 - 2BD UNITS
52 - 1BD UNITS

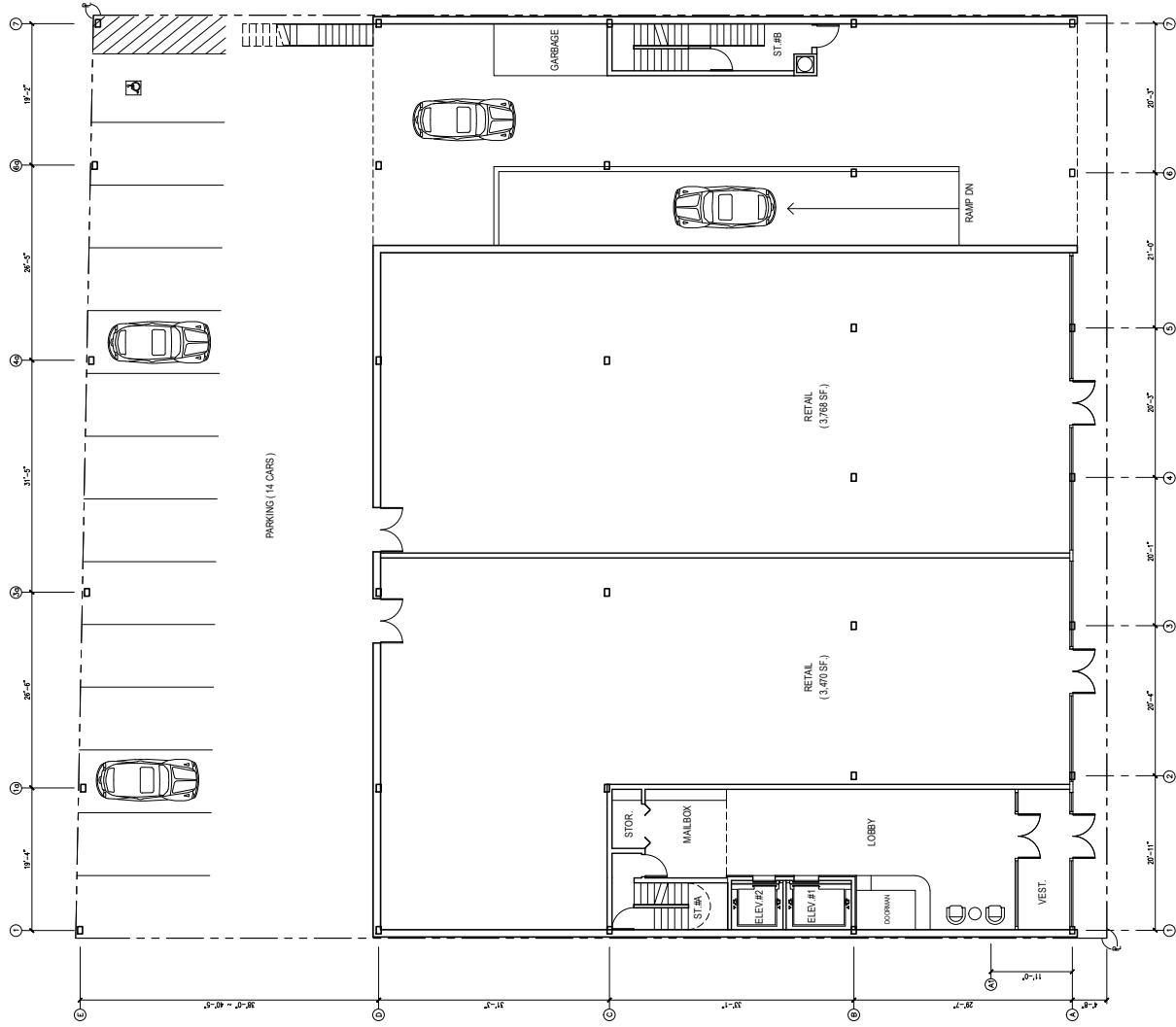
COMMERCIAL @ C2-3 : TOTAL 2 C. UNITS	
RETAIL	2 COMMERCIAL UNITS
PARKING	TOTAL 52 + 14 (OUTDOOR) + 38 (INDOOR)

FLOOR	GROSS	DEDUCTION	NET
ROOF	410 SF.	N/A	410 SF.
9F	8,076 SF.	511 SF.	7,565 SF.
8F	8,076 SF.	511 SF.	7,565 SF.
7F	9,322 SF.	152 SF.	9,170 SF.
6F	9,322 SF.	152 SF.	9,170 SF.
5F	9,322 SF.	152 SF.	9,170 SF.
4F	9,322 SF.	152 SF.	9,170 SF.
3F	9,322 SF.	152 SF.	9,170 SF.
2F	9,322 SF.	152 SF.	9,170 SF.
1F	1,513 SF.	433 SF.	1,080 SF.
TOTAL	74,007 SF.	2,367 SF.	71,640 SF.

TOTAL FAR : 79,580 SF.
TOTAL GROSS : 81,621 SF.
TOTAL DEDUCTION : 2,367 SF.
TOTAL NET : 79,254 SF.

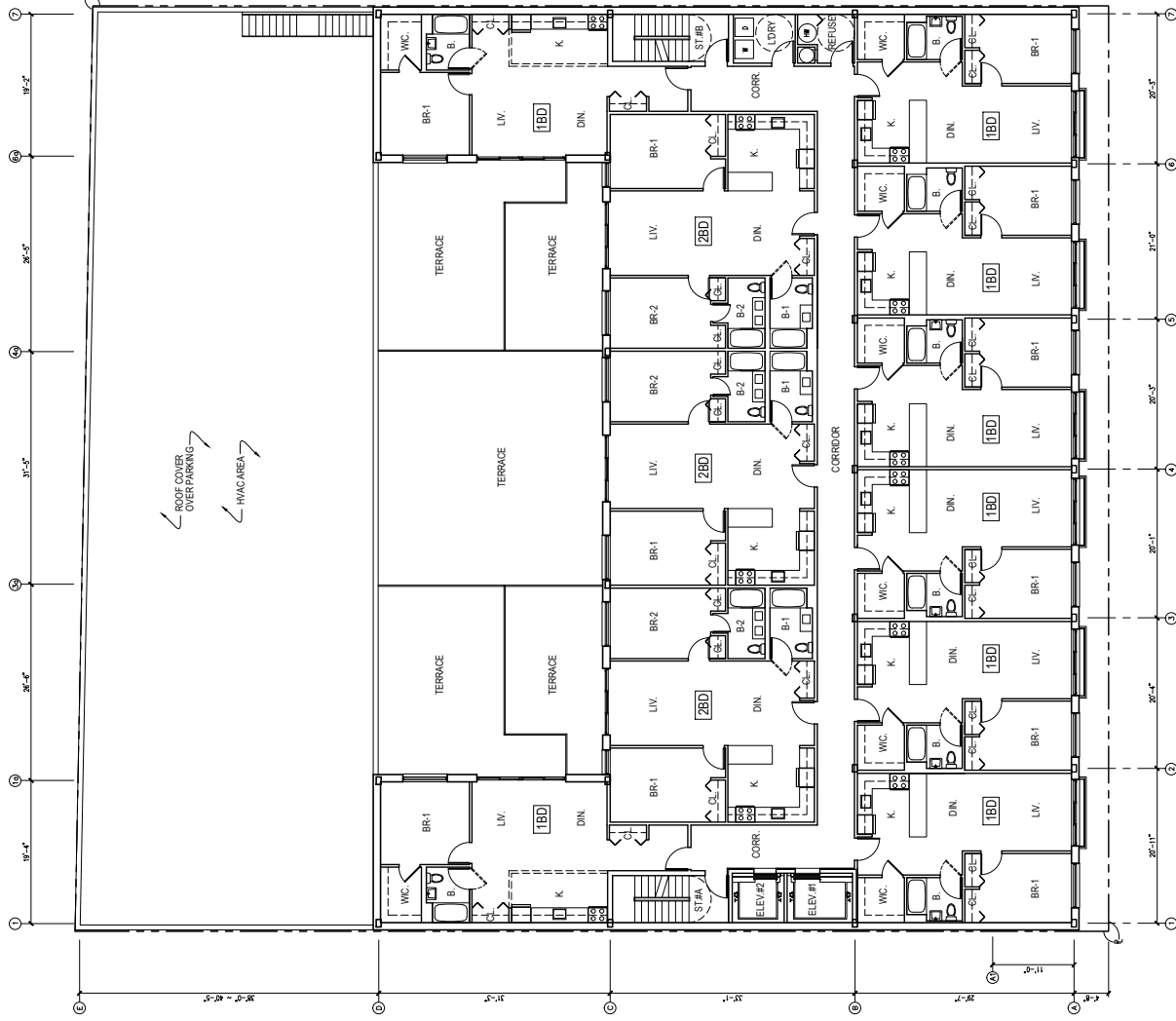
LOT @ C2-3 / R7A : 17,300 SF. C:2.0 MAX.	
1F	7,614 SF.

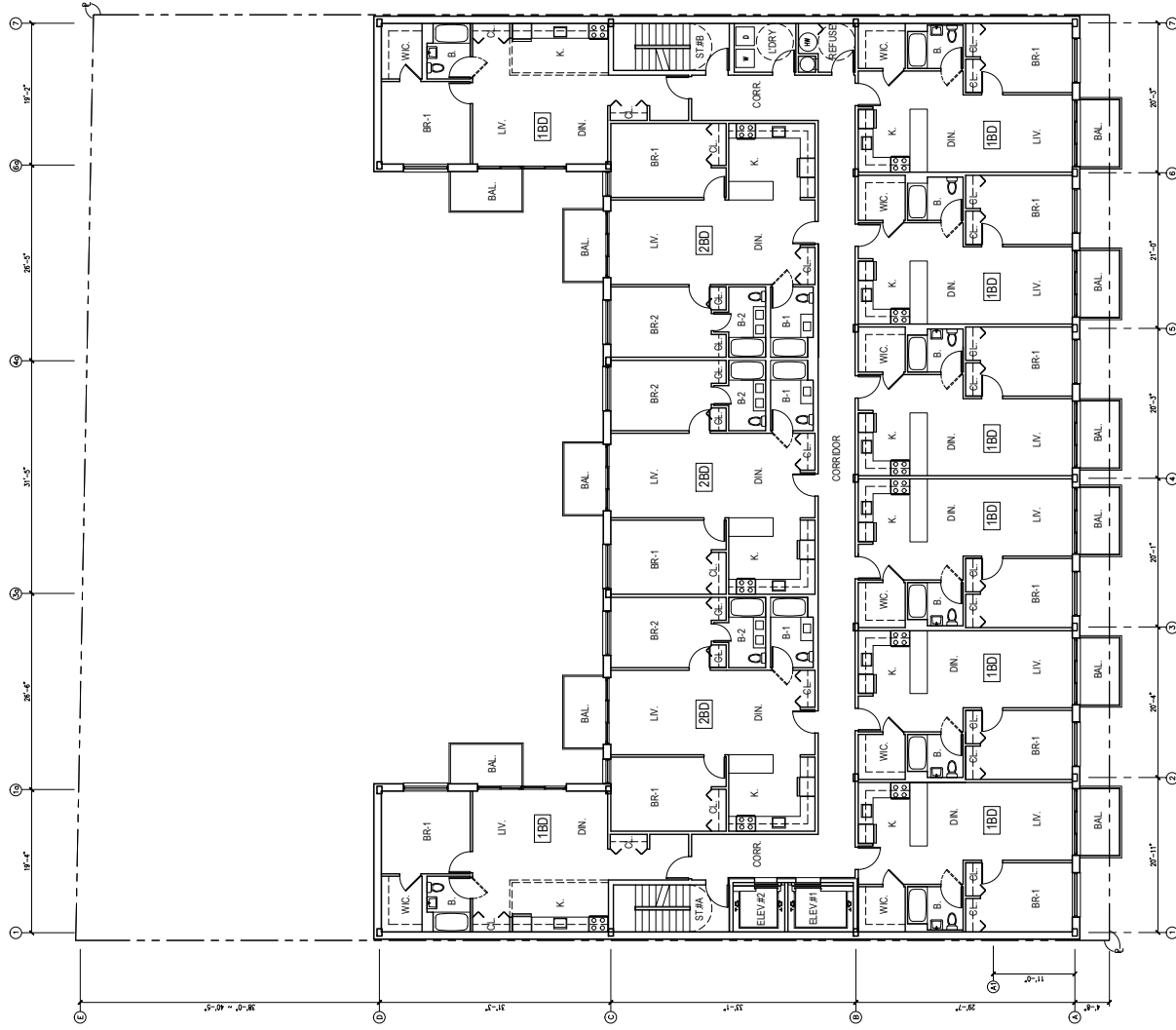




A-4

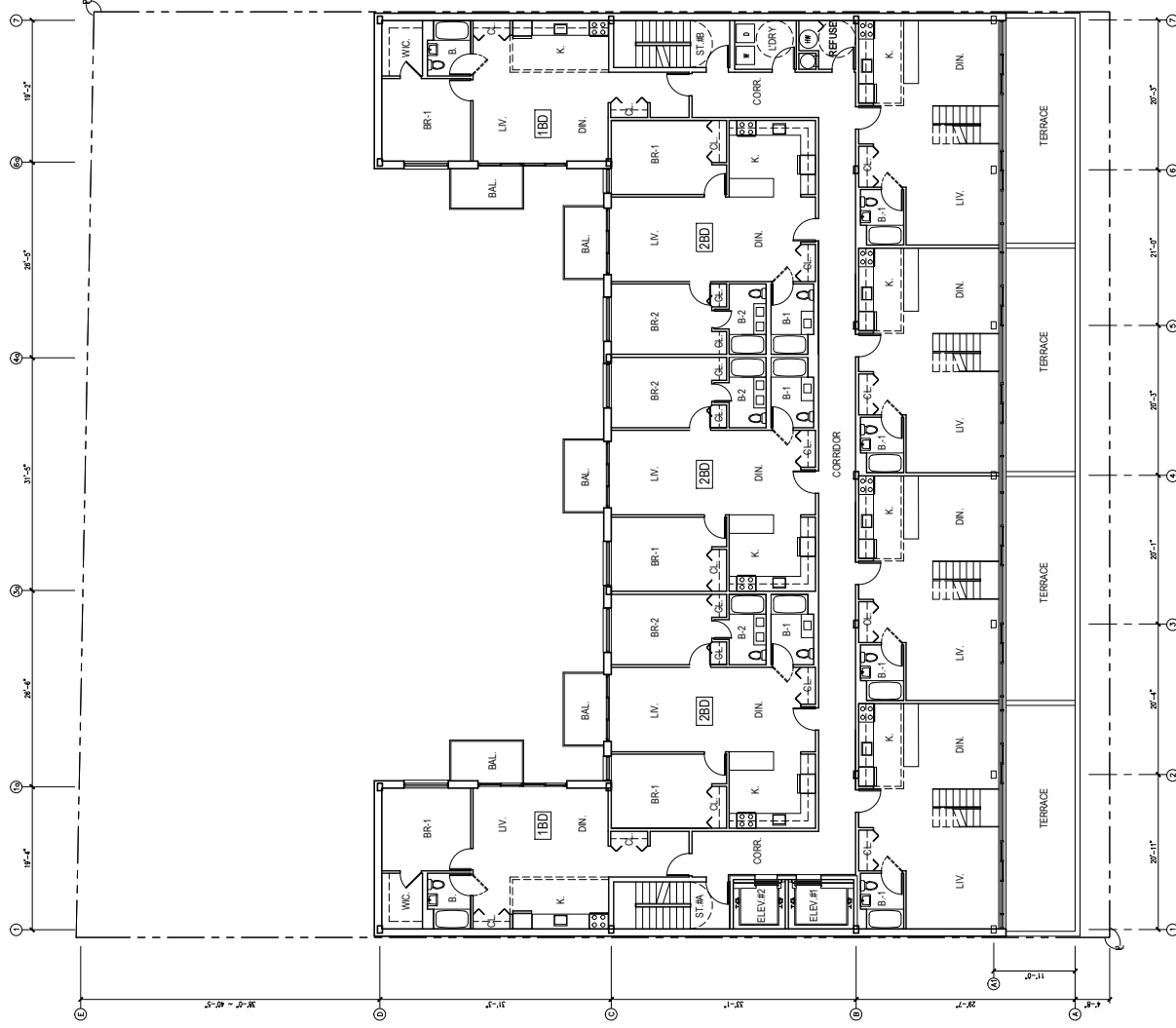
2F PLAN
SCALE : 1/8"=1'-0"
DATE : 10/26/2016

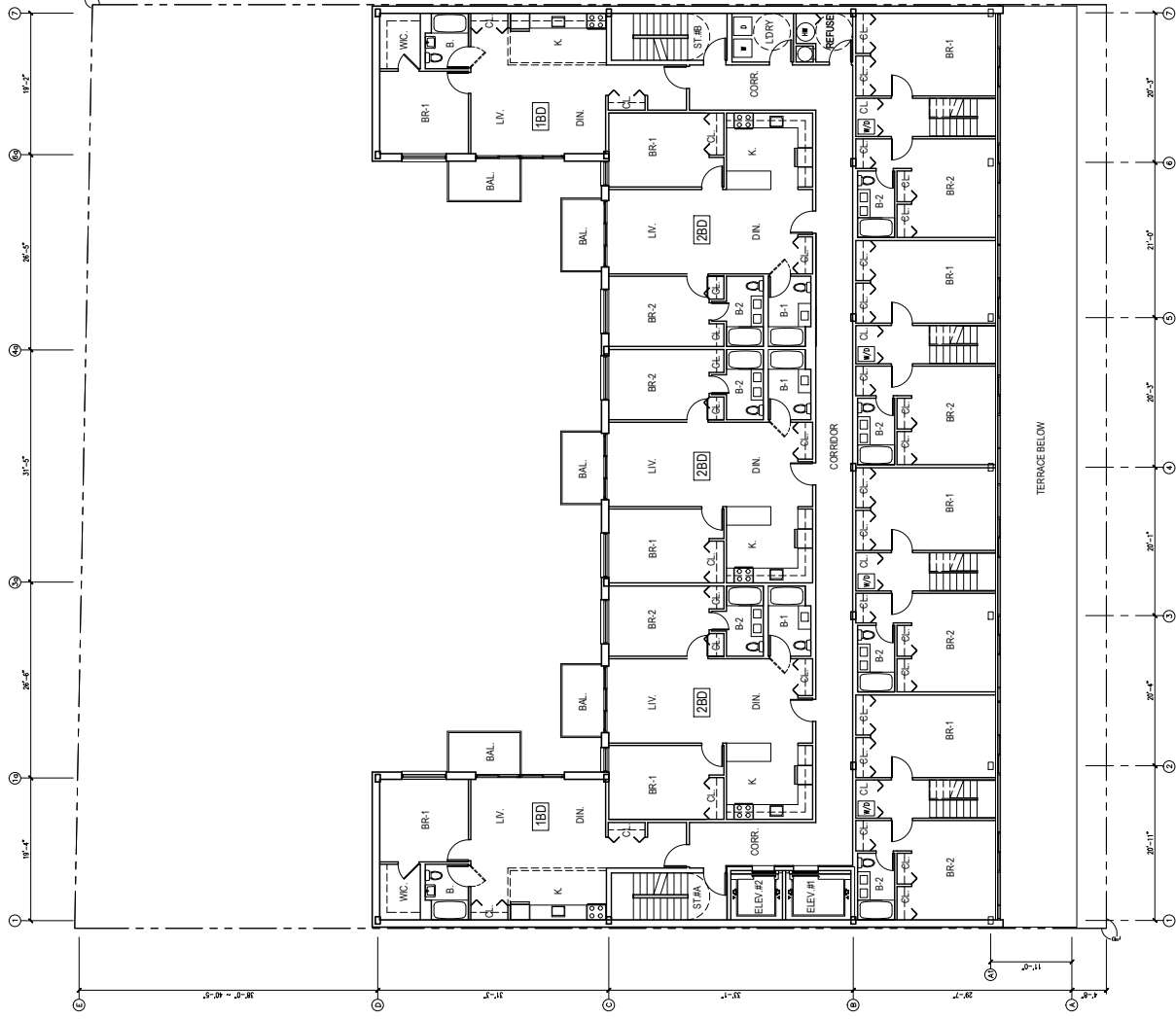




A-6

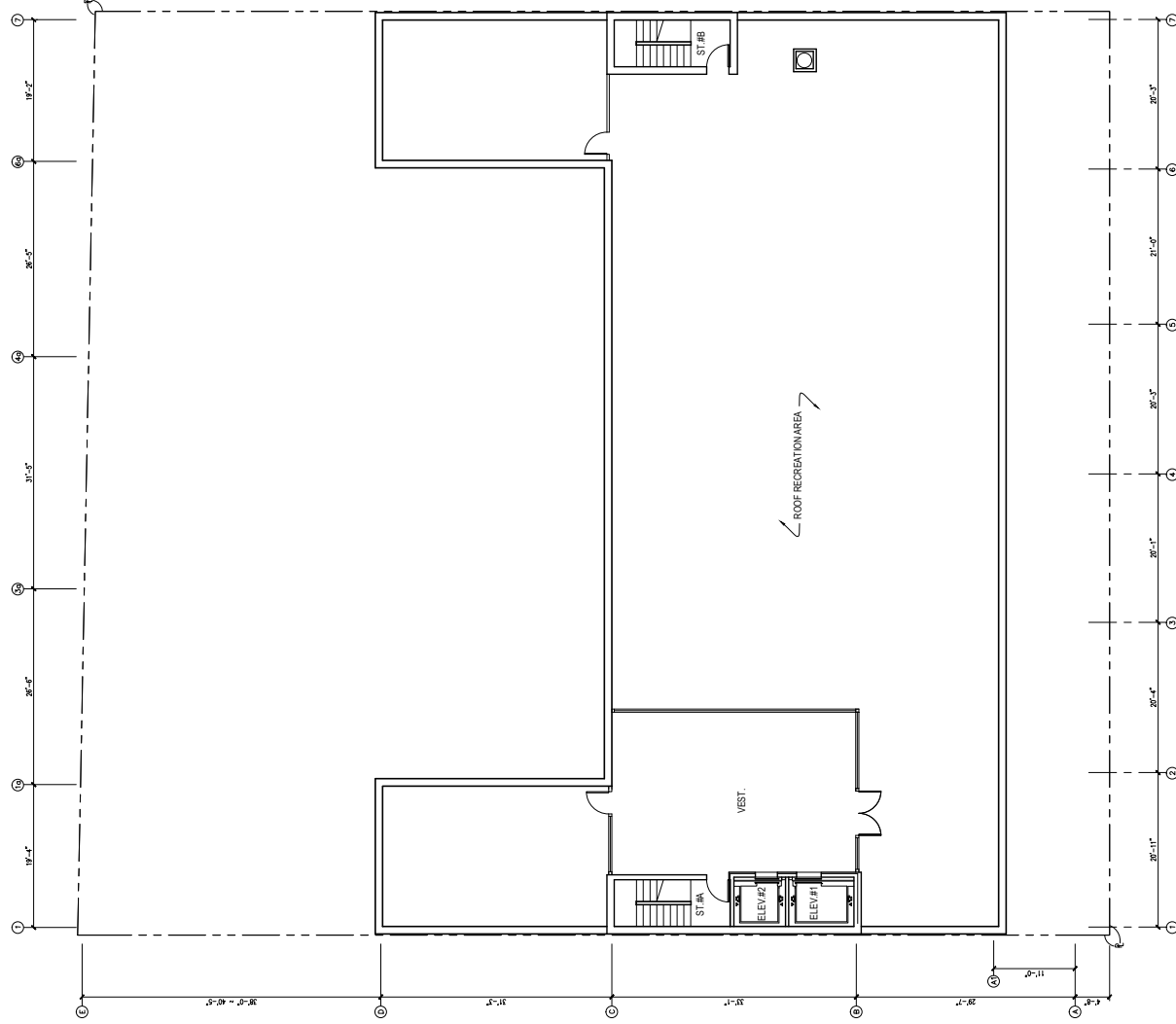
8F PLAN
SCALE : 1/8"=1'-0"
DATE : 10/26/2016





A-8

ROOF PLAN
SCALE : 1/16"=1'-0"
DATE : 10/26/2016





March 29, 2021

Shaminder Chawla
Deputy Director
Office of Environmental Remediation
100 Gold Street, 2nd Floor
New York New York 10038

RE: 148-28 Hillside Avenue, Jamaica, NY 11435
NYCOER Project No. 17TMP0097Q
NYSDEC Order on Consent (Site No. 241199)

Dear Shaminder:

On April 24, 2020, The New York State Department of Environmental Conservation (NYSDEC) and 168 Hillside Inc. (the "Volunteer") executed an Order on Consent directing the Volunteer to perform a Site Characterization to address the hotspot of Tetrachloroethene (PCE) in shallow soil discovered during a Remedial Investigation (RI) under New York City Voluntary Cleanup Program (VCP). The NYSDEC Order on Consent was apparently issued due to the delayed implementation of an approved Remedial Action Work Plan (RAWP) by the New York City Office of Environmental Remediation (NYCOER).

Since issuance of a Notice to Proceed on May 1, 2018, the Volunteer, has sought approval from the New York City Department of Housing Preservation and Development (NYCHPD) for the development of a nine-story mixed-use building with affordable housing units, which has recently been approved. The COVID-19 pandemic caused additional delays in the commencement of remedial activities until only recently when NYCOER was contacted to schedule a pre-construction meeting pursuant to the approved Stipulation List.

Due to the comprehensive investigations already performed at the Site, the Volunteer seeks to continue remedial activities under the NYCOER's Voluntary Cleanup Program. The following information summarizes the NYCOER-approved remedial investigations and remedial activities intended to address urban fill and the PCE hotspot beneath the Site.

In October of 2016, ACT issued a Remedial Investigation Report ("RIR"), which indicated that the Site was formerly occupied by a filling station and auto repair shop. The Remedial Investigation included a site inspection, geophysical investigation, and the installation, screening, and sampling of 10 soil borings, 3 groundwater monitoring wells, and 7 soil vapor probes throughout the Site. A Sampling Diagram is attached as Figure 1.

200 Broadhollow Road, Suite 207, Melville, NY 11747 • Tel: (516) 441-5800 • Fax: (516) 441-5511
Website Address: actenvirons.com



The results of the Remedial Investigation indicated the following:

Soil:

- PCE was detected above its Unrestricted Use Soil Cleanup Objectives (UUSCOs) in one shallow soil sample (SB-9, 11 mg/Kg @ 0-2 ft) beneath the eastern portion of the former building. A soil sample collected from SB-9 at the 10-12 foot depth did not contain PCE above its laboratory method detection limit. No other VOCs except Acetone were detected in soil above their UUSCOs during the Remedial Investigation;
- Shallow soil also contained two SVOCs (Benzo(a)anthracene, 1.55 mg/kg and Chrysene, 1.56 mg/kg), one pesticide (4,4'-DDT, 5.06 mg/kg), and four metals (Lead, max. 1,100 mg/Kg, Selenium, max. 7.18 mg/Kg, Chromium, max. 31.2 mg/Kg, and Mercury, max. 0.217 mg/Kg) above SCO;
- With the exception of PCE, shallow soil chemistry beneath the Site is consistent with historical urban fill material in New York City.

Groundwater:

- One VOC, Chloroform was detected in two groundwater samples (max. 14 µg/L) above its GQS of 7 µg/L;
- One SVOC, Bis(2-ethylhexyl)phthalate was detected in one groundwater sample (11 µg/L) above its GQS of 5 µg/L. PCBs were detected in the three groundwater samples (max. 0.135 µg/L) above its GQS of 0.09 µg/L

Soil Vapor:

- PCE was detected in all six soil vapor samples with a maximum concentration of 2,700 µg/m³ in SS-3 beneath the eastern portion of the Site. Trichloroethylene was also detected in SS-3 @ 55 µg/m³.

A RAWP and Stipulation List approved by the NYCOER indicate that the following remedial activities will be protective of public health and the environment:

- Delineation of PCE contaminated shallow soil previously identified in SB-9;
- Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs. The entire footprint of the Site will be excavated to a depth of approximately 13 feet below grade for development purposes. A small portion of property will be excavated to the depths of 18 feet below grade for elevator pit(s);

148-28 Hillside Avenue, Jamaica, NY 11435
NYCOER Project No. 17TMP0097Q
NYSDEC Order on Consent (Site No. 241199)



- Collection of 8 endpoint soil samples, including 1 endpoint sample in the vicinity of the PCE hotspot;
- Installation of a vapor barrier system beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building;
- Installation of an active sub-slab depressurization system (SSDS) beneath the building slab and vapor barrier system;
- Construction and operation of a cellar parking garage with high volume air exchange in conformance with NYC Building Code.

In 2017, ACT conducted a PCE Delineation Investigation at the Site, which included the installation, screening and sampling of 4 soil borings spaced 5 feet from soil boring SB-9. Two soil samples (4-6ft and 6-8ft) were collected from each soil boring. Only soil boring SB-4 contained PCE (0.0093 mg/Kg @ 4-6ft) well below its UUSCO of 1.3 mg/Kg. None of the remaining seven soil samples contained PCE above its laboratory method detection limit. A diagram of chlorinated volatile organic compounds (CVOCs) detected in subsurface soil during the Remedial Investigation and Delineation Investigation is included in Figure 2.

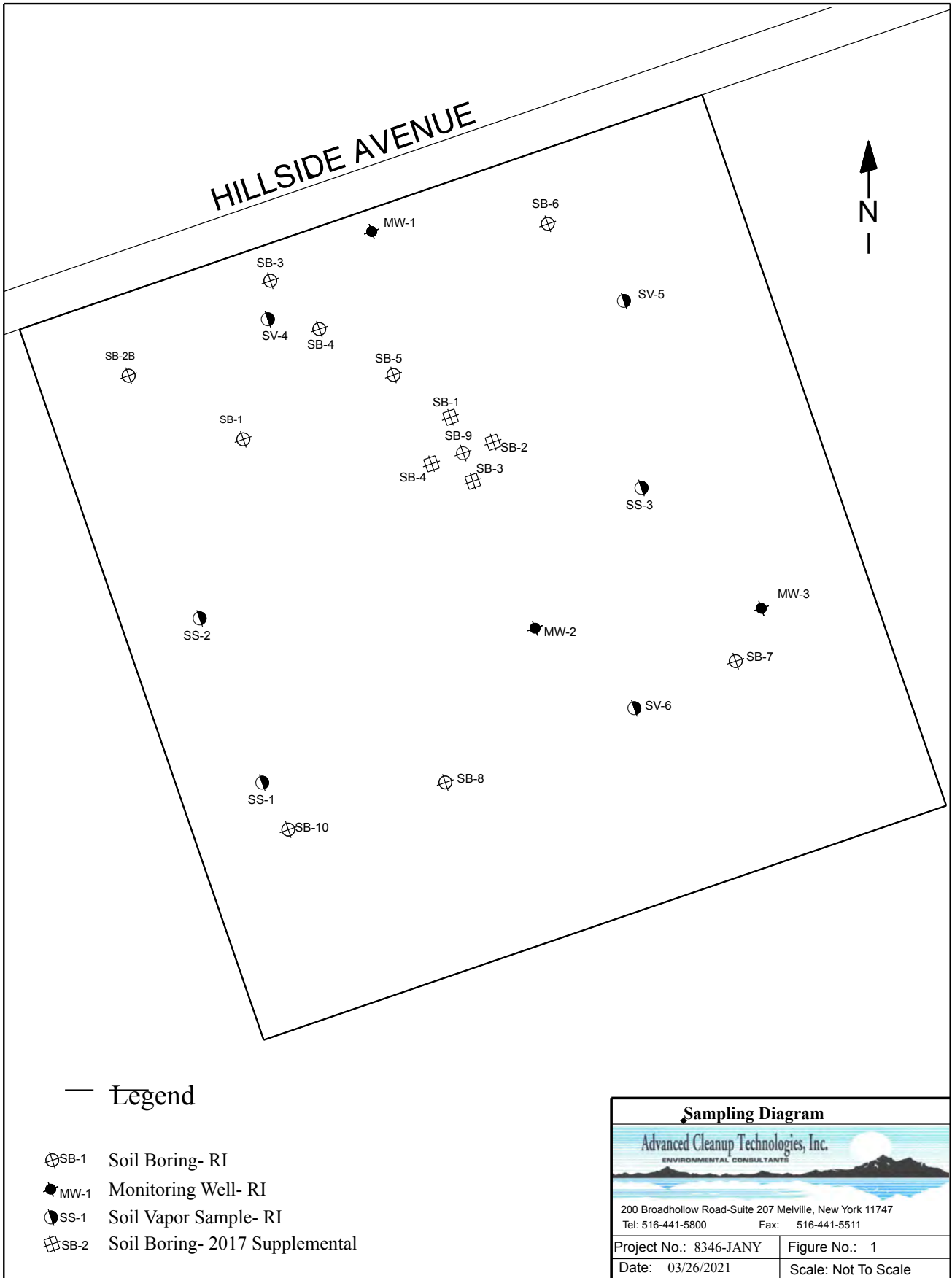
In summary, the extent of PCE soil contamination has been delineated to a depth of 0-2 ft below a small area in the eastern portion of the Site. The remedial activities specified in the NYOER-approved RAWP will remove soil up to 13 feet in depth beneath the entire site and mitigate residual soil vapor intrusion with a vapor barrier system, active sub-slab depressurization system and a parking garage ventilation system.

In light of the above, ACT concludes the above-mentioned remedial activities will sufficiently address the PCE hotspot and urban fill material in shallow soil beneath the Site. In an effort to minimize the economic burden and time for development of this affordable housing project, ACT requests to continue remedial activities under the NYCOER's Voluntary Cleanup Program.

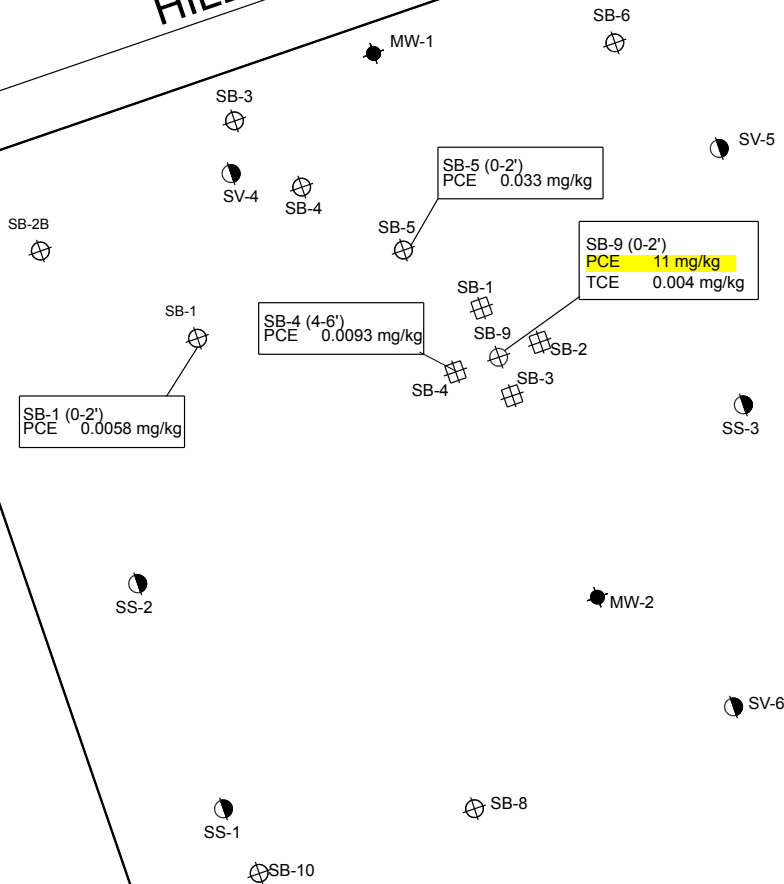
Please let us know if NYSDEC and NYCOER finds this request acceptable.

Very truly yours,

Paul P. Stewart, MS, QEP
President



HILLSIDE AVENUE



Legend

- ⊕ SB-1 Soil Boring- RI
- MW-1 Monitoring Well- RI
- SS-1 Soil Vapor Sample- RI
- ⊞ SB-2 Soil Boring- 2017 Supplemental

Note:

PCE: Tetrachloroethylene
TCE: Trichloroethylene
c12-DCE: cis-1,2 Dichloroethylene
VC: Vinyl Chloride

Unit: mg/kg

Yellow Highlight Indicates an Exceedance above
NYSDEC Part 375 Restricted Use Soil Cleanup
Objectives-Protection of GW

Orange Highlight Indicates an Exceedance above
NYSDEC Part 375 Restricted Use Soil Cleanup
Objectives-Commercial

CVOCs in Subsurface Soil



200 Broadhollow Road-Suite 207 Melville, New York 11747
Tel: 516-441-5800 Fax: 516-441-5511

Project No.: 8346-JANY	Figure No.: 2
Date: 03/26/2021	Scale: Not To Scale

FIELD SOIL BORING LOG

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

960 S. Broadway
Hicksville NY

JOB No.:

8346-SAMX

BORING NUMBER:

SB-1

LOCATION:

14828 Hillside Ave

DATE:

2-24-17

WEATHER:

Drilling Method:

Direct Push drilling technology-

Depth (ft. bgs)	Depth (ft)	Recovery (ft)	PID (ppm)	USCS Symbol	Description	Environmental Description
1	0-4	25"	0.0		0-4' fill material	
2					0-2' concrete asphalt	
3					2-4 Brn Bituminous coal	
4					trace sand black red red-brown	
5	4-8	56"	0.0		4-4.5" red fill	
6					4.5 - 7.5' graded to coarse sub	sub ang sub rounded gravels
7					1+ brn sand	
8					little to trace silt from top 4.5 - 7.5'	
9	8-12		0.0		7.5-8.0 6-med graded + co sand "beach sand"	
10						
11						
12						

FIELD SOIL BORING LOG

Advanced Cleanup Technologies, Inc. ENVIRONMENTAL CONSULTANTS		Tamp - Driller TY - logger					
960 S. Broadway Hicksville NY	JOB No.: <u>8346-JANY</u>	BORING NUMBER: <u>"SB-2"</u>					
	LOCATION: <u>148-28 Hillside Ave Jamaica</u>	DATE: <u>4/18/17</u>					
	Drilling Method: <u>Direct Push drilling technology- Portable</u>	WEATHER: <u>sunny 50's</u>					
Depth (ft. bgs)	Depth (ft)	Recovery (ft)	PID (ppm)	USCS Symbol	Description	Environmental Description	
1	0-4	3' ft	800 ppb		concrete - 3"	* UNABLE TO DUPLICATE PID HITS * NO ODORS	
2			1600 ppb		0-1' → concrete fragments asphalt (lying) below (old) light brown to brown, red grained sands matrix - coal like fragments		
3			0 ppb		1-3' → Fill - pink to light red coarse sands - brick / asphalt rock like fragments ceramics (?)		
4			0 ppb		3-4' light brown to brown, medium grained sands, silty - compact rounded qtz frags		
5	4-8	4.5' ft	0.0		~ 6" retrieval (concrete/asphalt mix)	NATIVES (?)	
6					6-7.5 - orange / rusty brown, medium to coarse grained sands (toward 7') rounded, abundant qtz large gravel chunks throughout (NON-SILTY)		
7					7.5-8.0 - light tan fine grained sands, silty		
8							
9	8-12				<u>SAMPLES</u> 4-6' 1110 6-8' 1120		
10							
11							
12							

FIELD SOIL BORING LOG

Advanced Cleanup Technologies, Inc. ENVIRONMENTAL CONSULTANTS		JOB No.: <u>8346-JANY</u>		BORING NUMBER: <u>SB-3</u>		
960 S. Broadway Hicksville NY		LOCATION: <u>148-28 Hillside Ave NY</u> <u>Tamara</u>		DATE: <u>4/18/17</u>		
Drilling Method: <u>Direct Push drilling technology- Portable</u>		WEATHER: <u>sunny 50's</u>				
Depth (ft. bgs)	Depth (ft)	Recovery (ft)	PID (ppm)	USCS Symbol	Description	Environmental Description
1	0-4	2.8 ft	0	apb	concrete -	NO ODORS
2					0-1- concrete powder mostly hard rock (concrete) fragments light brown, medium sand matrix	
3					1-3.5- light brown to brown, medium grained sand abundant asphaltic / coal like fragments w/ large gte frags	
4					3.5-4.0 - light to orange brown, medium grain sands, some silt layering	
5	4-8	3.5 ft	0.0		8" rebar (concrete mostly)	NO ODORS (Natives?)
6					4-5- light brown to orange brown, medium (some coarse) sand medium sized gravel fragments	
7					5-7.5 orange orange to rusty orange / brown coarse to very coarse sand, abundant gte fragments + rounded pebbles	
8					7.5-8.0 - light tan fine sand, silty compact	
9	8-12				SAMPLE 4-6 1215	
10					SAMPLE 6-8 1220	
11						
12						

FIELD SOIL BORING LOG

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

960 S. Broadway
Hicksville NY

JOB No.: 8340-SAM

BORING NUMBER: SB-4

LOCATION: 14828 Hillside Ave

DATE: 2-24-17

WEATHER: _____

Drilling Method: Direct Push drilling technology-

Depth (ft. bgs)	Depth (ft)	Recovery (ft)	PID (ppm)	USCS Symbol	Description	Environmental Description
1	0-4	24"	0.0		0-2' fill material concrete, asphalt, small gravel 2-4' lt brn sand partly sieved f-c graded w/ sub rounded to rounded graded trace silt coal bits to little loose damp	Sampled 4-6
2						
3						
4	4-8	36"	0.0		lt brn sand w/ trace silt med-coarse graded partly sieved loose damp	6-8
5			0.0			
6						
7						
8	8-12		0.0			
9						
10						
11						
12						



Technical Report

prepared for:

Advanced Cleanup Technologies, Inc.

110 Main Street

Port Washington NY, 11050

Attention: Mark Gelband

Report Date: 04/26/2017

Client Project ID: 8346-JANY

York Project (SDG) No.: 17D0698

CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037



New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

120 RESEARCH DRIVE
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(203) 325-1371

132-02 89th AVENUE
FAX (203) 357-0166

RICHMOND HILL, NY 11418
ClientServices@yorklab.com

Report Date: 04/26/2017
Client Project ID: 8346-JANY
York Project (SDG) No.: 17D0698

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Mark Gelband

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on April 19, 2017 and listed below. The project was identified as your project: **8346-JANY**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the attachment to this report, and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
17D0698-01	SB-2 (4-6')	Soil	04/18/2017	04/19/2017
17D0698-02	SB-2 (6-8')	Soil	04/18/2017	04/19/2017
17D0698-03	SB-3 (4-6')	Soil	04/18/2017	04/19/2017
17D0698-04	SB-3 (6-8')	Soil	04/18/2017	04/19/2017

General Notes for York Project (SDG) No.: 17D0698

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation, unless otherwise noted.
6. All analyses conducted met method or Laboratory SOP requirements. See the Qualifiers and/or Narrative sections for further information.
7. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
8. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
9. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By:



Benjamin Gulizia
Laboratory Director

Date: 04/26/2017





Sample Information

Client Sample ID: SB-2 (4-6')

York Sample ID: 17D0698-01

<u>York Project (SDG) No.</u>	<u>Client Project ID</u>	<u>Matrix</u>	<u>Collection Date/Time</u>	<u>Date Received</u>
17D0698	8346-JANY	Soil	April 18, 2017 11:10 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 14:10	BK
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 14:10	BK
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
95-63-6	1,2,4-Trimethylbenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
123-91-1	1,4-Dioxane	ND		ug/kg dry	61	120	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK



Sample Information

Client Sample ID: SB-2 (4-6')

York Sample ID: 17D0698-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 11:10 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
78-93-3	2-Butanone	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
591-78-6	2-Hexanone	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
108-10-1	* 4-Methyl-2-pentanone	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH	04/24/2017 07:33	04/24/2017 14:10	BK
67-64-1	Acetone	21	SCAL-E	ug/kg dry	6.1	12	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
107-02-8	Acrolein	ND		ug/kg dry	6.1	12	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
107-13-1	Acrylonitrile	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
71-43-2	Benzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
74-97-5	Bromochloromethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-27-4	Bromodichloromethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-25-2	Bromoform	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
74-83-9	Bromomethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-15-0	Carbon disulfide	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
56-23-5	Carbon tetrachloride	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
108-90-7	Chlorobenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-00-3	Chloroethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
67-66-3	Chloroform	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
74-87-3	Chloromethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
110-82-7	Cyclohexane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
124-48-1	Dibromochloromethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK



Sample Information

Client Sample ID: SB-2 (4-6')

York Sample ID: 17D0698-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 11:10 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-95-3	Dibromomethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
100-41-4	Ethyl Benzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
98-82-8	Isopropylbenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
79-20-9	Methyl acetate	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
108-87-2	Methylcyclohexane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-09-2	Methylene chloride	ND		ug/kg dry	6.1	12	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
104-51-8	n-Butylbenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
103-65-1	n-Propylbenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
95-47-6	o-Xylene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	6.1	12	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
135-98-8	sec-Butylbenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
100-42-5	Styrene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/kg dry	3.1	12	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
98-06-6	tert-Butylbenzene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
127-18-4	Tetrachloroethylene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
108-88-3	Toluene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK



Sample Information

Client Sample ID: SB-2 (4-6')

York Sample ID: 17D0698-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 11:10 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
79-01-6	Trichloroethylene	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
75-01-4	Vinyl Chloride	ND		ug/kg dry	3.1	6.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:10	BK
1330-20-7	Xylenes, Total	ND		ug/kg dry	9.2	18	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 14:10	BK
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: 1,2-Dichloroethane-d4	107 %	77-125								
2037-26-5	Surrogate: Toluene-d8	97.2 %	85-120								
460-00-4	Surrogate: p-Bromofluorobenzene	102 %	76-130								

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	81.6		%	0.100	1	SM 2540G Certifications: CTDOH	04/25/2017 12:18	04/25/2017 14:02	TAJ

Sample Information

Client Sample ID: SB-2 (6-8')

York Sample ID: 17D0698-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 11:20 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK

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Sample Information

Client Sample ID: SB-2 (6-8')

York Sample ID: 17D0698-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 11:20 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 14:42	BK
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 14:42	BK
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
95-63-6	1,2,4-Trimethylbenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
123-91-1	1,4-Dioxane	ND		ug/kg dry	57	110	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
78-93-3	2-Butanone	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
591-78-6	2-Hexanone	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
108-10-1	* 4-Methyl-2-pentanone	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH	04/24/2017 07:33	04/24/2017 14:42	BK
67-64-1	Acetone	32	SCAL- E	ug/kg dry	5.7	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK



Sample Information

Client Sample ID: SB-2 (6-8')

York Sample ID: 17D0698-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 11:20 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
107-02-8	Acrolein	ND		ug/kg dry	5.7	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
107-13-1	Acrylonitrile	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
71-43-2	Benzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
74-97-5	Bromochloromethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-27-4	Bromodichloromethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-25-2	Bromoform	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
74-83-9	Bromomethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-15-0	Carbon disulfide	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
56-23-5	Carbon tetrachloride	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
108-90-7	Chlorobenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-00-3	Chloroethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
67-66-3	Chloroform	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
74-87-3	Chloromethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
110-82-7	Cyclohexane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
124-48-1	Dibromochloromethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
74-95-3	Dibromomethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
100-41-4	Ethyl Benzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK



Sample Information

Client Sample ID: SB-2 (6-8')

York Sample ID: 17D0698-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 11:20 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
98-82-8	Isopropylbenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
79-20-9	Methyl acetate	3.6	SCAL- E, J	ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
108-87-2	Methylcyclohexane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-09-2	Methylene chloride	ND		ug/kg dry	5.7	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
104-51-8	n-Butylbenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
103-65-1	n-Propylbenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
95-47-6	o-Xylene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	5.7	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
135-98-8	sec-Butylbenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
100-42-5	Styrene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/kg dry	2.8	11	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
98-06-6	tert-Butylbenzene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
127-18-4	Tetrachloroethylene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
108-88-3	Toluene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
79-01-6	Trichloroethylene	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK
75-01-4	Vinyl Chloride	ND		ug/kg dry	2.8	5.7	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 14:42	BK



Sample Information

Client Sample ID: SB-2 (6-8')

York Sample ID: 17D0698-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 11:20 am	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
1330-20-7	Xylenes, Total	ND		ug/kg dry	8.5	17	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 14:42	BK
Surrogate Recoveries		Result		Acceptance Range							
17060-07-0	Surrogate: 1,2-Dichloroethane-d4	104 %		77-125							
2037-26-5	Surrogate: Toluene-d8	97.4 %		85-120							
460-00-4	Surrogate: p-Bromofluorobenzene	96.0 %		76-130							

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	89.1		%	0.100	1	SM 2540G Certifications: CTDOH	04/25/2017 12:18	04/25/2017 14:02	TAJ

Sample Information

Client Sample ID: SB-3 (4-6')

York Sample ID: 17D0698-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 12:15 pm	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 15:14	BK
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK



Sample Information

Client Sample ID: SB-3 (4-6')

York Sample ID: 17D0698-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 12:15 pm	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 15:14	BK
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
95-63-6	1,2,4-Trimethylbenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
123-91-1	1,4-Dioxane	ND		ug/kg dry	56	110	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
78-93-3	2-Butanone	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
591-78-6	2-Hexanone	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
108-10-1	* 4-Methyl-2-pentanone	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH	04/24/2017 07:33	04/24/2017 15:14	BK
67-64-1	Acetone	54	SCAL-E	ug/kg dry	5.6	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
107-02-8	Acrolein	ND		ug/kg dry	5.6	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
107-13-1	Acrylonitrile	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
71-43-2	Benzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
74-97-5	Bromochloromethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK



Sample Information

Client Sample ID: SB-3 (4-6')

York Sample ID: 17D0698-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 12:15 pm	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-27-4	Bromodichloromethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-25-2	Bromoform	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
74-83-9	Bromomethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-15-0	Carbon disulfide	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
56-23-5	Carbon tetrachloride	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
108-90-7	Chlorobenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-00-3	Chloroethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
67-66-3	Chloroform	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
74-87-3	Chloromethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
110-82-7	Cyclohexane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
124-48-1	Dibromochloromethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
74-95-3	Dibromomethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
100-41-4	Ethyl Benzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
98-82-8	Isopropylbenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
79-20-9	Methyl acetate	13	SCAL- E	ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
108-87-2	Methylcyclohexane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK



Sample Information

Client Sample ID: SB-3 (4-6')

York Sample ID: 17D0698-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 12:15 pm	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-09-2	Methylene chloride	ND		ug/kg dry	5.6	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
104-51-8	n-Butylbenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
103-65-1	n-Propylbenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
95-47-6	o-Xylene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	5.6	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
135-98-8	sec-Butylbenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
100-42-5	Styrene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/kg dry	2.8	11	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
98-06-6	tert-Butylbenzene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
127-18-4	Tetrachloroethylene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
108-88-3	Toluene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
79-01-6	Trichloroethylene	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
75-01-4	Vinyl Chloride	ND		ug/kg dry	2.8	5.6	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:14	BK
1330-20-7	Xylenes, Total	ND		ug/kg dry	8.4	17	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 15:14	BK
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: 1,2-Dichloroethane-d4	105 %	77-125								
2037-26-5	Surrogate: Toluene-d8	96.5 %	85-120								
460-00-4	Surrogate: p-Bromofluorobenzene	99.1 %	76-130								



Sample Information

Client Sample ID: SB-3 (4-6')

York Sample ID: 17D0698-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 12:15 pm	04/19/2017

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	91.3		%	0.100	1	SM 2540G Certifications: CTDOH	04/25/2017 12:18	04/25/2017 14:02	TAJ

Sample Information

Client Sample ID: SB-3 (6-8')

York Sample ID: 17D0698-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 12:20 pm	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 15:45	BK
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 15:45	BK
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
95-63-6	1,2,4-Trimethylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK



Sample Information

Client Sample ID: SB-3 (6-8')

York Sample ID: 17D0698-04

York Project (SDG) No.

17D0698

Client Project ID

8346-JANY

Matrix

Soil

Collection Date/Time

April 18, 2017 12:20 pm

Date Received

04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
123-91-1	1,4-Dioxane	ND		ug/kg dry	52	100	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
78-93-3	2-Butanone	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
591-78-6	2-Hexanone	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
108-10-1	* 4-Methyl-2-pentanone	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
67-64-1	Acetone	46	SCAL-E	ug/kg dry	5.2	10	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
107-02-8	Acrolein	ND		ug/kg dry	5.2	10	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
107-13-1	Acrylonitrile	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
71-43-2	Benzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
74-97-5	Bromochloromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
75-27-4	Bromodichloromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
75-25-2	Bromoform	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
74-83-9	Bromomethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
75-15-0	Carbon disulfide	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
56-23-5	Carbon tetrachloride	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK
108-90-7	Chlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications:	04/24/2017 07:33	04/24/2017 15:45	BK



Sample Information

Client Sample ID: SB-3 (6-8')

York Sample ID: 17D0698-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 12:20 pm	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-00-3	Chloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
67-66-3	Chloroform	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
74-87-3	Chloromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
110-82-7	Cyclohexane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
124-48-1	Dibromochloromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
74-95-3	Dibromomethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
100-41-4	Ethyl Benzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
98-82-8	Isopropylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
79-20-9	Methyl acetate	4.2	SCAL- E, J	ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
108-87-2	Methylcyclohexane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
75-09-2	Methylene chloride	ND		ug/kg dry	5.2	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
104-51-8	n-Butylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
103-65-1	n-Propylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
95-47-6	o-Xylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	5.2	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK



Sample Information

Client Sample ID: SB-3 (6-8')

York Sample ID: 17D0698-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17D0698	8346-JANY	Soil	April 18, 2017 12:20 pm	04/19/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
135-98-8	sec-Butylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
100-42-5	Styrene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/kg dry	2.6	10	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
98-06-6	tert-Butylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
127-18-4	Tetrachloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
108-88-3	Toluene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
79-01-6	Trichloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
75-01-4	Vinyl Chloride	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	04/24/2017 07:33	04/24/2017 15:45	BK
1330-20-7	Xylenes, Total	ND		ug/kg dry	7.7	15	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	04/24/2017 07:33	04/24/2017 15:45	BK
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: 1,2-Dichloroethane-d4	102 %	77-125								
2037-26-5	Surrogate: Toluene-d8	96.9 %	85-120								
460-00-4	Surrogate: p-Bromofluorobenzene	98.5 %	76-130								

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	90.9		%	0.100	1	SM 2540G Certifications: CTDOH	04/25/2017 12:18	04/25/2017 14:02	TAJ



Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
17D0698-01	SB-2 (4-6')	40mL Vial with Stir Bar-Cool 4° C
17D0698-02	SB-2 (6-8')	40mL Vial with Stir Bar-Cool 4° C
17D0698-03	SB-3 (4-6')	40mL Vial with Stir Bar-Cool 4° C
17D0698-04	SB-3 (6-8')	40mL Vial with Stir Bar-Cool 4° C



Notes and Definitions

SCAL-E	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration (average Rf>20%).
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
CCV-E	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.



Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.





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YORK
ANALYTICAL LABORATORIES INC

Field Chain-of-Custody Record

Page 1 of 1

York Project No.

NOTE: York's Std. Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization to York to proceed with the analyses requested and your signature binds you to York's Std. Terms & Conditions.

YOUR Information Company: <u>Advanced Cleanup Tech</u> Address: <u>110 Main St.</u> <u>Port Washington, NY</u> Phone No. <u>516-441-5300</u> Contact Person: <u>Tim Yang</u> E-Mail Address: <u>timy@act-eastn</u>		Report To: Company: <u>ACT</u> Address: <u> </u> Phone No. <u> </u> Attention: <u>Mark Belband</u> E-Mail Address: <u>Marky@act-eastn</u>		Invoice To: Company: <u>ACT</u> Address: <u> </u> Phone No. <u> </u> Attention: <u>Karen Friedman</u> E-Mail Address: <u>Karney@act-eastn</u>		YOUR Project ID <u>8346-SANY</u> Purchase Order No. <u> </u>		Turn-Around Time RUSH - Same Day ☐ RUSH - Next Day ☐ RUSH - Two Day ☐ RUSH - Three Day ☐ RUSH - Four Day ☐ Standard (5-7 Days) ☒		Report Type Summary Report ☒ Summary w/ QA Summary ☐ CT RCP Package ☐ CTRCP DQA/DUE Pkg ☐ NY ASP A Package ☐ NY ASP B Package ☐ NJDEP Red. Deliv. ☐ Electronic Data Deliverables (EDD) ☐	
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Print Clearly and Legibly. All Information must be complete. Samples will NOT be logged in and the turn-around time clock will not begin until any questions by York are resolved.

Matrix Codes
 S - soil
 Other - specify (oil, etc.)
 WW - wastewater
 GW - groundwater
 DW - drinking water
 Air-A - ambient air
 Air-SV - soil vapor

Samples Collected/Authorized By (Signature)
Tim Yang
 Name (printed)

Semi-Volatiles	Volatiles	Metals	Misc. Org.	Full Lists	Misc.
8270 or 625 STARS list BN Only Acids Only PAH list TAGM list CT RCP list TCLP list Arom. only Halog. only App. IX list 8021B list	8260 full 624 STARS list BTEX MTBE TCL list TAGM list CT RCP list 524.2 Arom. only 502.2 Halog. only App. IX list 8021B list	RCRA8 PPI3 list TAL CT15 list TAGM list NIDEP list Total Dissolved SP/PerTCLP TCLP Herb Chlordane 608 Pest SP/PerTCLP 608 PCB	TPH GRO TPH DRO CT ETPH NY 310-13 TPH 1664 Air TO14A Air TO15 Air STARS Air VPH Air TICs Methane Helium	Pr-Poll. TCL Oqars TAL MerCN Full TCLP Full App. IX Full App. IX Part 360-Residue Part 360-Residue Part 360-Residue NYCDEP Sewer NYCDEP Sewer Asbestos Silica	Corrosivity Reactivity Ignitability Flash Point Sieve Anal. Heterotrophs TOX BTU/lb. Aquatic Tox. NYCDEP Sewer TOC Asbestos Silica

Sample Identification	Date/Time Sampled	Sample Matrix	Choose Analyses Needed from the Menu Above and Enter Below	Container Description(s)
SB-2 (4-6')	4/18/17 1110	S	Full VOC's	VOC Kit
SB-2 (6-8')	" 1120	S		"
SB-3 (4-6')	" 1215	S		"
SB-3 (6-8')	" 1220	S		"

Comments	4°C <u> </u> Frozen <u> </u> HCl <u> </u> MeOH <u> </u> HNO ₃ <u> </u> H ₂ SO ₄ <u> </u> NaOH <u> </u> ZrAc <u> </u> Ascorbic Acid <u> </u> Other <u> </u>	Temperature on Receipt <u> </u> Date/Time <u>4/19/17 1007</u>
	Samples Relinquished By <u>Mark Yang</u> Date/Time <u>04/19/2017 1007</u> Samples Relinquished By <u>TC Habel</u> Date/Time <u>4/19/17 1845</u>	Samples Received in LAB by <u> </u> Date/Time <u> </u>
	Samples Relinquished By <u> </u> Date/Time <u> </u>	Samples Received in LAB by <u> </u> Date/Time <u> </u>



Technical Report

prepared for:

Advanced Cleanup Technologies, Inc.

110 Main Street

Port Washington NY, 11050

Attention: Paul Stewart

Report Date: 03/06/2017

Client Project ID: 8346

York Project (SDG) No.: 17B0945

CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037



New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

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www.YORKLAB.com

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(203) 325-1371

132-02 89th AVENUE
FAX (203) 357-0166

RICHMOND HILL, NY 11418
ClientServices@yorklab.com

Report Date: 03/06/2017
Client Project ID: 8346
York Project (SDG) No.: 17B0945

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on February 28, 2017 and listed below. The project was identified as your project: **8346**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the attachment to this report, and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
17B0945-04	SB-4 (4-6')	Soil	02/24/2017	02/28/2017
17B0945-05	SB-4 (6-8')	Soil	02/24/2017	02/28/2017
17B0945-06	SB-1 (4-6')	Soil	02/24/2017	02/28/2017
17B0945-07	SB-1 (6-8')	Soil	02/24/2017	02/28/2017

General Notes for York Project (SDG) No.: 17B0945

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation, unless otherwise noted.
6. All analyses conducted met method or Laboratory SOP requirements. See the Qualifiers and/or Narrative sections for further information.
7. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
8. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
9. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By:



Benjamin Gulizia
Laboratory Director

Date: 03/06/2017





Sample Information

Client Sample ID: SB-4 (4-6')

York Sample ID: 17B0945-04

<u>York Project (SDG) No.</u>	<u>Client Project ID</u>	<u>Matrix</u>	<u>Collection Date/Time</u>	<u>Date Received</u>
17B0945	8346	Soil	February 24, 2017 1:10 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
95-63-6	1,2,4-Trimethylbenzene	4.1	J	ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
123-91-1	1,4-Dioxane	ND		ug/kg dry	54	110	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
78-93-3	2-Butanone	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK

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Client Services



Sample Information

Client Sample ID: SB-4 (4-6')

York Sample ID: 17B0945-04

York Project (SDG) No.

17B0945

Client Project ID

8346

Matrix

Soil

Collection Date/Time

February 24, 2017 1:10 pm

Date Received

02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
67-64-1	Acetone	8.3	SCAL- E, J	ug/kg dry	5.4	11	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
107-02-8	Acrolein	ND		ug/kg dry	5.4	11	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
107-13-1	Acrylonitrile	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
71-43-2	Benzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
74-97-5	Bromochloromethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
75-27-4	Bromodichloromethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
75-25-2	Bromoform	ND		ug/kg dry	5.4	11	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
74-83-9	Bromomethane	ND		ug/kg dry	5.4	11	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
75-15-0	Carbon disulfide	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
56-23-5	Carbon tetrachloride	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
108-90-7	Chlorobenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
75-00-3	Chloroethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
67-66-3	Chloroform	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
74-87-3	Chloromethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
110-82-7	Cyclohexane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 NELAC-NY10854,NJDEP	03/03/2017 16:41	BK
124-48-1	Dibromochloromethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 NELAC-NY10854,NJDEP,PADEP	03/03/2017 16:41	BK
74-95-3	Dibromomethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications:	03/03/2017 08:40 NELAC-NY10854,NJDEP	03/03/2017 16:41	BK



Sample Information

Client Sample ID: SB-4 (4-6')

York Sample ID: 17B0945-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 1:10 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
100-41-4	Ethyl Benzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
98-82-8	Isopropylbenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
79-20-9	Methyl acetate	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
108-87-2	Methylcyclohexane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
75-09-2	Methylene chloride	ND		ug/kg dry	5.4	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
104-51-8	n-Butylbenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
103-65-1	n-Propylbenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
95-47-6	o-Xylene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854	03/03/2017 08:40	03/03/2017 16:41	BK
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	5.4	11	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854	03/03/2017 08:40	03/03/2017 16:41	BK
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
135-98-8	sec-Butylbenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
100-42-5	Styrene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
98-06-6	tert-Butylbenzene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
127-18-4	Tetrachloroethylene	9.3		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
108-88-3	Toluene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/03/2017 08:40	03/03/2017 16:41	BK
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK



Sample Information

Client Sample ID: SB-4 (4-6')

York Sample ID: 17B0945-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 1:10 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
75-01-4	Vinyl Chloride	ND		ug/kg dry	2.7	5.4	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
1330-20-7	Xylenes, Total	ND		ug/kg dry	8.1	16	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/03/2017 08:40	03/03/2017 16:41	BK
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: 1,2-Dichloroethane-d4	111 %	77-125								
2037-26-5	Surrogate: Toluene-d8	97.2 %	85-120								
460-00-4	Surrogate: p-Bromofluorobenzene	110 %	76-130								

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	93.0		%	0.100	0.100	1	SM 2540G Certifications: CTDOH	03/02/2017 16:16	03/02/2017 18:24	TAJ

Sample Information

Client Sample ID: SB-4 (6-8')

York Sample ID: 17B0945-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 1:15 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK

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Sample Information

Client Sample ID: SB-4 (6-8')

York Sample ID: 17B0945-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 1:15 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
95-63-6	1,2,4-Trimethylbenzene	3.5	J	ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
123-91-1	1,4-Dioxane	ND		ug/kg dry	51	100	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
78-93-3	2-Butanone	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
591-78-6	2-Hexanone	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
67-64-1	Acetone	5.5	ICV-E, J	ug/kg dry	5.1	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
107-02-8	Acrolein	ND		ug/kg dry	5.1	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
107-13-1	Acrylonitrile	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK

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Client Services



Sample Information

Client Sample ID: SB-4 (6-8')

York Sample ID: 17B0945-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 1:15 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
71-43-2	Benzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
74-97-5	Bromochloromethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-27-4	Bromodichloromethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-25-2	Bromoform	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
74-83-9	Bromomethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-15-0	Carbon disulfide	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
56-23-5	Carbon tetrachloride	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
108-90-7	Chlorobenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-00-3	Chloroethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
67-66-3	Chloroform	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
74-87-3	Chloromethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
110-82-7	Cyclohexane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
124-48-1	Dibromochloromethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
74-95-3	Dibromomethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
100-41-4	Ethyl Benzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
98-82-8	Isopropylbenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
79-20-9	Methyl acetate	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK



Sample Information

Client Sample ID: SB-4 (6-8')

York Sample ID: 17B0945-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 1:15 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
108-87-2	Methylcyclohexane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-09-2	Methylene chloride	ND		ug/kg dry	5.1	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
104-51-8	n-Butylbenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
103-65-1	n-Propylbenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
95-47-6	o-Xylene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854	03/02/2017 08:29	03/02/2017 17:15	BK
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	5.1	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854	03/02/2017 08:29	03/02/2017 17:15	BK
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
135-98-8	sec-Butylbenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
100-42-5	Styrene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
98-06-6	tert-Butylbenzene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
127-18-4	Tetrachloroethylene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
108-88-3	Toluene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:15	BK
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
79-01-6	Trichloroethylene	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
75-01-4	Vinyl Chloride	ND		ug/kg dry	2.6	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
1330-20-7	Xylenes, Total	ND		ug/kg dry	7.7	15	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:15	BK
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: 1,2-Dichloroethane-d4	101 %	77-125								
2037-26-5	Surrogate: Toluene-d8	111 %	85-120								

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Sample Information

Client Sample ID: SB-4 (6-8')

York Sample ID: 17B0945-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 1:15 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
460-00-4	Surrogate: <i>p</i> -Bromofluorobenzene	93.5 %			76-130						

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	93.3		%	0.100	0.100	1	SM 2540G Certifications: CTDOH	03/02/2017 16:16	03/02/2017 18:24	TAJ

Sample Information

Client Sample ID: SB-1 (4-6')

York Sample ID: 17B0945-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 2:30 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK



Sample Information

Client Sample ID: SB-1 (4-6')

York Sample ID: 17B0945-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 2:30 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
123-91-1	1,4-Dioxane	ND		ug/kg dry	52	100	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
78-93-3	2-Butanone	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
591-78-6	2-Hexanone	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
67-64-1	Acetone	ND		ug/kg dry	5.2	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
107-02-8	Acrolein	ND		ug/kg dry	5.2	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
107-13-1	Acrylonitrile	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
71-43-2	Benzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
74-97-5	Bromochloromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-27-4	Bromodichloromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-25-2	Bromoform	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
74-83-9	Bromomethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK



Sample Information

Client Sample ID: SB-1 (4-6')

York Sample ID: 17B0945-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 2:30 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-15-0	Carbon disulfide	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
56-23-5	Carbon tetrachloride	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
108-90-7	Chlorobenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-00-3	Chloroethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
67-66-3	Chloroform	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
74-87-3	Chloromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
110-82-7	Cyclohexane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
124-48-1	Dibromochloromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
74-95-3	Dibromomethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
100-41-4	Ethyl Benzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
98-82-8	Isopropylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
79-20-9	Methyl acetate	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
108-87-2	Methylcyclohexane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-09-2	Methylene chloride	ND		ug/kg dry	5.2	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
104-51-8	n-Butylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
103-65-1	n-Propylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK



Sample Information

Client Sample ID: SB-1 (4-6')

York Sample ID: 17B0945-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 2:30 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-47-6	o-Xylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854	03/02/2017 08:29	03/02/2017 17:49	BK
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	5.2	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854	03/02/2017 08:29	03/02/2017 17:49	BK
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
135-98-8	sec-Butylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
100-42-5	Styrene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
98-06-6	tert-Butylbenzene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
127-18-4	Tetrachloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
108-88-3	Toluene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 17:49	BK
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
79-01-6	Trichloroethylene	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
75-01-4	Vinyl Chloride	ND		ug/kg dry	2.6	5.2	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
1330-20-7	Xylenes, Total	ND		ug/kg dry	7.9	16	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 17:49	BK
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: 1,2-Dichloroethane-d4	97.7 %	77-125								
2037-26-5	Surrogate: Toluene-d8	107 %	85-120								
460-00-4	Surrogate: p-Bromofluorobenzene	93.0 %	76-130								

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	95.9		%	0.100	0.100	1	SM 2540G Certifications: CTDOH	03/02/2017 16:16	03/02/2017 18:24	TAJ

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Client Services



Sample Information

Client Sample ID: SB-1 (6-8')

York Sample ID: 17B0945-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 2:35 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
95-63-6	1,2,4-Trimethylbenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
123-91-1	1,4-Dioxane	ND		ug/kg dry	51	100	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
78-93-3	2-Butanone	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK



Sample Information

Client Sample ID: SB-1 (6-8')

York Sample ID: 17B0945-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 2:35 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
67-64-1	Acetone	ND		ug/kg dry	5.1	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
107-02-8	Acrolein	ND		ug/kg dry	5.1	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
107-13-1	Acrylonitrile	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
71-43-2	Benzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
74-97-5	Bromochloromethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-27-4	Bromodichloromethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-25-2	Bromoform	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
74-83-9	Bromomethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-15-0	Carbon disulfide	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
56-23-5	Carbon tetrachloride	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
108-90-7	Chlorobenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-00-3	Chloroethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
67-66-3	Chloroform	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
74-87-3	Chloromethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
110-82-7	Cyclohexane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
124-48-1	Dibromochloromethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
74-95-3	Dibromomethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK



Sample Information

Client Sample ID: SB-1 (6-8')

York Sample ID: 17B0945-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 2:35 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
100-41-4	Ethyl Benzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
98-82-8	Isopropylbenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
79-20-9	Methyl acetate	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
108-87-2	Methylcyclohexane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-09-2	Methylene chloride	ND		ug/kg dry	5.1	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
104-51-8	n-Butylbenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
103-65-1	n-Propylbenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
95-47-6	o-Xylene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854	03/02/2017 08:29	03/02/2017 18:23	BK
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	5.1	10	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854	03/02/2017 08:29	03/02/2017 18:23	BK
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
135-98-8	sec-Butylbenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
100-42-5	Styrene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
98-06-6	tert-Butylbenzene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
127-18-4	Tetrachloroethylene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
108-88-3	Toluene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP	03/02/2017 08:29	03/02/2017 18:23	BK
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK



Sample Information

Client Sample ID: SB-1 (6-8')

York Sample ID: 17B0945-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
17B0945	8346	Soil	February 24, 2017 2:35 pm	02/28/2017

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-01-6	Trichloroethylene	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
75-01-4	Vinyl Chloride	ND		ug/kg dry	2.5	5.1	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
1330-20-7	Xylenes, Total	ND		ug/kg dry	7.6	15	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	03/02/2017 08:29	03/02/2017 18:23	BK
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: 1,2-Dichloroethane-d4	105 %	77-125								
2037-26-5	Surrogate: Toluene-d8	104 %	85-120								
460-00-4	Surrogate: p-Bromofluorobenzene	94.8 %	76-130								

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	96.6		%	0.100	0.100	1	SM 2540G Certifications: CTDOH	03/02/2017 16:16	03/02/2017 18:24	TAJ



Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
17B0945-04	SB-4 (4-6')	40mL Vial with Stir Bar-Cool 4° C
17B0945-05	SB-4 (6-8')	40mL Vial with Stir Bar-Cool 4° C
17B0945-06	SB-1 (4-6')	40mL Vial with Stir Bar-Cool 4° C
17B0945-07	SB-1 (6-8')	40mL Vial with Stir Bar-Cool 4° C



Notes and Definitions

SCAL-E	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration (average $R_f > 20\%$).
QR-04	The RPD exceeded control limits for the LCS/LCSD QC.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
ICV-E	The value reported is ESTIMATED. The value is estimated due to its behavior during initial calibration verification (recovery exceeded 30% of expected value).
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.



2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.





YORK ANALYTICAL LABORATORIES
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FAX (203) 357-0166

Field Chain-of-Custody Record

NOTE: York's Std. Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization to York to proceed with the analyses requested and your signature binds you to York's Std. Terms & Conditions.

YOUR INFORMATION

Company: ACT
Address: 110 New Street Suite 103
Box 100000, Stratford, CT 06615
Phone No: 516 441 5800
Contact Person: Mark Gelbard
E-Mail Address: markgelbard@act-nj.com

Report To:

Company: ACT
Address: same
Phone No: same
Attention: Kevin Friedman
E-Mail Address: Kevin.Friedman@act-nj.com

Invoice To:

Company: ACT
Address: same
Phone No: same
Attention: Kevin Friedman
E-Mail Address: Kevin.Friedman@act-nj.com

YOUR PROJECT ID

8346
Purchase Order No. 8346

Turn-Around Time

RUSH - Same Day ☐
RUSH - Next Day ☐
RUSH - Two Day ☐
RUSH - Three Day ☐
RUSH - Four Day ☐
Standard (5-7 Days) ☒

Report Type

Summary Report ☒
Summary w/ QA Summary ☐
CT RCP Package ☐
CTRCP DQA/DUE Pkg ☐
NY ASP A Package ☐
NY ASP B Package ☐
NIDEPR Red. Deliv. ☐
Electronic Data Deliverables (EDD) ☐

Print Clearly and Legibly. All Information must be complete. Samples will NOT be logged in and the turn-around time clock will not begin until any questions by York are resolved.

Volatiles: 8260 full, TICs, 624, STARS list, Nassau Co., BTEX, MTBE, Ketones, TAGM list, CT RCP list, 524.2, Arom. only, 502.2, NIDEPR list, Halog. only, NIDEPR list, App. IX list, SPL/PCP list, 8021B list, Matrix Codes: S - soil, Other - specify (oil, etc.), WW - wastewater, GW - groundwater, DW - drinking water, Air-A - ambient air, Air-SV - soil vapor

Semi-Volatiles: 8270 or 625, 8082PCB, STARS list, 8081Pest, BN Only, 8151Herb, Acids Only, PAH list, TAGM list, CT RCP list, Site Spec, SPL/PCP list, Total, Dissolved, SPL/PCP list, Inhib. Metals, LIST Below

Misc. Org.: TPH GRO, TPH DRO, CT ETPH, NY 310-13, Full App. IX, Full App. IX, Sieve Anal., Heterotrophs, Part 360 Residue, TOX, Part 360 Residue, BTU/lb., Part 360 Residue, Aquatic Tox., NYDEP, TOC, NYDEP, Asbestos, TAGM, Silica

Simple Excel, NYSEDEC EQUIS, EQUIS (std), EZ-EDD (EQUIS), NIDEPR SRP HazSite EDD, GIS/KEY (std), Other, York Regulatory Comparison, Excel Spreadsheet, Compare to the following Regs. (please fill in)

Sample Matrix

S - soil, WW - wastewater, GW - groundwater, DW - drinking water, Air-A - ambient air, Air-SV - soil vapor

Date/Time Sampled

SB-2 (0-2') 2-24-17 10:40
SB-6 (4-6') 12:30
SB-6 (6-8') 12:35
SB-4 (4-6') 13:10
SB-4 (6-8') 13:15
SB-1 (4-6') 14:30
SB-1 (6-8') 14:35

Choose Analyses Needed from the Menu Above and Enter Below

8260 full VOCs

Container Description(s)

1802 TerraCure

Comments

confirm TAT with ANALYZE SAMPLES SB-1 AND SB-4. *SAMPLES SB-2 AND SB-6 WILL BE ANALYZED DEPENDENT UPON

Preservation

Check those Applicable: Special Instructions, Field Filtered ☐, Lab to Filter ☐

4°C

Frozen, HCl, ZnAc, MeOH, Ascorbic Acid, HNO₃, H₂SO₄, NaOH, Other

Samples Relinquished By

Date/Time: 2-28-17 9:30

Samples Relinquished In LAB by

Date/Time: 2-28-17 17:46

Temperature on Receipt

5.3 °C