

1520 FULTON STREET

BROOKLYN, NEW YORK

Remedial Action Work Plan

NYC Voluntary Cleanup number: 15CVCP142K

OER Project Number 15EH-N385K

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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/Demolition
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering and Institutional Controls
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
VCA	Voluntary Cleanup Agreement
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
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
PE	Professional Engineer

Acronym	Definition
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
SVOC	Semi-Volatile Organic Compound
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

CERTIFICATION

I, Gary A. Rozmus, 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 1520 Fulton Street, Brooklyn NY, site, site number 15CVCP142K. 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.

Gary A. Rozmus

Name

056744

PE License Number

Gary A. Rozmus

Signature



August 10, 2015

Date

I, Nicholas J. Recchia, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the 1520 Fulton Street, Brooklyn, NY site, site number VCP 15CVCP142K. 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.

Nicholas J. Recchia



QEP Signature

August 10, 2015

Date

Certification by a Professional Engineer is required. Certification by a Qualified Environmental Professional (QEP) is optional unless the PE and QEP work for separate firms.

EXECUTIVE SUMMARY

Hello Fulton, LLC is in the process of enrolling in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate an 11,800-square foot site located at 1520 Fulton Street in Brooklyn, 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 to applicable laws and regulations.

Site Location and Current Usage

The Site is located at 1520 Fulton Street in the Bedford-Stuyvesant section in Brooklyn, New York and is identified as Block 1864 and includes Lots 14 and 54 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 0.27-acres and is bounded by Fulton Street to the north, Herkimer Street to the south, commercial office building to the east, and a mixed commercial/residential building to the west. A map of the site boundary is shown in Figure 2. The property along Fulton Street (Lot 14) is currently a vacant former gas service station and auto repair garage. The adjoining parcel extending back to Herkimer Street (Lot 54) is currently vacant.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of a new 10-story mixed use development including commercial uses on the first floor, and 48 residential apartments on floors 2 through 10. The new building will cover the entire Site, with full cellar uses to include utility rooms, bicycle storage, and a ventilated parking garage. The property that extends back to Herkimer Street will be used mainly for the down-ramp into the lower parking area. Residential floors 8 to 10 stories in height (from ground floor) will cover approximately 70 percent of the building footprint, back from the street frontage. The rear of the structure will consist of single-story space.

The cellar slab grade will be approximately 11 feet below the ground floor level. Additionally, three elevator pits will be installed approximately 5.5 feet below the cellar slab grade. The site will be excavated to approximately 13 feet below grade. The proposed volume of excavated soil is anticipated to be approximately 6,700 cubic yards. There will be no open or uncapped areas of the site.

Layout of the proposed site development is presented in Appendix 2. The current zoning designation is C2-4/RD7 for lot 14 and R6A zoning district for lot 54. The proposed use is consistent with existing zoning for the property.

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

Summary of Environmental Findings

1. Elevation of the property ranges from 59 to 62 feet.
2. Depth to groundwater ranges from 49 to 51 feet at the Site.
3. Groundwater flow is generally from northeast to southwest beneath the Site.
4. Bedrock was not encountered during the investigation.
5. The stratigraphy of the site, from the surface down, consists of uncontrolled fill near the ground surface in all of our borings. Thickness of the fill varied from about 2 feet to 5 feet at our boring locations, and as viewed from our geotechnical test pits. Below the fill, the borings encountered native sands and gravels to the termination depths. The upper portion of this stratum typically varied from silty sands, with about 15 to 20 percent fines content, downward to zones with more gravel and cobble-sized fragments.
6. Fifteen soil/fill samples collected during the remedial investigation were compared to 6NYCRR Part 375-6.8 Track 1 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Track 2 Restricted Residential Use SCOs. Based on field observations (visual, olfactory, and PID readings), darkened petroleum impacted soils and petroleum-like odors were detected in one location (B-1), located down gradient of the USTs, with a maximum PID reading of 307.6 parts-per-million (ppm). Volatile organic compounds (VOCs) including 1,2,4-trimethylbenzene (max. of 63 mg/kg), 1,3,5-trimethylbenzene (max. of 28 mg/kg),

acetone (0.59 mg/Kg), methylene chloride (max. of 6.3 mg/kg) and total xylenes (6 mg/Kg) exceeded Unrestricted Use SCOs in one soil boring (B-2: 0-2 feet and B-2 12-14 feet), located adjacent to the gasoline USTs. The semi-volatile organic compounds (SVOC) exceeding the Unrestricted Use SCOs were polycyclic aromatic hydrocarbons (PAHs) and included benzo(a)anthracene (max. of 8.79 mg/kg), benzo(a)pyrene (max. of 6.38 mg/kg), benzo(b)fluoranthene (max. of 5.15 mg/kg), benzo(k)fluoranthene (max. of 5.96 mg/kg), chrysene (max. of 12.6 mg/kg), dibenzo(a,h)anthracene (max. of 0.93 mg/kg), and indeno(1,2,3-cd)pyrene (max. of 2.21 mg/kg). All SVOC exceedances were limited to one shallow boring (B-4), collected southwest of the gasoline pumping station. An exceedance of total PCBs (2.79 mg/kg) was identified in the shallow interval (0 to 2 feet from sample B-3). Pesticides were not detected in any soil samples. Metals including arsenic (at 16.8 mg/kg), copper (at 637 mg/kg), lead (max. of 668 mg/kg) in three samples, and mercury (max. of 11.7mg/kg) in three soil samples exceeded Restricted Residential Use SCOs in shallow soils only. Highest metals exceedances were in one soil boring, B-1, Selenium (at 16.8 mg/kg) also exceeded Unrestricted Use SCOs. No metals exceeded Unrestricted Use SCOs in deeper soil samples collected.

7. Groundwater samples were compared to 6NYCRR Part 703.5 Groundwater Quality Standards (GQS). Groundwater results identified exceedances of one VOC, chloroform (max. of 19 µg/L) in two ground water samples. SVOCs including benzo(a)anthracene (0.092 µg/L), benzo(a)pyrene (0.072 µg/L), benzo(b)fluoranthene (0.072 µg/L), benzo(k)fluoranthene (0.082 µg/L), chrysene (0.092 µg/L), indeno(1,2,3-cd)pyrene (0.051 µg/L), and bis(2-ethylhexyl)phthalate (6.24 µg/L) were found exceeding their respective GQSs. PCBs and pesticides were not detected in any groundwater samples. Several metals were identified, but only manganese (max. of 1460 µg/L) and sodium (max. of 139,000 µg/L) exceeded their GQSs in dissolved samples.
8. Data from the soil vapor samples collected during the RI were compared to the compounds listed in Matrices 1 and 2 in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion. Soil vapor results identified low to moderate concentrations of petroleum-related and chlorinated VOCs. Petroleum-related VOCs (BTEX) were detected at all five sampling locations, with a

maximum concentration of 64.90 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Chlorinated VOCs including tetrachloroethylene (PCE) were detected in all five samples and ranged in concentrations from $6.5 \mu\text{g}/\text{m}^3$ to $460 \mu\text{g}/\text{m}^3$. TCE was not detected in any of the five samples collected. Carbon tetrachloride and 1,1,1-trichloroethane were only detected in one sample with concentrations of $0.96 \mu\text{g}/\text{m}^3$ and $2.90 \mu\text{g}/\text{m}^3$, respectively. The concentrations of PCE are above the monitoring/mitigation level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion.

Summary of the Remedy

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. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency determined by the selected disposal facility permit requirements.
6. Excavation and removal of soil/fill exceeding Unrestricted Use (Track 1) SCOs. The site will be excavated to approximately 13 feet below grade. Elevator areas will be

excavated an additional 5 feet below grade for a total of 18 feet. The proposed volume of excavated soil is anticipated to be approximately 10,000 tons (6,700 cubic yards).

7. 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.
8. 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.
9. Registration of tanks and reporting of any petroleum spills associated with USTs and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
10. 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.
11. Collection and analysis of four end-point samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
13. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and lists any changes from this RAWP.

If Track 1 Unrestricted Use SCOs are not achieved, the following construction elements implemented as part of new development will constitute Engineering and Institutional Controls:

16. As part of development, construction, and maintenance of an engineered composite cover consisting of concrete foundation slabs and walkways and an asphalt driveway to prevent human exposure to residual soil/fill remaining under the Site.
17. As part of development, incorporation of a water-proofing/vapor barrier system beneath the building foundation and behind the foundation walls to grade.
18. As part of development, construction and operation of a ventilated parking garage.
19. Installation and operation of an active sub-slab depressurization system in areas not used for parking beneath the basement foundation to prevent any potential future exposures from soil vapor. The system will be monitored annually to evaluate if system can be converted to passive SSDS.
20. If Track 1 SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the 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.
21. If Track 1 SCOs are not achieved, the property will continue to maintain E designation at the NYC Building's Department and includes a listing of Engineering Controls and Institutional Controls 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: 1520 Fulton Street
- NYC Voluntary Cleanup Program Project Number: 15CVCP142K

Project Contacts:

- OER Project Manager: Horace Zhang, 212-788-8841
- Site Project Manager: Nicholas J. Recchia, 631-759-2973
- Site Safety Officer: Chris Morris, 631-759-2967
- Online Document Repository: <http://www.nyc.gov/html/oer/html/e-designation/ceqr-documents-brooklyn.shtml>

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 SITE BACKGROUND

Hello Fulton, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 1520 Fulton Street in a mixed use development section of Brooklyn, 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, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 SITE LOCATION AND CURRENT USAGE

The Site is located at 1520 Fulton Street in the Bedford-Stuyvesant section in Brooklyn, New York and is identified as Block 1864 and includes Lots 14 and 54 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 0.27-acres and is bounded by Fulton Street to the north, Herkimer Street to the south, commercial office building to the east, and a mixed commercial/residential building to the west. A map of the site boundary is shown in Figure 2. The property along Fulton Street (Lot 14) is currently a vacant former gas service station and auto repair garage. The adjoining parcel extending back to Herkimer Street (Lot 54) is currently vacant.

1.2 PROPOSED REDEVELOPMENT PLAN

The proposed future use of the Site will consist of a new 10-story mixed use development including commercial uses on the first floor, 48 residential apartments above and accessory parking, as well as utility rooms and parking in the cellar. The overall footprint of the structure will include a below-grade cellar level over nearly all the property that will be used for parking

and mechanical rooms, as well as a storm water tank near the north wall. The property that extends back to Herkimer Street will be used mainly for the down-ramp into the lower parking area. Residential floors 8 to 10 stories in height (from ground floor) will cover approximately 70 percent of the building footprint, back from the street frontage. The rear of the structure will consist of single-story space.

The cellar slab grade will be approximately 11 feet below the ground floor level. Additionally, three elevator pits will be installed approximately 5 feet below the cellar slab grade. The site will be excavated to approximately 13 feet below grade. The proposed volume of excavated soil is anticipated to be approximately 10,000 tons (6,700 cubic yards). There will be no open or uncapped areas of the site.

Layout of the proposed site development is presented in **Appendix 2**. The current zoning designation is C2-4/RD7 for lot 14 and R6A zoning district for lot 54. The proposed use is consistent with existing zoning for the property.

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

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The immediate surrounding properties consist of 2-story commercial properties to the north (across Fulton Street) and east, a 3-story mixed use property to the west and several 3-story residential homes to the south. The surrounding neighborhood is a mix of residential along with commercial, industrial/manufacturing, parking and public facilities and institutions. There are no public schools, day care centers or hospitals located within a 500-foot radius.

1.4 REMEDIAL INVESTIGATION

A remedial investigation was performed and the results are documented in a companion document called "*Remedial Investigation Report, 1520 Fulton Street,*" dated May, 2015 (RIR).

Summary of Past Uses of Site and Areas of Concern

Based on a review of available information provided and/or obtained for the Subject Property, it appears that the Subject Property was developed sometime between 1888 and 1908

as a stable and commercial business. The present building was constructed sometime after 1976. The following provides a listing of all documented usages of the Site dating back to 1928.

Date	Use of Subject Property
1928	Fulton Throop Garage Klee C F Office Motor Inn Garage
1934	Fulton Throop Garage Sottile MGR Garage
1940	Fulton Throop Garage
1949	Fulton Garage Auto Repairs
1960,1965	Fulthroop Service Center Inc
1970	Fulthroop Service Center Inc Tzucker Benj U Haul Co
1973, 1976	Fulthroop Service Center Inc Fulthroop Service Station L&F Towing Svc Inc U Haul Co
1985	Elevan Bainbridge Garage JY&W Garage
1992, 1997, 2000	Elevan Bainbridge Garage KCLY Garage Inc
2005	Allied Central Ambulette Service Galhain Inc Singh Joait

Areas of concern observed during the Phase I and Phase II field activities include;

- The presence of two (2) underground storage tanks (USTs) and associated underground piping from gas-filling station operations, and
- Hydraulic lifts associated within the auto repair shop facility.

Summary of the Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed eight (8) soil borings across the entire project Site, and collected fifteen (15) soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed three (3) groundwater monitoring wells throughout the Site to establish groundwater flow and collected three (3) groundwater samples for chemical analysis to evaluate groundwater quality;
4. Installed five (5) soil vapor probes around throughout the Site and collected five (5) samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property ranges from 59 to 62 feet.
2. Depth to groundwater ranges from 49 to 51 feet at the Site.
3. Groundwater flow is generally from northeast to southwest beneath the Site.
4. Bedrock was not encountered during the investigation.
5. The stratigraphy of the site, from the surface down, consists of uncontrolled fill near the ground surface in all of our borings. Thickness of the fill varied from about 2 feet to 5 feet at our boring locations, and as viewed from our geotechnical test pits. Below the fill, the borings encountered native sands and gravels to the termination depths. The upper portion of this stratum typically varied from silty sands, with about 15 to 20 percent fines content, downward to zones with more gravel and cobble-sized fragments.

6. Fifteen soil/fill samples collected during the remedial investigation were compared to 6NYCRR Part 375-6.8 Track 1 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Track 2 Restricted Residential Use SCOs. Based on field observations (visual, olfactory, and PID readings), darkened petroleum impacted soils and petroleum-like odors were detected in one location (B-1), located down gradient of the USTs, with a maximum PID reading of 307.6 parts-per-million (ppm). Volatile organic compound (VOC) including 1,2,4-trimethylbenzene (max. of 63 mg/kg), 1,3,5-trimethylbenzene (max. of 28 mg/kg), acetone (0.59 mg/Kg), methylene chloride (max. of 6.3 mg/kg) and total xylenes (6 mg/Kg) exceeded Unrestricted Use SCOs in one soil boring (B-2: 0-2 feet and B-2 12-14 feet), located adjacent to the gasoline USTs. The semi-volatile organic compound (SVOC) compounds exceeding the Unrestricted Use SCOs were polycyclic aromatic hydrocarbons (PAHs) and included benzo(a)anthracene (max. of 8.79 mg/kg), benzo(a)pyrene (max. of 6.38 mg/kg), benzo(b)fluoranthene (max. of 5.15 mg/kg), benzo(k)fluoranthene (max. of 5.96 mg/kg), chrysene (max. of 12.6 mg/kg), dibenzo(a,h)anthracene (max. of 0.93 mg/kg), and indeno(1,2,3-cd)pyrene (max. of 2.21 mg/kg). All SVOC exceedances were limited to one shallow boring (B-4), collected interior of the commercial building southwest of the gasoline pumping station. An exceedance of total PCBs (2.79 mg/kg) was identified in the shallow interval (0 to 2 feet from sample B-3). Pesticides were not detected in any soil samples. Metals including arsenic (at 16.8 mg/kg), copper (at 637 mg/kg), lead (max. of 668 mg/kg) in three samples, and mercury (max. of 11.7mg/kg) in three soil samples exceeded Restricted Residential Use SCOs in shallow soils only. Highest metals were exceedances were in one soil boring, B-1, indicating a metals hotspot area. Selenium (at 16.8 mg/kg) also exceeded Unrestricted Use SCOs. No metals exceeded Unrestricted Use SCOs in deeper soils.
7. Groundwater samples were compared to 6NYCRR Part 703.5 Groundwater Quality Standards (GQS). Groundwater results identified exceedances of one VOC, chloroform (max. of 19 µg/L) in two samples. SVOC including benzo(a)anthracene (0.092 µg/L), benzo(a)pyrene (0.072 µg/L), benzo(b)fluoranthene (0.072 µg/L),

benzo(k)fluoranthene (0.082 µg/L), chrysene (0.092 µg/L), indeno(1,2,3-cd)pyrene (0.051 µg/L) and bis(2-ethylhexyl)phthalate (6.24 µg/L) exceeded their respective GQSs. PCBs and pesticides were not detected in any groundwater samples. Several metals were identified, but only manganese (max. of 1460 µg/L) and sodium (max. of 139,000 µg/L) exceeded these GQSs in dissolved samples.

8. Soil vapor samples collected during the RI were compared to the compounds listed in Matrices 1 and 2 in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion. Soil vapor results identified low to moderate concentrations of petroleum-related and chlorinated VOCs. Petroleum-related VOCs (BTEX) were detected at all five sampling locations, with a maximum concentration of 64.90 micrograms per cubic meter (µg/m³). Chlorinated VOCs including tetrachloroethylene (PCE) were detected in all five samples and ranged in concentrations from 6.5 µg/m³ to 460 µg/m³. TCE was not detected in any of the five samples collected. Carbon tetrachloride and 1,1,1-trichloroethane were only detected in one sample each, with concentrations of 0.96 µg/m³ and 2.90 µg/m³, respectively. The concentrations of PCE are above the monitoring/mitigation level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion.

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:

Groundwater

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

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.

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). A remedy is then developed based on the following ten criteria:

1. Protection of human health and the environment;
2. Compliance with SCGs;
3. Short-term effectiveness and impacts;
4. Long-term effectiveness and permanence;
5. Reduction of toxicity, mobility, or volume of contaminated material
6. Implementability;
7. Cost effectiveness;
8. Community Acceptance;
9. Land use; and
10. Sustainability.

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the site. As required, a minimum of two remedial alternatives (including a Track 1 scenario) are evaluated, as follows:

Alternative 1 would involve the following remedial actions:

1. Selection of 6 NYCRR Part 703.5 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs);
2. Removal of all soil/ fill exceeding Track 1 Unrestricted Use SCOs throughout the site and confirmation that Track 1 SCOs have been achieved with post-excavation confirmatory sampling. Excavation for development purposes would generally take place to a maximum depth of approximately 13 feet bgs. If soil/fill containing analytes at concentrations above Track 1 SCOs are present after removal of soil required for

construction, additional over excavation will be performed to ensure complete removal of soil that does not meet Track 1 SCOs;

3. As part of new development, construction of a ventilated basement cellar beneath the building in accordance with NYC Building Code requirements; and incorporation of a water-proofing/vapor barrier into the building foundation system.
4. Additionally, a sub-slab depressurization system will be constructed and installed beneath the building in areas not used for ventilated garage.
5. As part of new development, placement of a final cover consisting of concrete foundation slabs or walkways and an asphalt driveway over the entire site.

Alternative 2 would involve the following remedial actions:

1. Establishment of Site-specific (Track 4) SCOs;
2. Removal of all soil/fill exceeding Site-specific SCOs and confirmation that 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;
3. 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;
4. Establishment of an approved Site Management Plan (SMP) to ensure long-term management of engineering and institutional controls (EC/ICs) including the performance of periodic inspections and certification that the controls are performing as they were intended;
5. As part of new development, construction of a ventilated parking garage in the cellar beneath the building in accordance with NYC Building Code requirements and incorporation of a water-proofing/vapor barrier into the building foundation system;

6. As part of new development, placement of a final cover consisting of concrete foundation slabs or walkways and an asphalt driveway over the entire site to prevent human exposure to residual soil/fill remaining under the Site. The property will continue to be registered with an E-Designation at the NYC Buildings Department; and
7. Placement of a deed notice to record the ECs/ICs on the deed to ensure that future owners of the Site continue to comply with the SMP, as required.

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 – Alternative 1 would be protective of human health and the environment by removing historic fill/soil exceeding Unrestricted Use Track 1 SCOs and groundwater protection standards, thus eliminating potential for exposure to contaminated soil/fill once construction is complete and eliminating the risk of contamination leaching into groundwater. Construction measures, including construction of a ventilated parking garage/utility room, sub-slab depressurization system and incorporation of a water-proofing/vapor barrier into the building foundation system, would further support the remedy.

Alternative 2 – Alternative 2 would achieve comparable protections of human health and the environment by removing most of the contaminated soil/fill and by ensuring that remaining soil/fill on-site meets the identified Track 4 Site Specific SCOs, as well as by placement of EC/ICs on the site. The composite cover system would prevent direct contact with and ingestion of any remaining soil/fill and would limit the risk of contamination leaching into groundwater. The ventilated basement cellar and incorporation of a water-proofing/vapor barrier into the building foundation system would prevent inhalation of any contaminants volatilizing from soil or groundwater. Implementing ICs including a SMP would ensure that the engineering controls remain intact and protective.

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 – Alternative 1 would achieve compliance with the remedial goals, SCGs and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCOs and groundwater protection standards. Compliance with SCGs for soil vapor would also be achieved by the construction of a ventilated parking garage/utility room, sub-slab depressurization system and incorporation of a water-proofing/vapor barrier into the building foundation system.

Alternative 2 – Alternative 2 would achieve compliance with the remedial goals, SCGs, and RAOs for soil through removal of soil to achieve the Track 4 Site Specific SCOs identified above and construction and maintenance of engineering controls on site. Compliance with SCGs for soil vapor would also be achieved by the construction of a ventilated sub-grade basement cellar incorporation of a water-proofing/vapor barrier into the building foundation system. A SMP would ensure that these controls remained protective for the long term. Compliance with groundwater SCGs would be achieved over the long term by excavation and removal of soil exceeding Track 4 Site Specific SCOs and by restricting use of groundwater.

Health and Safety measures contained in the Construction Health and Safety Plan (CHASP) and Community Air Monitoring Program (CAMP) that comply with the applicable SCGs would be implemented during the site redevelopment in 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. United States Occupational Health and Safety Administration (OSHA) requirements for on-site construction safety would also be followed by the site contractors. These measures would protect on-site workers and the surrounding community from exposures 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 effects on public health and the environment during implementation of the remedial action, including protection of the community, environmental impacts, time until remedial response objectives are achieved, and protection of workers during remedial actions.

Both alternatives have somewhat similar short term impacts during their respective implementation, as each requires excavation. Both remedial alternatives would result in dust generation impacts associated with excavation, handling, load out of materials, and truck traffic; however, the duration of excavation during implementation of Alternative 1 could be slightly greater. Similarly, truck traffic associated with the transport of fill material to the site could be similarly greater during the implementation of Alternative 1. Truck traffic for both Alternatives would be routed on the most direct course using major thoroughfares where possible and flaggers would be used to protect pedestrians at site entrances and exits. Focused attention to means and methods during the remedial action, including community air monitoring and appropriate truck routing would minimize or negate the overall impact of these activities.

Both alternatives would employ appropriate measures to prevent short term impacts, including a CAMP and an 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 through employment of CAMP and operational measures to control dust and site vapors. Construction workers operating under appropriate management procedures and a CHASP would be protected from on-site contaminants (personal protective equipment would be worn consistent with the documented risk 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 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 Engineering Controls.

Alternative 1 – The Track 1 remedy would achieve long-term effectiveness and permanence related to on-site contamination by permanently removing all impacted soil/fill. Removal of on-site contaminant sources would also prevent impacts to groundwater. Construction measures, including the construction of a ventilated parking garage/utility room, sub-slab depressurization system and incorporation of a water-proofing/vapor barrier into the building foundation system on the lower level would prevent potential future migration of soil vapors into the new building.

Alternative 2 – The Track 4 remedy would provide long-term effectiveness by removing the majority of on-site contamination and attaining the Site Specific SCOs; by establishing ECs, including a composite cover system and a water-proofing/vapor barrier into the building foundation system.; and by establishing ICs, including use restrictions, and SMP. The SMP will ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and use restrictions continue to be in place and are functioning as they were intended to assure that protections designed into the remedy would provide continued high level of protection in perpetuity.

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 – The Track 1 remedy would provide the maximum reduction of toxicity, mobility, and volume of contaminated material through the removal of historic fill and soil exceeding Track 1 SCOs.

Alternative 2 – Alternative 2 would remove most of the impacted soil present on the site and remaining soil beneath the composite cover would meet Track 4 Site Specific SCOs. Containment via the composite cover system would be used to eliminate exposure to

contaminants that remain at the site. Alternative 1 would likely eliminate a greater total mass of contaminants on site.

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.

Both alternatives would utilize standard methods that are commonly available and routinely applied by the industry. They would use standard materials and services that are well established and administratively and technically feasible. The reliability of each remedy would also be high; however, the permanence of the removal effort in Alternative 1 is greater than Alternative 2, which would rely on institutional and engineering controls. 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 during investigations to only extend to a depth of up to 5 feet below grade, 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 the comparable. Costs associated with Alternative 1 could potentially be higher for additional excavation in the cellar ramp area and if soil with analytes above Track 1 Unrestricted Use SCOs is encountered below the excavation depth required for development. There are no long-term operations, maintenance, or monitoring costs associated with the Alternative 1. However, long-term costs for Alternative 2 are higher than Alternative 1 based on implementation of a Site Management Plan and operation of active SSDS.

The selected remedial plan creates an approach that combines the remedial action with planned development of the Site. The remedial plan is also cost effective in that it will take into consideration the selection of the closest and most appropriate disposal facilities to reduce transportation and disposal costs during the excavation of historic fill and other soils during the 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.

Based on the overall goals of the remedial program, no adverse community opinion is anticipated for either alternative. This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for public input on the selected remedial actions. Any public comments related to environmental remediation will be considered by NYC OER prior to approval of this plan.

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 would be compatible with the selected remedies under both alternatives. The proposed development will include a 10-story, mixed use (residential and commercial) building covering approximately 70%

of the property. The reasonably anticipated future use of the site and its surroundings will be documented by the applicant in the NYC VCP application.

The proposed redevelopment of the site is compatible with its current zoning and is consistent with recent development patterns. The areas surrounding the site are urban and consist predominantly of commercial and residential buildings, both single and multi-story in zoning districts designated for commercial, manufacturing, and residential uses. There are no areas zoned for agricultural use in the proximity of the site. The development would replace the underutilized site with a modern residential building.

The proposed use will not cause or increase a disproportionate burden on the community in which the site is located. In addition, temporary short-term project impacts would be 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 appropriate for its planned residential use.

The Site is not in close proximity to any water bodies and the associated fish and wildlife. Municipal water supply wells are not present in New York City; therefore, groundwater from the Site cannot affect municipal water supply wells or recharge areas. Both alternatives are equally protective of natural resources and cultural resources.

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.

Track 1 will achieve sustainable remedial goals for a Greener Greater New York. The overall sustainability of Track 1 is low/moderate. The excavated material would likely be landfilled (no recycling and reuse of non-virgin materials). There would also be significant

energy consumption and greenhouse gas emissions associated with truck trips needed for transport of excavated soil.

4.0 REMEDIAL ACTION

4.1 SUMMARY OF PREFERRED REMEDIAL ACTION

The preferred remedial action alternative is Alternative 1, provided that the soils removed to achieve Track 1 criteria do not greatly exceed the volume of soil planned for removal during construction. If the volume of soil to achieve Track 1 soil criteria is significantly greater than the volume to be removed during construction, a Track 4 cleanup would be implemented. The preferred remedial action alternative achieves protection of public health and the environment for the intended use of the property. The preferred remedial action alternative will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action alternative 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. Perform a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. 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).
6. Excavation and removal of soil/fill exceeding Unrestricted Use (Track 1) SCOs. The site will be excavated to approximately 13 feet below grade. Elevator areas will be excavated additional 5 feet below grade. The proposed volume of excavated soil is anticipated to be approximately 10,000 tons (6,700 cubic yards).

7. 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.
8. 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.
9. Registration of tanks and reporting of any petroleum spills associated with USTs and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
10. 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.
11. Collection and analysis of four end-point samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
13. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and lists any changes from this RAWP.

If Track 1 Unrestricted Use SCOs are not achieved, the following construction elements implemented as part of new development will constitute Engineering and Institutional Controls:

16. As part of development, construction, and maintenance of an engineered composite cover consisting of concrete foundation slabs and walkways and an asphalt driveway to prevent human exposure to residual soil/fill remaining under the Site.
17. As part of development, incorporation of a water-proofing/vapor barrier system beneath the building foundation and behind the foundation walls to grade.
18. As part of development, construction and operation of a ventilated parking garage.
19. Installation and operation of an active sub-slab depressurization system in areas not used for parking beneath the basement foundation to prevent any potential future exposures from soil vapor. The system will be monitored annually to evaluate if system can be converted to passive SSDS.
20. If Track 1 SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the 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.
21. If Track 1 SCOs are not achieved, the property will continue to maintain E designation at the NYC Building's Department and includes a listing of Engineering Controls and Institutional Controls 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 Soil Cleanup Objectives (SCOs) are proposed for this project. The SCOs for this Site are listed in NYCRR Part 375, Table 6.8(a). If Track 1 Unrestricted Use SCOs are not achieved, the following Site Specific SCOs will be used:

<u>Contaminant</u>	<u>Track 4 SCOs</u>
Total SVOCs	150 ppm
Lead	800 ppm
Mercury	2.5 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. The entire site is planned for excavation.

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.

Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is approximately 6,700 cubic yards or 10,000tons.

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

End-Point Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation soil sampling. Four confirmation samples will be collected from the base of the excavation at the location approved by OER. The endpoint sampling locations are presented in **Figure 4**. For comparison to Track 1 SCOs, analytes will include VOCs, SVOC, pesticides, PCBs and metals according to analytical methods described below. For comparison to Track 4 SCOs, analytes will only include trigger compounds and elements established on the Track 4 SCO list.

Hot-spot removal actions, whether established under this RAWP or identified during the remedial program, will be performed in conjunction with post remedial end-point samples to ensure that hot-spots are fully removed. Analytes for end-point sampling will be those parameters that are driving the hot-spot removal action and will be approved by OER. Frequency for hot-spot end-point sample collection is as follows:

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.

New York State ELAP certified labs will be used for all confirmation and end-point sample analyses. Labs performing confirmation and end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all confirmation and end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. End-point samples will be analyzed for compounds and elements as described above utilizing the following methodology:

Soil analytical methods will include:

- 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.

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 (QA/QC)

The sample analyses are proposed to be report only, with no QA/QC sample analysis.

Import and Reuse of Soils

Import of soils onto the property and reuse of soils already onsite will be performed in conformance with the Soil/Materials Management Plan in Appendix 3. No soil/fill is expected to be imported or reused on Site.

4.3 ENGINEERING CONTROLS

The excavation required for the proposed Site development will achieve Track 1 Unrestricted Use SCOs. Track 1 remedial actions do not require Engineering Controls. However, the construction elements below will be incorporated into the foundation design as part of the new development. If Track 1 SCOs are not achieved, these elements will constitute Engineering Controls that will be employed in the remedial action to address residual contamination remaining at the Site:

- Composite cover system consisting of asphalt covered roads, concrete covered sidewalks, and concrete building slabs;
- Active sub-slab depressurization system; and
- Ventilated sub-grade parking garage/utility rooms and a water proofing/vapor barrier into the building foundation

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 is comprised of concrete covered walkways,

concrete building slabs and an asphalt driveway. The entire site is planned for excavation. The development plans are included as Appendix 2.

The composite cover system is a permanent engineering control for the Site. The system will be inspected and reported at specified intervals as required by this RAWP and the SMP. A Soil 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 RAR.

Vapor Barrier

As part of development, migration of potential soil vapor from on-Site or off-Site sources in the future will be mitigated with a combination of the concrete building slab, as well as an active SSDS and vapor barrier. The vapor barrier will be placed under foundation footings and slabs. The vapor barrier will consist of a GSE HD Geomembrane which is a 20 mil high density polyethylene (HDPE) installed beneath entire building basement concrete slab and GSE HD Geomembrane a 20-mil high density polyethylene (HDPE) installed along foundation sidewalls. The vapor barrier will be installed prior to pouring the building's concrete slab behind and alongside the existing foundation slab. The vapor barrier will go up the foundation sidewalls in accordance with manufacturer specifications. The specifications for installation will be provided to the construction management company and the foundation contractor or installer of the liner. The specifications state that all vapor barrier seam, penetrations, and repairs will be sealed either by the tape method or weld method, according to the manufacturer's recommendations and instructions.

The project's Professional Engineer licensed by the State of New York will have primary direct responsibility for overseeing the implementation of the vapor barrier. The extent of the proposed vapor barrier membrane is provided in **Figure 6**. The manufacturer specification for the vapor barrier is included in **Appendix 5**.

The Remedial Action Report will include photographs (maximum of two photos per page) of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturer's certificate of warranty.

Sub-Slab Depressurization System

Migration of soil vapor will be mitigated with the construction of a passive sub-slab depressurization system (SSDS).

The active SSDS will consist of a network of sub-slab 4" ID Schedule 80 PVC piping protected with 6-oz geotextiles on both sides, six inches minimum sand above and below placed on a bed of gravel. This will be connected to a riser pipe that leads to a passive exhaust fan discharge point located above 2 feet above the roof-line. The riser pipe will consist of a 4" ID Schedule 80 PVC pipe or CI vent pipe. All sub-slab piping will be sealed with plumber's cement (or similar product) to be applied according to the manufacturer's specifications.

Detailed information regarding this SSDS system is contained in **Appendix 5**.

4.4 INSTITUTIONAL CONTROLS

Track 1 remedial actions do not require Engineering Controls. If Track 1 SCOs are not achieved, Institutional Controls (IC) will be utilized in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. Institutional Controls are listed below. Long-term employment of EC/ICs will be implemented under a site-specific Site Management Plan (SMP) that will be included in the RAR. The property will continue to be registered with an E-Designation by the NYC Buildings Department.

Institutional Controls for this remedial action (if Track 1 is not achieved) are:

- 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 Site Management Plan in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting and certification of ECs. 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 determined by OER in the SMP and will comply with RCNY §43-1407(1)(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 commercial and residential use and will not be used for a higher level of use without prior approval by OER.

4.5 SITE MANAGEMENT PLAN

Site Management is not required for Track 1 remedial actions. However, if Track 1 SCOs are not achieved, Site Management will be 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 the DCR and 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 Brownfield Cleanup Agreement with OER. This includes a plan for: (1) implementation of ECs and ICs; (2) implementation of monitoring programs; (3) operation and maintenance of ECs; (4) inspection and certification of ECs; and (5) reporting.

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 Sources

Based on the results of the Remedial Investigation Report (RIR), the contaminants of concern found are:

Soil

- Petroleum-like odors were detected down gradient of the USTs with a PID reading of 307.6 parts-per-million (ppm); and
- Several VOCs (including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, methylene chloride, acetone and total xylenes) were detected, but did not exceed Restricted Residential Use SCOs;

- SVOCs were identified, but did not exceed Restricted Residential Use SCOs; and
- Metals, including arsenic, copper, lead, and mercury exceeding Restricted Residential Use SCOs were identified;

Groundwater

- One VOC, chloroform, exceeding its GQS was identified;
- Metals including arsenic, barium, cadmium, chromium, copper, lead, manganese, magnesium, nickel, selenium and sodium, exceeding GQSs were identified;
- SVOC, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, exceeding their GQSs were identified.

Soil Vapor

- Petroleum-related VOCs detected at low moderate concentrations were identified;
- PCE was detected at concentrations above the NYSDOH matrix for mitigation.

Nature, Extent, Fate and Transport of Contaminants

Petroleum-related VOCs, SVOCs, several metals and one PCB are present in soil adjacent to and downgradient of the gasoline USTs and pumping islands above the Track 1 Unrestricted Use SCOs. Concentrations of several SVOCs, located across the Site were identified above the Restricted Residential Use SCOs. One VOC, several SVOCs and several metals were identified above the GQS in groundwater samples collected at the Site. VOCs detected in soil were not detected in groundwater. Low to moderate concentrations of petroleum-related and chlorinated VOCs were identified in soil vapor. PCE was detected above the NYSDOH Action Levels at two locations on the eastern portion of the Site. PCE was also detected in soils at low concentrations throughout the Site.

Potential Routes of Exposure

Potential On-Site Exposures: An exposure route is the mechanism by which a receptor comes into contact with a chemical. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill or soil;
- Inhalation of vapors and particulates; and
- Dermal contact with water, fill, or soil.

Existence of Human Health Exposure

An exposure pathway begins with a source and mechanism of contaminant release resulting in the contamination of a receiving matrix (environmental medium). A complete exposure pathway also requires a point of potential contact with the contaminated matrix (i.e., exposure point), an exposure route (i.e., inhalation, ingestion, or dermal contact), and a receptor population. If an exposure pathway is not complete because it does not include a contaminated matrix, a point of potential contact, an exposure route, or a receptor, then no risk exists.

Current

Exposure to fill is not a concern at the Site since the portion of the Site with identified soil impacts is currently capped. Groundwater is not physically exposed at the surface of the site and, because the site is served by the public water supply and groundwater use for potable supply is prohibited, there is no potential for exposure.

Construction/ Remediation Activities

Once redevelopment activities begin, construction 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 soil, fill, and groundwater. Similarly, off-Site receptors could be exposed to dust and vapors from on-Site activities. 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

Once the remedial actions and redevelopment of the Site has been completed, there will be no potential on-Site or off-Site exposure pathways. Not only will soil/fill exceeding Track 1 SCOs be removed, but the Site will also be fully capped with either a concrete slab within the footprint of the new building, concrete walkways and an asphalt driveway, which will prevent contact with soil. A sub-slab depressurization system will be installed beneath the building, as well as a ventilated sub-grade parking/utility garage and a water-proofing/vapor barrier into the building foundation system is also being installed.

Receptor Populations

On-Site Receptors – The property along Fulton Street is currently vacant; however, it was previously used as a gasoline service station and automotive repair garage. The adjoining parcel extending back to Herkimer Street is currently vacant. Therefore, the only potential on-Site receptors are Site Representatives and trespassers. During redevelopment of the Site, the on-Site potential receptors will include construction workers, site representatives, and visitors. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child building residents and visitors.

Off-Site Receptors – Potential off-Site receptors within a 0.25-mile radius of the Site include: adult and child residents, and commercial and construction workers, pedestrians, trespassers, and cyclists, based on the following:

1. Commercial Businesses (up to 0.25 mile) – existing and future
2. Residential Buildings (up to 0.25 mile) – existing and future
3. Building Construction/Renovation (up to 0.25 mile) – existing and future
4. Pedestrians, Trespassers, Cyclists (up to .25 mile) – existing and future
5. Schools (up to .25 mile) – existing and future

Overall Human Health Exposure Assessment

There are potential complete exposure pathways for soil vapor under the current site condition. There is a potential complete exposure pathway that requires mitigation during

implementation of the remedy. Under current conditions, groundwater is not accessible at the site and impacted soil is capped. During remedial construction, on-Site and off-Site exposures to contaminated dust and volatile vapors 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.

There is no complete exposure pathway under future conditions after the Site is developed. After the remedial action is complete, there will be no remaining exposure pathways to identified contaminants, as all soil/fill exceeding Track 1 SCOs will be removed from the site, the entire site will be excavated to approximately 13 feet and fully capped. Construction measures, including the construction of a ventilated parking garage/utility room, sub-slab depressurization system and incorporation of a water-proofing/vapor barrier into the building foundation system on the lower level would prevent potential future migration of soil vapors into the new building. 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.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 PROJECT ORGANIZATION AND OVERSIGHT

Principal personnel who will participate in the remedial action include Nicholas Recchia who will be the remediation project director. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Gary Rozmus and Nicholas Recchia, respectively.

5.2 SITE SECURITY

Site access will be controlled by through gated entrances to the fenced Site.

5.3 WORK HOURS

The hours for operation of remedial construction will be from 7 am to 5pm. These hours conform to the New York City Department of Buildings construction code requirements.

5.4 CONSTRUCTION HEALTH AND SAFETY PLAN

The Construction Health and Safety Plan is included in Appendix 4. The Site Safety Coordinator will be Christopher Anastasiou. 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, including 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 be required to sign an HASP acknowledgment. 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 HASP. 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 baling/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/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ 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 to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Markout 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

No dewatering is planned for this project.

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 roads 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 NYC VCP 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 potable 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 holes, 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, haybales; 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. Storm-water 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. 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 NYC VCP 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 will be provided when the disposal facilities is identified.

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 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; and
- 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 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 that the remedial action with the deviation(s) is protective of public health and the environment.

5.13 DATA USABILITY SUMMARY REPORT

The primary objective of a Data Usability Summary Report (DUSR) is to determine whether or not data meets the site specific criteria for data quality and data use. The DUSR provides an evaluation of analytical data without third party data validation. The DUSR for post-remedial samples collected during implementation of this RAWP will be included in the Remedial Action Report (RAR).

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;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 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 and all material characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action and DUSR;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account 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.

- Reports and supporting material will be submitted in digital form.

Remedial Action Report Certification

The following certification will appear in front of the Executive Summary of the Remedial Action Report. The certification will include the following statements:

I, Gary A. Rozmus, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the [1520 Fulton Street Brooklyn NY \(NYC OER Site No. 15EH-N385K\)](#).

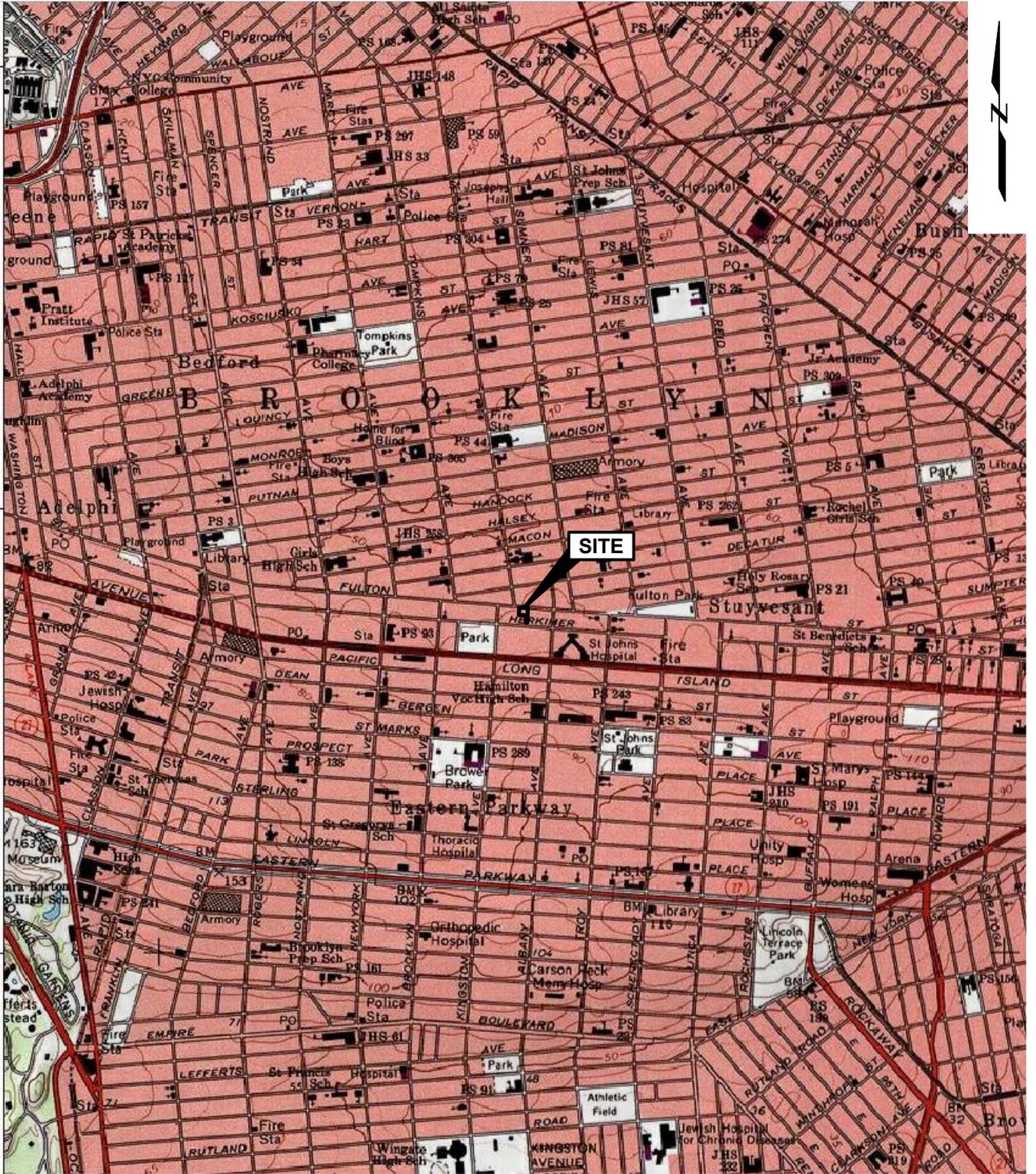
I, Nicholas J. Recchia, am a qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the [1520 Fulton Street Brooklyn NY \(NYC OER Site No. 15EH-N385K\)](#).

I certify that the OER-approved Remedial Action Work Plan dated June 11, 2015 and Stipulations in a letter dated June 11, 2015; if any 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.

7.0 SCHEDULE

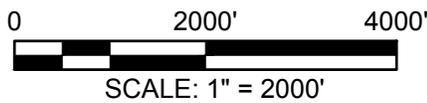
The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 2 month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	0	-
Mobilization	2 weeks	1 week
Remedial Excavation	3 weeks	3 Months
Demobilization	1 year	4 weeks
Submit Remedial Action Report	13 months	4 weeks



SOURCE:

Map created with TOPO!® ©2001 National Geographic
 (www.nationalgeographic.com/topo)



Remedial Investigation Report
 1520 Fulton Street
 Brooklyn, New York

Hello Living, LLC
 Brooklyn, New York

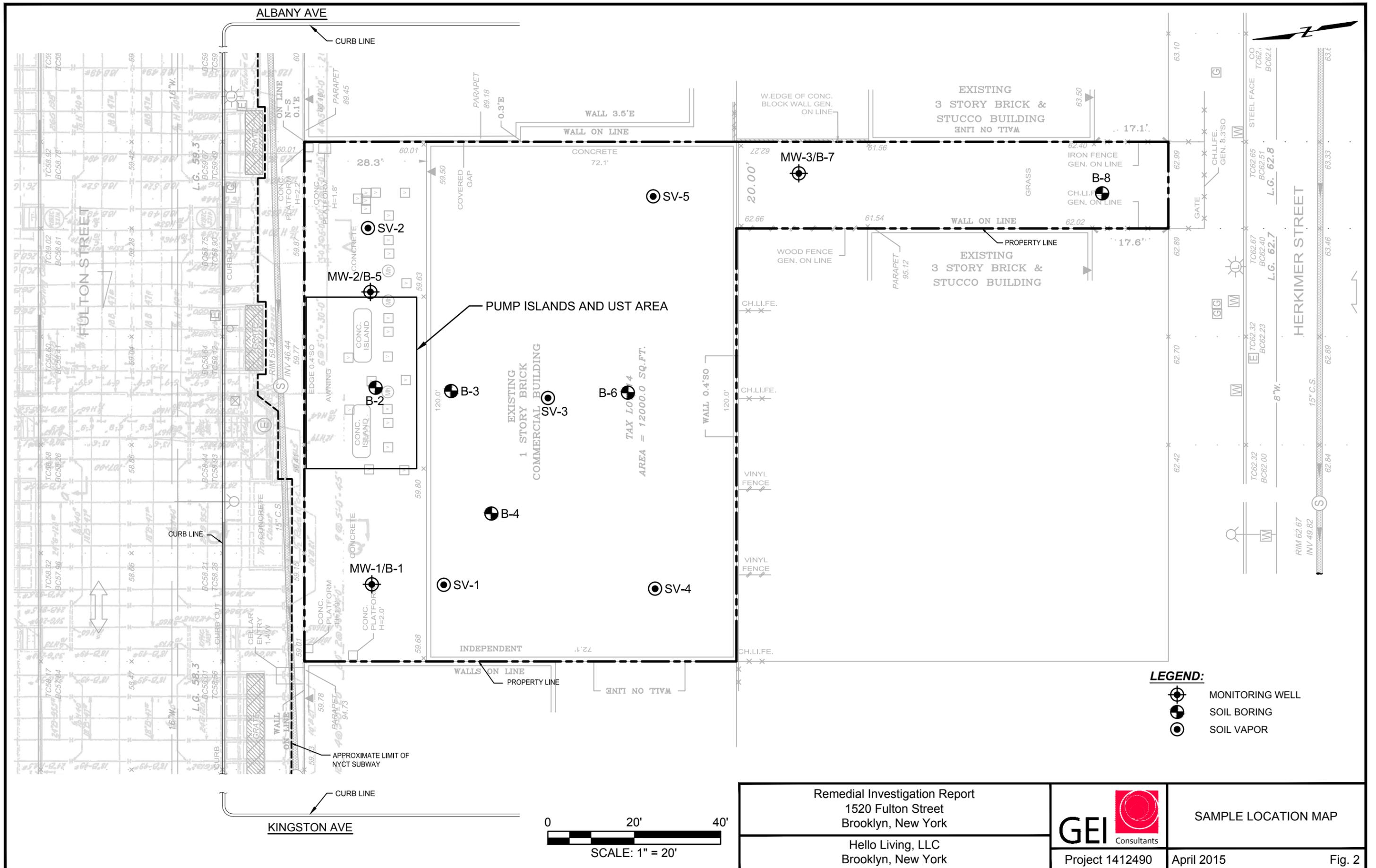


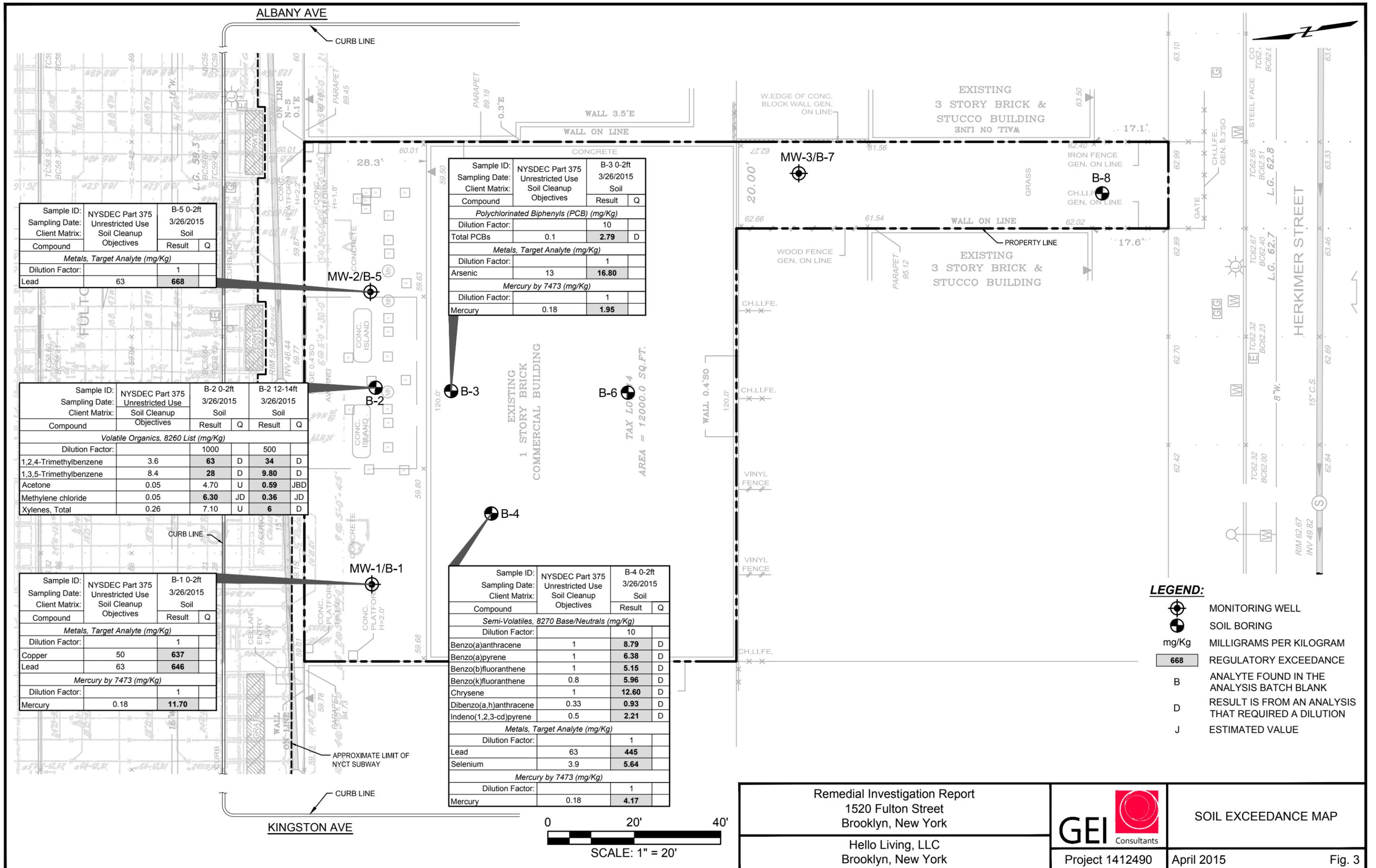
Project 1412490

SITE LOCATION MAP

April 2015

Fig. 1





Sample ID:	NYSDEC Part 375	B-5 0-2ft
Sampling Date:	Unrestricted Use	3/26/2015
Client Matrix:	Soil Cleanup Objectives	Soil
Compound	Objectives	Result Q
Metals, Target Analyte (mg/Kg)		
Dilution Factor:	1	
Lead	63	668

Sample ID:	NYSDEC Part 375	B-3 0-2ft
Sampling Date:	Unrestricted Use	3/26/2015
Client Matrix:	Soil Cleanup Objectives	Soil
Compound	Objectives	Result Q
Polychlorinated Biphenyls (PCB) (mg/Kg)		
Dilution Factor:	10	
Total PCBs	0.1	2.79 D
Metals, Target Analyte (mg/Kg)		
Dilution Factor:	1	
Arsenic	13	16.80
Mercury by 7473 (mg/Kg)		
Dilution Factor:	1	
Mercury	0.18	1.95

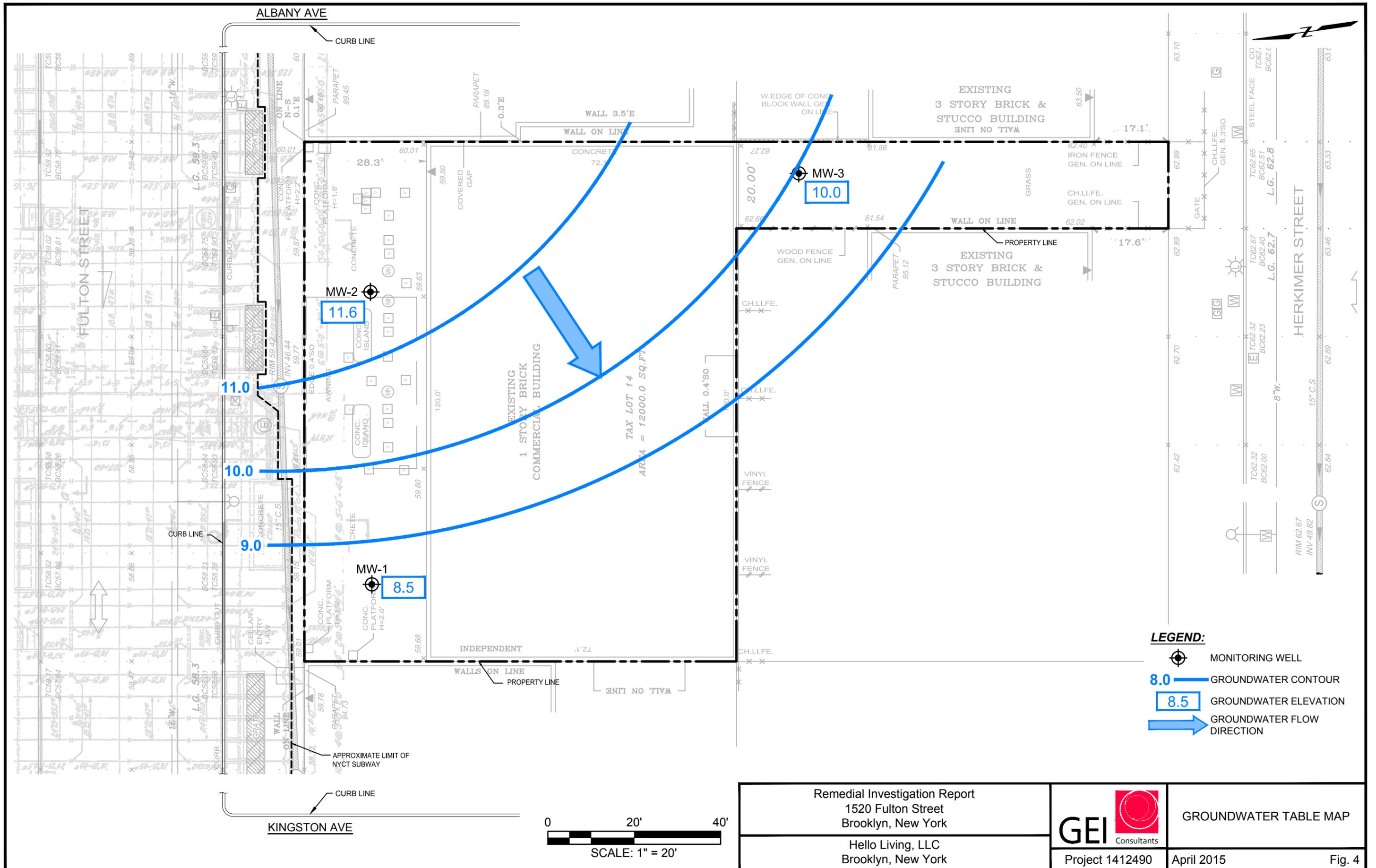
Sample ID:	NYSDEC Part 375	B-2 0-2ft	B-2 12-14ft
Sampling Date:	Unrestricted Use	3/26/2015	3/26/2015
Client Matrix:	Soil Cleanup Objectives	Soil	Soil
Compound	Objectives	Result Q	Result Q
Volatile Organics, 8260 List (mg/Kg)			
Dilution Factor:		1000	500
1,2,4-Trimethylbenzene	3.6	63 D	34 D
1,3,5-Trimethylbenzene	8.4	28 D	9.80 D
Acetone	0.05	4.70 U	0.59 JBD
Methylene chloride	0.05	6.30 JD	0.36 JD
Xylenes, Total	0.26	7.10 U	6 D

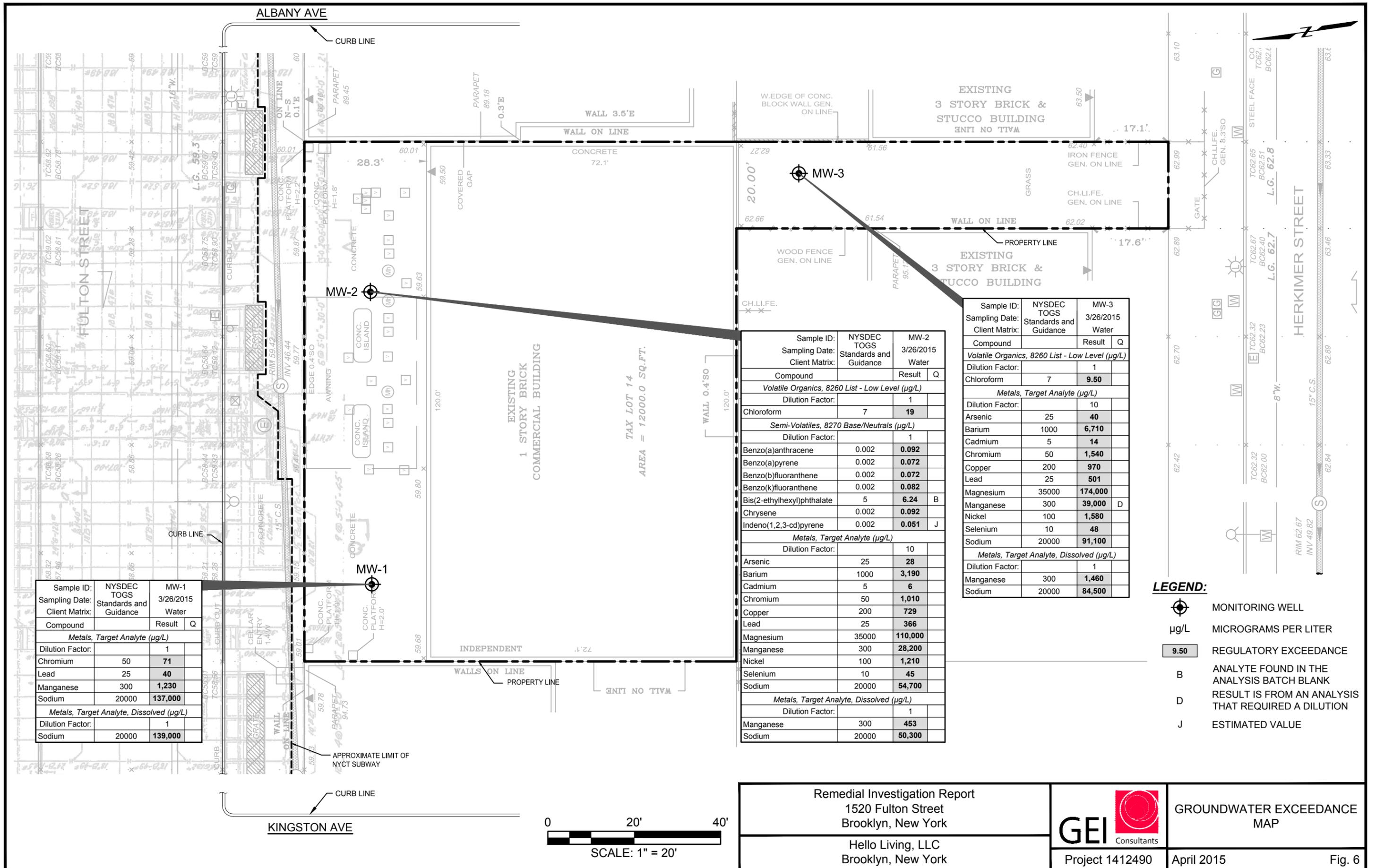
Sample ID:	NYSDEC Part 375	B-4 0-2ft
Sampling Date:	Unrestricted Use	3/26/2015
Client Matrix:	Soil Cleanup Objectives	Soil
Compound	Objectives	Result Q
Semi-Volatiles, 8270 Base/Neutrals (mg/Kg)		
Dilution Factor:	10	
Benzo(a)anthracene	1	8.79 D
Benzo(a)pyrene	1	6.38 D
Benzo(b)fluoranthene	1	5.15 D
Benzo(k)fluoranthene	0.8	5.96 D
Chrysene	1	12.60 D
Dibenzo(a,h)anthracene	0.33	0.93 D
Indeno(1,2,3-cd)pyrene	0.5	2.21 D
Metals, Target Analyte (mg/Kg)		
Dilution Factor:	1	
Lead	63	445
Selenium	3.9	5.64
Mercury by 7473 (mg/Kg)		
Dilution Factor:	1	
Mercury	0.18	4.17

Sample ID:	NYSDEC Part 375	B-1 0-2ft
Sampling Date:	Unrestricted Use	3/26/2015
Client Matrix:	Soil Cleanup Objectives	Soil
Compound	Objectives	Result Q
Metals, Target Analyte (mg/Kg)		
Dilution Factor:	1	
Copper	50	637
Lead	63	646
Mercury by 7473 (mg/Kg)		
Dilution Factor:	1	
Mercury	0.18	11.70

- LEGEND:**
- MONITORING WELL
 - SOIL BORING
 - mg/Kg MILLIGRAMS PER KILOGRAM
 - 668** REGULATORY EXCEEDANCE
 - B** ANALYTE FOUND IN THE ANALYSIS BATCH BLANK
 - D** RESULT IS FROM AN ANALYSIS THAT REQUIRED A DILUTION
 - J** ESTIMATED VALUE

Remedial Investigation Report 1520 Fulton Street Brooklyn, New York Hello Living, LLC Brooklyn, New York		SOIL EXCEEDANCE MAP
		Project 1412490 April 2015 Fig. 3



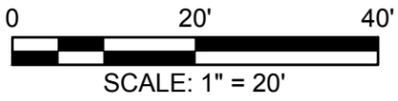


Sample ID:	NYSDEC TOGS Standards and Guidance	MW-1
Sampling Date:		3/26/2015
Client Matrix:		Water
Compound		Result Q
Metals, Target Analyte (µg/L)		
Dilution Factor:		1
Chromium	50	71
Lead	25	40
Manganese	300	1,230
Sodium	20000	137,000
Metals, Target Analyte, Dissolved (µg/L)		
Dilution Factor:		1
Sodium	20000	139,000

Sample ID:	NYSDEC TOGS Standards and Guidance	MW-2
Sampling Date:		3/26/2015
Client Matrix:		Water
Compound		Result Q
Volatile Organics, 8260 List - Low Level (µg/L)		
Dilution Factor:		1
Chloroform	7	19
Semi-Volatiles, 8270 Base/Neutrals (µg/L)		
Dilution Factor:		1
Benzo(a)anthracene	0.002	0.092
Benzo(a)pyrene	0.002	0.072
Benzo(b)fluoranthene	0.002	0.072
Benzo(k)fluoranthene	0.002	0.082
Bis(2-ethylhexyl)phthalate	5	6.24 B
Chrysene	0.002	0.092
Indeno(1,2,3-cd)pyrene	0.002	0.051 J
Metals, Target Analyte (µg/L)		
Dilution Factor:		10
Arsenic	25	28
Barium	1000	3,190
Cadmium	5	6
Chromium	50	1,010
Copper	200	729
Lead	25	366
Magnesium	35000	110,000
Manganese	300	28,200
Nickel	100	1,210
Selenium	10	45
Sodium	20000	54,700
Metals, Target Analyte, Dissolved (µg/L)		
Dilution Factor:		1
Manganese	300	453
Sodium	20000	50,300

Sample ID:	NYSDEC TOGS Standards and Guidance	MW-3
Sampling Date:		3/26/2015
Client Matrix:		Water
Compound		Result Q
Volatile Organics, 8260 List - Low Level (µg/L)		
Dilution Factor:		1
Chloroform	7	9.50
Metals, Target Analyte (µg/L)		
Dilution Factor:		10
Arsenic	25	40
Barium	1000	6,710
Cadmium	5	14
Chromium	50	1,540
Copper	200	970
Lead	25	501
Magnesium	35000	174,000
Manganese	300	39,000 D
Nickel	100	1,580
Selenium	10	48
Sodium	20000	91,100
Metals, Target Analyte, Dissolved (µg/L)		
Dilution Factor:		1
Manganese	300	1,460
Sodium	20000	84,500

- LEGEND:**
- MONITORING WELL
 - µg/L MICROGRAMS PER LITER
 - 9.50** REGULATORY EXCEEDANCE
 - B ANALYTE FOUND IN THE ANALYSIS BATCH BLANK
 - D RESULT IS FROM AN ANALYSIS THAT REQUIRED A DILUTION
 - J ESTIMATED VALUE



Remedial Investigation Report 1520 Fulton Street Brooklyn, New York Hello Living, LLC Brooklyn, New York		GROUNDWATER EXCEEDANCE MAP
Project 1412490	April 2015	Fig. 6

Table 1. Soil Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-1 0-2ft 3/26/2015 Soil		B-1 12-14ft 3/26/2015 Soil		B-2 0-2ft 3/26/2015 Soil		B-2 12-14ft 3/26/2015 Soil		B-3 0-2ft 3/26/2015 Soil		B-3 12-14ft 3/26/2015 Soil	
		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Compound													
Volatile Organics, 8260 List	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Dilution Factor		1		1		1000		500		1		1	
1,1,1,2-Tetrachloroethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,1,1-Trichloroethane	0.68	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,1,2,2-Tetrachloroethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,1,2-Trichloroethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,1-Dichloroethane	0.27	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,1-Dichloroethylene	0.33	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,1-Dichloropropylene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,2,3-Trichlorobenzene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,2,3-Trichloropropane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,2,4-Trichlorobenzene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,2,4-Trimethylbenzene	3.6	0.0015	U	0.0007	U	63	D	34	D	0.0011	U	0.0009	U
1,2-Dibromo-3-chloropropane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,2-Dibromoethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,2-Dichlorobenzene	1.1	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,2-Dichloroethane	0.02	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,2-Dichloropropane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,3,5-Trimethylbenzene	8.4	0.0015	U	0.0007	U	28	D	9.80	D	0.0011	U	0.0009	U
1,3-Dichlorobenzene	2.4	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,3-Dichloropropane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,4-Dichlorobenzene	1.8	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
1,4-Dioxane	0.1	0.030	U	0.014	U	47	U	3.20	U	0.021	U	0.018	U
2,2-Dichloropropane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
2-Butanone	0.12	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0029	U	0.0009	U
2-Chlorotoluene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
4-Chlorotoluene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Acetone	0.05	0.0030	U	0.0014	U	4.70	U	0.59	JBD	0.018	U	0.0023	J
Benzene	0.06	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Bromobenzene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Bromochloromethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Bromodichloromethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Bromoform	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Bromomethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Carbon tetrachloride	0.76	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Chlorobenzene	1.1	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Chloroethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Chloroform	0.37	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Chloromethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
cis-1,2-Dichloroethylene	0.25	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
cis-1,3-Dichloropropylene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Dibromochloromethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Dibromomethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Dichlorodifluoromethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Ethyl Benzene	1	0.0015	U	0.0007	U	2.40	U	0.65	D	0.0011	U	0.0009	U
Hexachlorobutadiene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Isopropylbenzene	~	0.0015	U	0.0007	U	2.40	U	0.48	D	0.0011	U	0.0009	U

Table 1. Soil Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-1 0-2ft 3/26/2015 Soil		B-1 12-14ft 3/26/2015 Soil		B-2 0-2ft 3/26/2015 Soil		B-2 12-14ft 3/26/2015 Soil		B-3 0-2ft 3/26/2015 Soil		B-3 12-14ft 3/26/2015 Soil	
		Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result
Methyl tert-butyl ether (MTBE)	0.93	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Methylene chloride	0.05	0.0030	U	0.0014	U	6.30	JD	0.36	JD	0.0021	U	0.0018	U
Naphthalene	12	0.0015	U	0.0007	U	2.40	U	4	D	0.0011	U	0.0009	U
n-Butylbenzene	12	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
n-Propylbenzene	3.9	0.0015	U	0.0007	U	2.40	U	1.80	D	0.0011	U	0.0009	U
o-Xylene	~	0.0015	U	0.0007	U	2.40	U	1.70	D	0.0011	U	0.0009	U
p- & m- Xylenes	~	0.0030	U	0.0014	U	4.70	U	4.30	D	0.0021	U	0.0018	U
p-Isopropyltoluene	~	0.0015	U	0.0007	U	2.40	U	0.51	D	0.0011	U	0.0009	U
sec-Butylbenzene	11	0.0015	U	0.0007	U	2.40	U	0.38	D	0.0011	U	0.0009	U
Styrene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
tert-Butylbenzene	5.9	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Tetrachloroethylene	1.3	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Toluene	0.7	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
trans-1,2-Dichloroethylene	0.19	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
trans-1,3-Dichloropropylene	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Trichloroethylene	0.47	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Trichlorofluoromethane	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Vinyl acetate	~	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Vinyl Chloride	0.02	0.0015	U	0.0007	U	2.40	U	0.16	U	0.0011	U	0.0009	U
Xylenes, Total	0.26	0.0045	U	0.0021	U	7.10	U	6	D	0.0032	U	0.0026	U
Semi-Volatiles, 8270 Base/Neutrals	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Dilution Factor		20		1		1		1		2		2	
1,2,4-Trichlorobenzene	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
1,2-Dichlorobenzene	1.1	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
1,3-Dichlorobenzene	2.4	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
1,4-Dichlorobenzene	1.8	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
2,4-Dinitrotoluene	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
2,6-Dinitrotoluene	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
2-Chloronaphthalene	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
2-Methylnaphthalene	~	0.52	U	0.022	U	0.23	U	0.075	U	0.044	U	0.044	U
3,3'-Dichlorobenzidine	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
3-Nitroaniline	~	1.04	U	0.043	U	0.044	U	0.045	U	0.089	U	0.087	U
4-Bromophenyl phenyl ether	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
4-Chloroaniline	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
4-Chlorophenyl phenyl ether	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
4-Nitroaniline	~	1.04	U	0.043	U	0.044	U	0.045	U	0.089	U	0.087	U
Acenaphthene	20	0.52	U	0.022	U	0.022	U	0.022	U	0.064	JD	0.044	U
Acenaphthylene	100	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Aniline	~	2.07	U	0.087	U	0.089	U	0.089	U	0.18	U	0.18	U
Anthracene	100	0.52	U	0.022	U	0.022	U	0.022	U	0.16	D	0.044	U
Benzo(a)anthracene	1	0.52	U	0.022	U	0.022	U	0.031	J	0.45	D	0.044	U
Benzo(a)pyrene	1	0.52	U	0.022	U	0.022	U	0.040	J	0.13	D	0.044	U
Benzo(b)fluoranthene	1	0.52	U	0.022	U	0.022	U	0.025	J	0.17	D	0.044	U
Benzo(g,h,i)perylene	100	0.52	U	0.022	U	0.022	U	0.031	J	0.21	D	0.044	U
Benzo(k)fluoranthene	0.8	0.52	U	0.022	U	0.022	U	0.034	J	0.22	D	0.044	U
Benzyl butyl phthalate	~	0.52	U	0.022	U	0.022	U	0.022	U	1.07	D	0.044	U

Table 1. Soil Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-1 0-2ft 3/26/2015 Soil		B-1 12-14ft 3/26/2015 Soil		B-2 0-2ft 3/26/2015 Soil		B-2 12-14ft 3/26/2015 Soil		B-3 0-2ft 3/26/2015 Soil		B-3 12-14ft 3/26/2015 Soil	
		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Compound													
Bis(2-chloroethoxy)methane	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Bis(2-chloroethyl)ether	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Bis(2-chloroisopropyl)ether	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Bis(2-ethylhexyl)phthalate	~	0.52	U	0.022	U	0.022	U	0.044	J	0.45	D	0.044	U
Carbazole	~	0.52	U	0.022	U	0.022	U	0.022	U	0.12	D	0.044	U
Chrysene	1	0.65	JD	0.022	U	0.022	U	0.047	U	0.56	D	0.044	U
Dibenzo(a,h)anthracene	0.33	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Dibenzofuran	7	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Diethyl phthalate	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Dimethyl phthalate	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Di-n-butyl phthalate	~	0.52	U	0.022	U	0.050		0.022	U	0.044	U	0.044	U
Di-n-octyl phthalate	~	0.52	U	0.022	U	0.022	U	0.022	U	0.053	JD	0.044	U
Fluoranthene	100	1.19	D	0.022	U	0.037	J	0.065	U	1.01	D	0.044	U
Fluorene	30	0.52	U	0.022	U	0.022	U	0.022	U	0.054	JD	0.044	U
Hexachlorobenzene	0.33	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Hexachlorobutadiene	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Hexachlorocyclopentadiene	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Hexachloroethane	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Indeno(1,2,3-cd)pyrene	0.5	0.52	U	0.022	U	0.022	U	0.038	J	0.15	D	0.044	U
Isophorone	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Naphthalene	12	0.52	U	0.022	U	0.076		0.026	J	0.044	U	0.044	U
Nitrobenzene	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
N-Nitrosodimethylamine	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
N-nitroso-di-n-propylamine	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
N-Nitrosodiphenylamine	~	0.52	U	0.022	U	0.022	U	0.022	U	0.044	U	0.044	U
Phenanthrene	100	0.99	JD	0.022	U	0.041	J	0.039	J	0.78	D	0.044	U
Pyrene	100	1.03	JD	0.022	U	0.042	J	0.067	U	1.05	D	0.044	U
Pyridine	~	2.07	U	0.087	U	0.089	U	0.089	U	0.18	U	0.18	U
Pesticides, 8081 target list	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Dilution Factor		5		5		5		5		5		5	
4,4'-DDD	0.0033	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
4,4'-DDE	0.0033	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
4,4'-DDT	0.0033	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Aldrin	0.005	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
alpha-BHC	0.02	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
alpha-Chlordane	0.094	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
beta-BHC	0.036	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Chlordane, total	~	0.082	U	0.069	U	0.070	U	0.070	U	0.070	U	0.069	U
delta-BHC	0.04	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Dieldrin	0.005	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Endosulfan I	2.4	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Endosulfan II	2.4	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Endosulfan sulfate	2.4	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Endrin	0.014	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Endrin aldehyde	~	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
Endrin ketone	~	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
gamma-BHC (Lindane)	0.1	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
gamma-Chlordane	~	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U

Table 1. Soil Sample Analytical Results
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Sample ID	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-1 0-2ft 3/26/2015 Soil		B-1 12-14ft 3/26/2015 Soil		B-2 0-2ft 3/26/2015 Soil		B-2 12-14ft 3/26/2015 Soil		B-3 0-2ft 3/26/2015 Soil		B-3 12-14ft 3/26/2015 Soil		
Sampling Date		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Matrix	Compound													
	Heptachlor	0.042	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
	Heptachlor epoxide	~	0.0021	U	0.0017	U	0.0018	U	0.0018	U	0.0018	U	0.0017	U
	Methoxychlor	~	0.010	U	0.0086	U	0.0088	U	0.0088	U	0.0088	U	0.0086	U
	Toxaphene	~	0.10	U	0.087	U	0.089	U	0.089	U	0.089	U	0.087	U
	Polychlorinated Biphenyls (PCB)	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Dilution Factor		1		1		1		1		1		1	
	Aroclor 1016	~	0.021	U	0.017	U	0.018	U	0.018	U	0.18	U	0.017	U
	Aroclor 1221	~	0.021	U	0.017	U	0.018	U	0.018	U	0.18	U	0.017	U
	Aroclor 1232	~	0.021	U	0.017	U	0.018	U	0.018	U	0.18	U	0.017	U
	Aroclor 1242	~	0.021	U	0.017	U	0.018	U	0.018	U	0.18	U	0.017	U
	Aroclor 1248	~	0.021	U	0.017	U	0.018	U	0.018	U	0.18	U	0.017	U
	Aroclor 1254	~	0.021	U	0.017	U	0.018	U	0.018	U	0.18	U	0.017	U
	Aroclor 1260	~	0.021	U	0.017	U	0.018	U	0.018	U	2.79	D	0.017	U
	Total PCBs	0.1	0.021	U	0.017	U	0.018	U	0.018	U	2.79	D	0.017	U
	Metals, Target Analyte	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Dilution Factor		1		1		1		1		1		1	
	Aluminum	~	6,120		5,610		4,680		5,850		8,120		4,620	
	Antimony	~	2.48		0.52	U	0.53	U	0.53	U	2.17		0.52	U
	Arsenic	13	11.90		1.73		1.06	U	2.27		16.80		1.48	
	Barium	350	158		46.40		29		57.70		198		34.90	
	Beryllium	7.2	0.12	U	0.10	U	0.11	U	0.11	U	0.11	U	0.11	U
	Cadmium	2.5	0.37	U	0.31	U	0.32	U	0.32	U	2.06		0.31	U
	Calcium	~	4,600		698		945		5,080		56,900		951	
	Chromium	~	16.70		13.10		14.60		13.30		50.80		11	
	Cobalt	~	8.25		5.76		5.95		5.57		10.50		5.17	
	Copper	50	637		16.60		15.70		21.50		64.50		13.40	
	Iron	~	17,000		13,600		12,300		13,300		17,300		13,800	
	Lead	63	646		3.87		6.47		75.40		237		4.10	
	Magnesium	~	899		1,570		1,470		1,990		7,690		1,680	
	Manganese	1600	261		331		384		350		269		275	
	Nickel	30	15.40		14.80		26.60		17.50		38.50		13.60	
	Potassium	~	737		586		712		821		1,800		866	
	Selenium	3.9	3.05		1.14		1.39		1.56		2.31		1.84	
	Silver	2	0.62	U	0.52	U	0.53	U	0.53	U	1.61		0.52	U
	Sodium	~	390		112		77		202		871		126	
	Thallium	~	1.24	U	1.04	U	1.06	U	1.07	U	1.06	U	1.05	U
	Vanadium	~	23.10		20.60		21.50		20.50		20.80		18.30	
	Zinc	109	431		21.30		28.40		129		207		28.40	
	Mercury by 7473	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Dilution Factor		1		1		1		1		1		1	
	Mercury	0.18	11.70		0.031	U	0.032	U	0.22		1.95		0.031	U
	Total Solids		%		%		%		%		%		%	
	Dilution Factor		1		1		1		1		1		1	
	% Solids	~	80.50		96.20		94.30		93.80		94.30		95.50	

Table 1. Soil Sample Analytical Results
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Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-4 0-2ft 3/26/2015 Soil		B-4 12-14ft 3/26/2015 Soil		B-5 0-2ft 3/26/2015 Soil		B-5 12-14ft 3/26/2015 Soil		B-6 0-2ft 3/26/2015 Soil		B-6 12-14ft 3/26/2015 Soil	
		Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result
Volatile Organics, 8260 List	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Dilution Factor		1		1		1		1		1		1	
1,1,1,2-Tetrachloroethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,1,1-Trichloroethane	0.68	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,1,2,2-Tetrachloroethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,1,2-Trichloroethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,1-Dichloroethane	0.27	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,1-Dichloroethylene	0.33	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,1-Dichloropropylene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2,3-Trichlorobenzene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2,3-Trichloropropane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2,4-Trichlorobenzene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2,4-Trimethylbenzene	3.6	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2-Dibromo-3-chloropropane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2-Dibromoethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2-Dichlorobenzene	1.1	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2-Dichloroethane	0.02	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,2-Dichloropropane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,3,5-Trimethylbenzene	8.4	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,3-Dichlorobenzene	2.4	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,3-Dichloropropane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,4-Dichlorobenzene	1.8	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
1,4-Dioxane	0.1	0.026	U	0.017	U	0.019	U	0.021	U	0.030	U	0.062	U
2,2-Dichloropropane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
2-Butanone	0.12	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
2-Chlorotoluene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
4-Chlorotoluene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Acetone	0.05	0.0026	U	0.0023	J	0.0023	J	0.0021	U	0.0069	U	0.011	J
Benzene	0.06	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Bromobenzene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Bromochloromethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Bromodichloromethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Bromoform	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Bromomethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Carbon tetrachloride	0.76	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Chlorobenzene	1.1	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Chloroethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Chloroform	0.37	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Chloromethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
cis-1,2-Dichloroethylene	0.25	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
cis-1,3-Dichloropropylene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Dibromochloromethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Dibromomethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Dichlorodifluoromethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Ethyl Benzene	1	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Hexachlorobutadiene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Isopropylbenzene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U

Table 1. Soil Sample Analytical Results
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Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-4 0-2ft 3/26/2015 Soil		B-4 12-14ft 3/26/2015 Soil		B-5 0-2ft 3/26/2015 Soil		B-5 12-14ft 3/26/2015 Soil		B-6 0-2ft 3/26/2015 Soil		B-6 12-14ft 3/26/2015 Soil	
		Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result
Methyl tert-butyl ether (MTBE)	0.93	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Methylene chloride	0.05	0.0026	U	0.0017	U	0.0019	U	0.0021	U	0.0030	U	0.0062	U
Naphthalene	12	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
n-Butylbenzene	12	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
n-Propylbenzene	3.9	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
o-Xylene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
p- & m- Xylenes	~	0.0026	U	0.0017	U	0.0019	U	0.0021	U	0.0030	U	0.0062	U
p-Isopropyltoluene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
sec-Butylbenzene	11	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Styrene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
tert-Butylbenzene	5.9	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Tetrachloroethylene	1.3	0.0046		0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Toluene	0.7	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
trans-1,2-Dichloroethylene	0.19	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
trans-1,3-Dichloropropylene	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Trichloroethylene	0.47	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Trichlorofluoromethane	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Vinyl acetate	~	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Vinyl Chloride	0.02	0.0013	U	0.0009	U	0.0009	U	0.0011	U	0.0015	U	0.0031	U
Xylenes, Total	0.26	0.0039	U	0.0026	U	0.0028	U	0.0032	U	0.0045	U	0.0093	U
Semi-Volatiles, 8270 Base/Neutrals	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Dilution Factor		10		1		1		1		1		1	
1,2,4-Trichlorobenzene	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
1,2-Dichlorobenzene	1.1	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
1,3-Dichlorobenzene	2.4	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
1,4-Dichlorobenzene	1.8	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
2,4-Dinitrotoluene	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
2,6-Dinitrotoluene	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
2-Chloronaphthalene	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
2-Methylnaphthalene	~	0.75	D	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
3,3'-Dichlorobenzidine	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
3-Nitroaniline	~	0.47	U	0.043	U	0.043	U	0.043	U	0.046	U	0.043	U
4-Bromophenyl phenyl ether	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
4-Chloroaniline	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
4-Chlorophenyl phenyl ether	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
4-Nitroaniline	~	0.47	U	0.043	U	0.043	U	0.043	U	0.046	U	0.043	U
Acenaphthene	20	3.87	D	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Acenaphthylene	100	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Aniline	~	0.94	U	0.085	U	0.086	U	0.086	U	0.093	U	0.086	U
Anthracene	100	7.02	D	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Benzo(a)anthracene	1	8.79	D	0.021	U	0.081		0.022	U	0.023	U	0.022	U
Benzo(a)pyrene	1	6.38	D	0.021	U	0.079		0.022	U	0.054		0.022	U
Benzo(b)fluoranthene	1	5.15	D	0.021	U	0.050		0.022	U	0.023	U	0.022	U
Benzo(g,h,i)perylene	100	1.72	D	0.021	U	0.035	J	0.022	U	0.023	U	0.022	U
Benzo(k)fluoranthene	0.8	5.96	D	0.021	U	0.050		0.022	U	0.032	J	0.022	U
Benzyl butyl phthalate	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U

Table 1. Soil Sample Analytical Results
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Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-4 0-2ft 3/26/2015 Soil		B-4 12-14ft 3/26/2015 Soil		B-5 0-2ft 3/26/2015 Soil		B-5 12-14ft 3/26/2015 Soil		B-6 0-2ft 3/26/2015 Soil		B-6 12-14ft 3/26/2015 Soil	
		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Compound													
Bis(2-chloroethoxy)methane	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Bis(2-chloroethyl)ether	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Bis(2-chloroisopropyl)ether	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Bis(2-ethylhexyl)phthalate	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Carbazole	~	3.14	D	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Chrysene	1	12.60	D	0.021	U	0.12		0.022	U	0.033	J	0.022	U
Dibenzo(a,h)anthracene	0.33	0.93	D	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Dibenzofuran	7	2.90	D	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Diethyl phthalate	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Dimethyl phthalate	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Di-n-butyl phthalate	~	0.23	U	0.021	U	0.021	U	0.045		0.023	U	0.022	U
Di-n-octyl phthalate	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Fluoranthene	100	25.30	D	0.037	J	0.13		0.022	U	0.048		0.022	U
Fluorene	30	2.94	D	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Hexachlorobenzene	0.33	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Hexachlorobutadiene	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Hexachlorocyclopentadiene	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Hexachloroethane	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Indeno(1,2,3-cd)pyrene	0.5	2.21	D	0.021	U	0.032	J	0.022	U	0.023	U	0.022	U
Isophorone	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Naphthalene	12	2.03	D	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Nitrobenzene	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
N-Nitrosodimethylamine	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
N-nitroso-di-n-propylamine	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
N-Nitrosodiphenylamine	~	0.23	U	0.021	U	0.021	U	0.022	U	0.023	U	0.022	U
Phenanthrene	100	27.20	D	0.038	J	0.22		0.022	U	0.023	U	0.022	U
Pyrene	100	21.90	D	0.032	J	0.32		0.022	U	0.043	J	0.022	U
Pyridine	~	0.94	U	0.085	U	0.086	U	0.086	U	0.093	U	0.086	U
Pesticides, 8081 target list	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Dilution Factor		5		5		5		5		5		5	
4,4'-DDD	0.0033	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
4,4'-DDE	0.0033	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
4,4'-DDT	0.0033	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Aldrin	0.005	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
alpha-BHC	0.02	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
alpha-Chlordane	0.094	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
beta-BHC	0.036	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Chlordane, total	~	0.074	U	0.068	U	0.068	U	0.068	U	0.074	U	0.068	U
delta-BHC	0.04	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Dieldrin	0.005	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Endosulfan I	2.4	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Endosulfan II	2.4	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Endosulfan sulfate	2.4	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Endrin	0.014	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Endrin aldehyde	~	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
Endrin ketone	~	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
gamma-BHC (Lindane)	0.1	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
gamma-Chlordane	~	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U

Table 1. Soil Sample Analytical Results
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Sample ID	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-4 0-2ft 3/26/2015 Soil		B-4 12-14ft 3/26/2015 Soil		B-5 0-2ft 3/26/2015 Soil		B-5 12-14ft 3/26/2015 Soil		B-6 0-2ft 3/26/2015 Soil		B-6 12-14ft 3/26/2015 Soil		
Sampling Date		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Matrix	Compound													
	Heptachlor	0.042	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
	Heptachlor epoxide	~	0.0019	U	0.0017	U	0.0017	U	0.0017	U	0.0018	U	0.0017	U
	Methoxychlor	~	0.0092	U	0.0084	U	0.0085	U	0.0085	U	0.0092	U	0.0085	U
	Toxaphene	~	0.094	U	0.085	U	0.086	U	0.086	U	0.093	U	0.086	U
	Polychlorinated Biphenyls (PCB)	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Dilution Factor		1		1		1		1		1		1	
	Aroclor 1016	~	0.019	U	0.017	U	0.017	U	0.017	U	0.019	U	0.017	U
	Aroclor 1221	~	0.019	U	0.017	U	0.017	U	0.017	U	0.019	U	0.017	U
	Aroclor 1232	~	0.019	U	0.017	U	0.017	U	0.017	U	0.019	U	0.017	U
	Aroclor 1242	~	0.019	U	0.017	U	0.017	U	0.017	U	0.019	U	0.017	U
	Aroclor 1248	~	0.019	U	0.017	U	0.017	U	0.017	U	0.019	U	0.017	U
	Aroclor 1254	~	0.019	U	0.017	U	0.017	U	0.017	U	0.019	U	0.017	U
	Aroclor 1260	~	0.019	U	0.017	U	0.017	U	0.017	U	0.019	U	0.017	U
	Total PCBs	0.1	0.019	U	0.017	U	0.017	U	0.017	U	0.019	U	0.017	U
	Metals, Target Analyte	mg/Kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Dilution Factor		1		1		1		1		1		1	
	Aluminum	~	9,300		5,730		5,630		7,340		12,000		3,440	
	Antimony	~	1.79		0.51	U	0.51	U	0.52	U	0.56	U	0.51	U
	Arsenic	13	10.40		1.07		3.25		1.38		3.68		1.03	U
	Barium	350	153		36.80		165		35.40		68.80		34.80	
	Beryllium	7.2	0.11	U	0.10	U	0.10	U	0.10	U	0.11	U	0.10	U
	Cadmium	2.5	0.34	U	0.31	U	0.31	U	0.31	U	0.33	U	0.31	U
	Calcium	~	3,410		1,110		6,520		2,260		1,650		997	
	Chromium	~	17.30		14.80		16.40		29		17.50		9.17	
	Cobalt	~	8.50		6.31		6.33		5.68		8.33		4.70	
	Copper	50	34.80		13.40		34		28.60		8.78		12.20	
	Iron	~	33,700		12,700		18,900		12,200		18,800		15,600	
	Lead	63	445		4.41		668		3.38		29.90		6.45	
	Magnesium	~	1,610		2,470		1,680		1,970		1,910		1,400	
	Manganese	1600	397		332		381		254		299		564	
	Nickel	30	13.60		23.20		10.40		20.10		10.60		14.20	
	Potassium	~	655		1,100		627		774		579		620	
	Selenium	3.9	5.64		1.27		2.32		1.15		2.50		1.96	
	Silver	2	0.56	U	0.51	U	0.51	U	0.52	U	0.56	U	0.51	U
	Sodium	~	398		213		189		547		100		116	
	Thallium	~	1.12	U	1.02	U	1.02	U	1.03	U	1.11	U	1.03	U
	Vanadium	~	20.80		26.60		17.90		26.60		24.70		15	
	Zinc	109	150		23.70		229		19.20		29.60		22	
	Mercury by 7473	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
	Dilution Factor		1		1		1		1		1		1	
	Mercury	0.18	4.17		0.031	U	0.19		0.031	U	0.11		0.031	U
	Total Solids		%		%		%		%		%		%	
	Dilution Factor		1		1		1		1		1		1	
	% Solids	~	89.30		97.80		97.60		97.10		89.80		97.20	

Table 1. Soil Sample Analytical Results
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Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-7 0-2ft 3/26/2015 Soil		B-7 12-14ft 3/26/2015 Soil		B-8 0-2ft 3/26/2015 Soil	
		Result	Q	Result	Q	Result	Q
Compound							
Volatile Organics, 8260 List	mg/Kg	mg/kg		mg/kg		mg/kg	
Dilution Factor		1		1		1	
1,1,1,2-Tetrachloroethane	~	0.0010	U	0.0020	U	0.0013	U
1,1,1-Trichloroethane	0.68	0.0010	U	0.0020	U	0.0013	U
1,1,2,2-Tetrachloroethane	~	0.0010	U	0.0020	U	0.0013	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	0.0010	U	0.0020	U	0.0013	U
1,1,2-Trichloroethane	~	0.0010	U	0.0020	U	0.0013	U
1,1-Dichloroethane	0.27	0.0010	U	0.0020	U	0.0013	U
1,1-Dichloroethylene	0.33	0.0010	U	0.0020	U	0.0013	U
1,1-Dichloropropylene	~	0.0010	U	0.0020	U	0.0013	U
1,2,3-Trichlorobenzene	~	0.0010	U	0.0020	U	0.0013	U
1,2,3-Trichloropropane	~	0.0010	U	0.0020	U	0.0013	U
1,2,4-Trichlorobenzene	~	0.0010	U	0.0020	U	0.0013	U
1,2,4-Trimethylbenzene	3.6	0.0010	U	0.0033	J	0.0013	J
1,2-Dibromo-3-chloropropane	~	0.0010	U	0.0020	U	0.0013	U
1,2-Dibromoethane	~	0.0010	U	0.0020	U	0.0013	U
1,2-Dichlorobenzene	1.1	0.0010	U	0.0020	U	0.0013	U
1,2-Dichloroethane	0.02	0.0010	U	0.0020	U	0.0013	U
1,2-Dichloropropane	~	0.0010	U	0.0020	U	0.0013	U
1,3,5-Trimethylbenzene	8.4	0.0010	U	0.0020	U	0.0013	U
1,3-Dichlorobenzene	2.4	0.0010	U	0.0020	U	0.0013	U
1,3-Dichloropropane	~	0.0010	U	0.0020	U	0.0013	U
1,4-Dichlorobenzene	1.8	0.0010	U	0.0020	U	0.0013	U
1,4-Dioxane	0.1	0.019	U	0.040	U	0.025	U
2,2-Dichloropropane	~	0.0010	U	0.0020	U	0.0013	U
2-Butanone	0.12	0.0010	U	0.0020	U	0.0067	U
2-Chlorotoluene	~	0.0010	U	0.0020	U	0.0013	U
4-Chlorotoluene	~	0.0010	U	0.0020	U	0.0013	U
Acetone	0.05	0.0019	U	0.010	U	0.036	U
Benzene	0.06	0.0010	U	0.0020	U	0.0013	U
Bromobenzene	~	0.0010	U	0.0020	U	0.0013	U
Bromochloromethane	~	0.0010	U	0.0020	U	0.0013	U
Bromodichloromethane	~	0.0010	U	0.0020	U	0.0013	U
Bromoform	~	0.0010	U	0.0020	U	0.0013	U
Bromomethane	~	0.0010	U	0.0020	U	0.0013	U
Carbon tetrachloride	0.76	0.0010	U	0.0020	U	0.0013	U
Chlorobenzene	1.1	0.0010	U	0.0020	U	0.0013	U
Chloroethane	~	0.0010	U	0.0020	U	0.0013	U
Chloroform	0.37	0.0010	U	0.0020	U	0.0013	U
Chloromethane	~	0.0010	U	0.0020	U	0.0013	U
cis-1,2-Dichloroethylene	0.25	0.0010	U	0.0020	U	0.0013	U
cis-1,3-Dichloropropylene	~	0.0010	U	0.0020	U	0.0013	U
Dibromochloromethane	~	0.0010	U	0.0020	U	0.0013	U
Dibromomethane	~	0.0010	U	0.0020	U	0.0013	U
Dichlorodifluoromethane	~	0.0010	U	0.0020	U	0.0013	U
Ethyl Benzene	1	0.0010	U	0.0020	U	0.0013	U
Hexachlorobutadiene	~	0.0010	U	0.0020	U	0.0013	U
Isopropylbenzene	~	0.0010	U	0.0020	U	0.0013	U

Table 1. Soil Sample Analytical Results
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Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-7 0-2ft 3/26/2015 Soil		B-7 12-14ft 3/26/2015 Soil		B-8 0-2ft 3/26/2015 Soil	
		Result	Q	Result	Q	Result	Q
Compound							
Methyl tert-butyl ether (MTBE)	0.93	0.0010	U	0.0020	U	0.0013	U
Methylene chloride	0.05	0.0019	U	0.0040	U	0.0025	U
Naphthalene	12	0.0010	U	0.0020	U	0.0036	J
n-Butylbenzene	12	0.0010	U	0.0020	U	0.0013	U
n-Propylbenzene	3.9	0.0010	U	0.0020	U	0.0013	U
o-Xylene	~	0.0010	U	0.0020	U	0.0013	U
p- & m- Xylenes	~	0.0019	U	0.0040	U	0.0025	U
p-Isopropyltoluene	~	0.0010	U	0.0020	U	0.0013	U
sec-Butylbenzene	11	0.0010	U	0.0020	U	0.0013	U
Styrene	~	0.0010	U	0.0020	U	0.0013	U
tert-Butylbenzene	5.9	0.0010	U	0.0020	U	0.0013	U
Tetrachloroethylene	1.3	0.0010	U	0.0020	U	0.0013	U
Toluene	0.7	0.0010	U	0.0020	U	0.0013	U
trans-1,2-Dichloroethylene	0.19	0.0010	U	0.0020	U	0.0013	U
trans-1,3-Dichloropropylene	~	0.0010	U	0.0020	U	0.0013	U
Trichloroethylene	0.47	0.0010	U	0.0020	U	0.0013	U
Trichlorofluoromethane	~	0.0010	U	0.0020	U	0.0013	U
Vinyl acetate	~	0.0010	U	0.0020	U	0.0013	U
Vinyl Chloride	0.02	0.0010	U	0.0020	U	0.0013	U
Xylenes, Total	0.26	0.0029	U	0.0060	U	0.0038	U
Semi-Volatiles, 8270 Base/Neutrals	mg/Kg	mg/kg		mg/kg		mg/kg	
Dilution Factor		2		1		2	
1,2,4-Trichlorobenzene	~	0.050	U	0.022	U	0.049	U
1,2-Dichlorobenzene	1.1	0.050	U	0.022	U	0.049	U
1,3-Dichlorobenzene	2.4	0.050	U	0.022	U	0.049	U
1,4-Dichlorobenzene	1.8	0.050	U	0.022	U	0.049	U
2,4-Dinitrotoluene	~	0.050	U	0.022	U	0.049	U
2,6-Dinitrotoluene	~	0.050	U	0.022	U	0.049	U
2-Chloronaphthalene	~	0.050	U	0.022	U	0.049	U
2-Methylnaphthalene	~	0.050	U	0.022	U	0.049	U
3,3'-Dichlorobenzidine	~	0.050	U	0.022	U	0.049	U
3-Nitroaniline	~	0.099	U	0.043	U	0.097	U
4-Bromophenyl phenyl ether	~	0.050	U	0.022	U	0.049	U
4-Chloroaniline	~	0.050	U	0.022	U	0.049	U
4-Chlorophenyl phenyl ether	~	0.050	U	0.022	U	0.049	U
4-Nitroaniline	~	0.099	U	0.043	U	0.097	U
Acenaphthene	20	0.10	D	0.022	U	0.049	U
Acenaphthylene	100	0.050	U	0.022	U	0.049	U
Aniline	~	0.20	U	0.087	U	0.20	U
Anthracene	100	0.24	D	0.022	U	0.049	U
Benzo(a)anthracene	1	0.88	D	0.022	U	0.049	U
Benzo(a)pyrene	1	0.26	D	0.022	U	0.049	U
Benzo(b)fluoranthene	1	0.28	D	0.022	U	0.049	U
Benzo(g,h,i)perylene	100	0.088	JD	0.022	U	0.049	U
Benzo(k)fluoranthene	0.8	0.35	D	0.022	U	0.049	U
Benzyl butyl phthalate	~	0.050	U	0.022	U	0.049	U

Table 1. Soil Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-7 0-2ft 3/26/2015 Soil		B-7 12-14ft 3/26/2015 Soil		B-8 0-2ft 3/26/2015 Soil	
		Result	Q	Result	Q	Result	Q
Compound							
Bis(2-chloroethoxy)methane	~	0.050	U	0.022	U	0.049	U
Bis(2-chloroethyl)ether	~	0.050	U	0.022	U	0.049	U
Bis(2-chloroisopropyl)ether	~	0.050	U	0.022	U	0.049	U
Bis(2-ethylhexyl)phthalate	~	0.15	D	0.046		0.049	U
Carbazole	~	0.14	D	0.022	U	0.049	U
Chrysene	1	1	D	0.022	U	0.049	U
Dibenzo(a,h)anthracene	0.33	0.063	JD	0.022	U	0.049	U
Dibenzofuran	7	0.063	JD	0.022	U	0.049	U
Diethyl phthalate	~	0.050	U	0.022	U	0.049	U
Dimethyl phthalate	~	0.050	U	0.022	U	0.049	U
Di-n-butyl phthalate	~	0.050	U	0.022	U	0.049	U
Di-n-octyl phthalate	~	0.050	U	0.022	U	0.049	U
Fluoranthene	100	2.12	D	0.022	U	0.049	U
Fluorene	30	0.096	JD	0.022	U	0.049	U
Hexachlorobenzene	0.33	0.050	U	0.022	U	0.049	U
Hexachlorobutadiene	~	0.050	U	0.022	U	0.049	U
Hexachlorocyclopentadiene	~	0.050	U	0.022	U	0.049	U
Hexachloroethane	~	0.050	U	0.022	U	0.049	U
Indeno(1,2,3-cd)pyrene	0.5	0.14	D	0.022	U	0.049	U
Isophorone	~	0.050	U	0.022	U	0.049	U
Naphthalene	12	0.050	U	0.022	U	0.049	U
Nitrobenzene	~	0.050	U	0.022	U	0.049	U
N-Nitrosodimethylamine	~	0.050	U	0.022	U	0.049	U
N-nitroso-di-n-propylamine	~	0.050	U	0.022	U	0.049	U
N-Nitrosodiphenylamine	~	0.050	U	0.022	U	0.049	U
Phenanthrene	100	1.34	D	0.022	U	0.049	U
Pyrene	100	2.37	D	0.022	U	0.049	U
Pyridine	~	0.20	U	0.087	U	0.20	U
Pesticides, 8081 target list	mg/kg	mg/kg		mg/kg		mg/kg	
Dilution Factor		5		5		5	
4,4'-DDD	0.0033	0.0020	U	0.0017	U	0.069	D
4,4'-DDE	0.0033	0.013	D	0.0017	U	0.030	D
4,4'-DDT	0.0033	0.056	D	0.0017	U	0.018	D
Aldrin	0.005	0.0020	U	0.0017	U	0.0019	U
alpha-BHC	0.02	0.0020	U	0.0017	U	0.0019	U
alpha-Chlordane	0.094	0.0033	D	0.0017	U	0.0068	D
beta-BHC	0.036	0.0020	U	0.0017	U	0.0019	U
Chlordane, total	~	0.078	U	0.069	U	0.077	U
delta-BHC	0.04	0.0020	U	0.0017	U	0.0019	U
Dieldrin	0.005	0.0020	U	0.0017	U	0.0019	U
Endosulfan I	2.4	0.0020	U	0.0017	U	0.0019	U
Endosulfan II	2.4	0.0020	U	0.0017	U	0.0019	U
Endosulfan sulfate	2.4	0.0020	U	0.0017	U	0.0019	U
Endrin	0.014	0.0020	U	0.0017	U	0.0019	U
Endrin aldehyde	~	0.0020	U	0.0017	U	0.0019	U
Endrin ketone	~	0.0020	U	0.0017	U	0.0019	U
gamma-BHC (Lindane)	0.1	0.0020	U	0.0017	U	0.0019	U
gamma-Chlordane	~	0.0043	D	0.0017	U	0.0068	D

Table 1. Soil Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives	B-7 0-2ft 3/26/2015 Soil		B-7 12-14ft 3/26/2015 Soil		B-8 0-2ft 3/26/2015 Soil	
		Result	Q	Result	Q	Result	Q
Compound							
Heptachlor	0.042	0.0020	U	0.0017	U	0.0019	U
Heptachlor epoxide	~	0.0020	U	0.0017	U	0.0019	U
Methoxychlor	~	0.0098	U	0.0086	U	0.0096	U
Toxaphene	~	0.099	U	0.087	U	0.098	U
Polychlorinated Biphenyls (PCB)	mg/Kg	mg/kg		mg/kg		mg/kg	
Dilution Factor		1		1		1	
Aroclor 1016	~	0.020	U	0.017	U	0.019	U
Aroclor 1221	~	0.020	U	0.017	U	0.019	U
Aroclor 1232	~	0.020	U	0.017	U	0.019	U
Aroclor 1242	~	0.020	U	0.017	U	0.019	U
Aroclor 1248	~	0.020	U	0.017	U	0.019	U
Aroclor 1254	~	0.020	U	0.017	U	0.019	U
Aroclor 1260	~	0.035		0.017	U	0.019	U
Total PCBs	0.1	0.035		0.017	U	0.019	U
Metals, Target Analyte	mg/Kg	mg/kg		mg/kg		mg/kg	
Dilution Factor		1		1		1	
Aluminum	~	9,320		4,430		15,900	
Antimony	~	0.74		0.52	U	0.58	U
Arsenic	13	6.39		3.12		6.11	
Barium	350	189		31.60		49.10	
Beryllium	7.2	0.12	U	0.10	U	0.12	U
Cadmium	2.5	0.42		0.31	U	0.35	U
Calcium	~	4,100		1,140		2,290	
Chromium	~	15.90		13.50		23.20	
Cobalt	~	6.66		7.17		8.47	
Copper	50	50		22		14.60	
Iron	~	15,000		16,700		28,100	
Lead	63	247		4.40		21	
Magnesium	~	2,280		1,620		2,170	
Manganese	1600	382		368		197	
Nickel	30	21.40		15.60		12.40	
Potassium	~	648		750		875	
Selenium	3.9	1.22		1.46		2.41	
Silver	2	0.59	U	0.52	U	0.58	U
Sodium	~	37.90		129		79	
Thallium	~	1.19	U	1.04	U	1.17	U
Vanadium	~	24.70		22.20		32.60	
Zinc	109	173		23.30		46.60	
Mercury by 7473	mg/Kg	mg/kg		mg/kg		mg/kg	
Dilution Factor		1		1		1	
Mercury	0.18	0.43		0.031	U	0.12	
Total Solids		%		%		%	
Dilution Factor		1		1		1	
% Solids	~	84.20		96.10		85.70	

Table 1. Soil Sample Analytical Results
Phase 2 Subsurface Investigation
1520 Fulton Street
Brooklyn, New York

NOTES:

mg/kg = milligrams per kilogram

Any Regulatory Exceedences are shaded and bold

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

J=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

B=analyte found in the analysis batch blank

E=result is estimated and cannot be accurately reported due to levels encountered or interferences

NT=this indicates the analyte was not a target for this sample

~=this indicates that no regulatory limit has been established for this analyte

Table 2. Groundwater Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC TOGS Standards and Guidance Values - GA	MW-1 3/26/2015 Water		MW-2 3/26/2015 Water		MW-3 3/26/2015 Water	
		Result	Q	Result	Q	Result	Q
Compound	ug/L	ug/L		ug/L		ug/L	
Volatiles Organics, 8260 List - Low Level							
Dilution Factor		1		1		1	
1,1,1,2-Tetrachloroethane	5	0.20	U	0.20	U	0.20	U
1,1,1-Trichloroethane	5	0.20	U	0.20	U	0.20	U
1,1,2,2-Tetrachloroethane	5	0.20	U	0.20	U	0.20	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	5	0.20	U	0.20	U	0.20	U
1,1,2-Trichloroethane	1	0.20	U	0.20	U	0.20	U
1,1-Dichloroethane	5	0.20	U	0.20	U	0.20	U
1,1-Dichloroethylene	5	0.20	U	0.20	U	0.20	U
1,1-Dichloropropylene	5	0.20	U	0.20	U	0.20	U
1,2,3-Trichlorobenzene	5	0.20	U	0.20	U	0.20	U
1,2,3-Trichloropropane	0.04	0.20	U	0.20	U	0.20	U
1,2,4-Trichlorobenzene	5	0.20	U	0.20	U	0.20	U
1,2,4-Trimethylbenzene	5	0.74	U	0.20	U	0.20	U
1,2-Dibromo-3-chloropropane	0.04	0.80	U	0.80	U	0.80	U
1,2-Dibromoethane	5	0.20	U	0.20	U	0.20	U
1,2-Dichlorobenzene	3	0.20	U	0.20	U	0.20	U
1,2-Dichloroethane	0.6	0.20	U	0.20	U	0.20	U
1,2-Dichloropropane	1	0.20	U	0.20	U	0.20	U
1,3,5-Trimethylbenzene	5	0.20	U	0.20	U	0.20	U
1,3-Dichlorobenzene	3	0.20	U	0.20	U	0.20	U
1,3-Dichloropropane	5	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	3	0.20	U	0.20	U	0.20	U
2,2-Dichloropropane	5	0.20	U	0.20	U	0.20	U
2-Butanone	50	0.80	U	0.80	U	0.80	U
2-Chlorotoluene	5	0.20	U	0.20	U	0.20	U
2-Hexanone	50	0.20	U	0.20	U	0.56	U
4-Chlorotoluene	5	0.20	U	0.20	U	0.20	U
4-Methyl-2-pentanone	~	0.20	U	0.20	U	1.70	U
Acetone	50	1.60	J	1.40	J	4.60	U
Benzene	1	0.20	U	0.20	U	0.20	U
Bromobenzene	5	0.20	U	0.20	U	0.20	U
Bromochloromethane	5	0.20	U	0.20	U	0.20	U
Bromodichloromethane	50	0.20	U	2	U	0.20	U
Bromoform	50	0.20	U	0.20	U	0.20	U
Bromomethane	5	0.20	U	0.20	U	0.20	U
Carbon disulfide	~	0.20	U	0.65	B	0.20	U
Carbon tetrachloride	5	0.20	U	0.20	U	0.20	U
Chlorobenzene	5	0.20	U	0.20	U	0.20	U
Chloroethane	5	0.20	U	0.20	U	0.20	U
Chloroform	7	0.20	U	19		9.50	
Chloromethane	5	0.20	U	0.20	U	0.20	U
cis-1,2-Dichloroethylene	5	0.20	U	0.20	U	0.20	U
cis-1,3-Dichloropropylene	0.4	0.20	U	0.20	U	0.20	U
Dibromochloromethane	50	0.20	U	0.20	U	0.20	U
Dibromomethane	~	0.20	U	0.20	U	0.20	U
Dichlorodifluoromethane	5	0.20	U	0.20	U	0.20	U
Ethyl Benzene	5	0.20	U	0.20	U	0.20	U
Hexachlorobutadiene	0.5	0.20	U	0.20	U	0.20	U
Isopropylbenzene	5	0.20	U	0.20	U	0.20	U
Methyl tert-butyl ether (MTBE)	10	9.20	U	0.20	U	0.20	U
Methylene chloride	5	1	U	1	U	1	U
Naphthalene	10	1	U	1	U	1	U
n-Butylbenzene	5	0.20	U	0.20	U	0.20	U
n-Propylbenzene	5	0.20	U	0.20	U	0.20	U
o-Xylene	5	0.20	U	0.20	U	0.20	U
p- & m- Xylenes	5	0.80	J	0.50	U	0.50	U
p-Isopropyltoluene	5	0.20	U	0.20	U	0.20	U
sec-Butylbenzene	5	0.20	U	0.20	U	0.20	U
Styrene	5	0.20	U	0.20	U	0.20	U
tert-Butylbenzene	5	0.20	U	0.20	U	0.20	U
Tetrachloroethylene	5	0.20	U	0.20	U	0.20	U
Toluene	5	0.20	U	0.20	U	0.20	U
trans-1,2-Dichloroethylene	5	0.20	U	0.20	U	0.20	U
trans-1,3-Dichloropropylene	0.4	0.20	U	0.20	U	0.20	U
Trichloroethylene	5	0.20	U	0.20	U	0.20	U
Trichlorofluoromethane	5	0.20	U	0.20	U	0.20	U
Vinyl Chloride	2	0.20	U	0.20	U	0.20	U
Xylenes, Total	5	0.80	J	0.60	U	0.60	U

Table 2. Groundwater Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC TOGS Standards and Guidance Values - GA	MW-1 3/26/2015 Water		MW-2 3/26/2015 Water		MW-3 3/26/2015 Water	
		Compound	Result	Q	Result	Q	Result
Semi-Volatiles, 8270 Base/Neutrals	ug/L	ug/L		ug/L		ug/L	
Dilution Factor		1		1		1	
1,2,4-Trichlorobenzene	5	2.60	U	2.53	U	3.29	U
1,2-Dichlorobenzene	3	2.62	U	2.55	U	3.32	U
1,3-Dichlorobenzene	3	2.75	U	2.68	U	3.48	U
1,4-Dichlorobenzene	3	2.33	U	2.27	U	2.95	U
2,4-Dinitrotoluene	5	1.69	U	1.65	U	2.15	U
2,6-Dinitrotoluene	5	1.69	U	1.65	U	2.15	U
2-Chloronaphthalene	10	2.32	U	2.26	U	2.93	U
2-Methylnaphthalene	~	2.91	U	2.83	U	3.68	U
2-Nitroaniline	5	1.77	U	1.72	U	2.24	U
3,3'-Dichlorobenzidine	5	1.34	U	1.30	U	1.69	U
3-Nitroaniline	5	1.77	U	1.72	U	2.24	U
4-Bromophenyl phenyl ether	~	1.40	U	1.36	U	1.77	U
4-Chloroaniline	5	3.14	U	3.06	U	3.97	U
4-Chlorophenyl phenyl ether	~	2.58	U	2.51	U	3.27	U
4-Nitroaniline	5	2.82	U	2.75	U	3.57	U
Acenaphthene	20	0.053	U	0.051	U	0.067	U
Acenaphthylene	~	0.053	U	0.051	U	0.067	U
Aniline	5	1.58	U	1.54	U	2	U
Anthracene	50	0.053	U	0.051	U	0.067	U
Benzo(a)anthracene	0.002	0.053	U	0.092		0.067	U
Benzo(a)pyrene	ND	0.053	U	0.072		0.067	U
Benzo(b)fluoranthene	0.002	0.053	U	0.072		0.067	U
Benzo(g,h,i)perylene	~	0.053	U	0.062		0.067	U
Benzo(k)fluoranthene	0.002	0.053	U	0.082		0.067	U
Benzyl butyl phthalate	50	0.90	U	0.87	U	1.14	U
Bis(2-chloroethoxy)methane	5	1.86	U	1.82	U	2.36	U
Bis(2-chloroethyl)ether	1	1.58	U	1.54	U	2	U
Bis(2-chloroisopropyl)ether	5	3.15	U	3.07	U	3.99	U
Bis(2-ethylhexyl)phthalate	5	1.02	B	6.24	B	2.33	B
Carbazole	~	1.38	U	1.34	U	1.75	U
Chrysene	0.002	0.053	U	0.092		0.067	U
Dibenzo(a,h)anthracene	~	0.053	U	0.051	U	0.067	U
Dibenzofuran	~	2.54	U	2.47	U	3.21	U
Diethyl phthalate	50	2.69	U	2.63	U	3.41	U
Dimethyl phthalate	50	2.01	U	1.96	U	2.55	U
Di-n-butyl phthalate	50	2.16	U	2.10	U	2.73	U
Di-n-octyl phthalate	50	1.18	U	1.15	U	1.49	U
Fluoranthene	50	0.053	U	0.23		0.067	U
Fluorene	50	0.053	U	0.051	U	0.067	U
Hexachlorobenzene	0.04	0.021	U	0.021	U	0.027	U
Hexachlorobutadiene	0.5	0.53	U	0.51	U	0.67	U
Hexachlorocyclopentadiene	5	2.66	U	2.59	U	3.37	U
Hexachloroethane	5	0.53	U	0.51	U	0.67	U
Indeno(1,2,3-cd)pyrene	0.002	0.053	U	0.051	J	0.067	U
Isophorone	50	2.82	U	2.75	U	3.57	U
Naphthalene	10	0.053	U	0.051	U	0.067	U
Nitrobenzene	0.4	0.26	U	0.26	U	0.33	U
N-Nitrosodimethylamine	~	0.53	U	0.51	U	0.67	U
N-nitroso-di-n-propylamine	~	2.69	U	2.63	U	3.41	U
N-Nitrosodiphenylamine	50	5.26	U	5.13	U	6.67	U
Phenanthrene	50	0.053	U	0.092		0.067	U
Pyrene	50	0.053	U	0.22		0.067	U
Pyridine	50	4.12	U	4.01	U	5.21	U
Pesticides, 8081 target list	ug/L	ug/L		ug/L		ug/L	
Dilution Factor		1		1		1	
4,4'-DDD	0.3	0.0041	U	0.0044	U	0.0050	U
4,4'-DDE	0.2	0.0041	U	0.0044	U	0.0050	U
4,4'-DDT	0.2	0.0041	U	0.0044	U	0.0050	U
Aldrin	~	0.0041	U	0.0044	U	0.0050	U
alpha-BHC	0.01	0.0041	U	0.0044	U	0.0050	U
alpha-Chlordane	~	0.0041	U	0.0044	U	0.0050	U
beta-BHC	0.04	0.0041	U	0.0044	U	0.0050	U
Chlordane, total	0.05	0.041	U	0.044	U	0.050	U
delta-BHC	0.04	0.0041	U	0.0044	U	0.0050	U
Dieldrin	0.004	0.0021	U	0.0022	U	0.0025	U
Endosulfan I	~	0.0041	U	0.0044	U	0.0050	U
Endosulfan II	~	0.0041	U	0.0044	U	0.0050	U

Table 2. Groundwater Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC TOGS Standards and Guidance Values - GA	MW-1 3/26/2015 Water		MW-2 3/26/2015 Water		MW-3 3/26/2015 Water	
Compound	GA	Result	Q	Result	Q	Result	Q
Endosulfan sulfate	~	0.0041	U	0.0044	U	0.0050	U
Endrin	~	0.0041	U	0.0044	U	0.0050	U
Endrin aldehyde	5	0.010	U	0.011	U	0.013	U
Endrin ketone	5	0.010	U	0.011	U	0.013	U
gamma-BHC (Lindane)	0.05	0.0041	U	0.0044	U	0.0050	U
gamma-Chlordane	~	0.010	U	0.011	U	0.013	U
Heptachlor	0.04	0.0041	U	0.0044	U	0.0050	U
Heptachlor epoxide	0.03	0.0041	U	0.0044	U	0.0050	U
Methoxychlor	35	0.0041	U	0.0044	U	0.0050	U
Toxaphene	0.06	0.10	U	0.11	U	0.13	U
Polychlorinated Biphenyls (PCB)	ug/L	ug/L		ug/L		ug/L	
Dilution Factor		1		1		1	
Aroclor 1016	~	0.051	U	0.056	U	0.063	U
Aroclor 1221	~	0.051	U	0.056	U	0.063	U
Aroclor 1232	~	0.051	U	0.056	U	0.063	U
Aroclor 1242	~	0.051	U	0.056	U	0.063	U
Aroclor 1248	~	0.051	U	0.056	U	0.063	U
Aroclor 1254	~	0.051	U	0.056	U	0.063	U
Aroclor 1260	~	0.051	U	0.056	U	0.063	U
Total PCBs	0.09	0.051	U	0.056	U	0.063	U
Metals, Target Analyte	ug/L	ug/L		ug/L		ug/L	
Dilution Factor		1		10		10	
Aluminum	~	7,430		148,000		226,000	
Antimony	3	5	U	5	U	8	
Arsenic	25	6		28		40	
Barium	1000	176		3,190		6,710	
Beryllium	3	1	U	1	U	1	U
Cadmium	5	3	U	6		14	
Calcium	~	39,500		77,000		127,000	
Chromium	50	71		1,010		1,540	
Cobalt	~	15		352		490	
Copper	200	60		729		970	
Iron	~	24,400		462,000	D	600,000	D
Lead	25	40		366		501	
Magnesium	35000	13,200		110,000		174,000	
Manganese	300	1,230		28,200		39,000	D
Nickel	100	80		1,210		1,580	
Potassium	~	4,900		39,600		63,400	
Selenium	10	10	U	45		48	
Silver	50	5	U	5	U	5	U
Sodium	20000	137,000		54,700		91,100	
Thallium	~	5	U	5	U	5	U
Vanadium	~	23		413		561	
Zinc	2000	110		988		1,400	
Metals, Target Analyte, Dissolved	ug/L	ug/L		ug/L		ug/L	
Dilution Factor		1		1		1	
Aluminum	~	10	U	32		31	
Antimony	3	5	U	5	U	5	U
Arsenic	25	4	U	4	U	4	U
Barium	1000	67		34		49	
Beryllium	3	1	U	1	U	1	U
Cadmium	5	3	U	3	U	3	U
Calcium	~	34,800		16,000		31,600	
Chromium	50	5	U	5	U	5	U
Cobalt	~	5	U	5	U	5	U
Copper	200	3	U	3	U	3	U
Iron	~	20	U	25		20	U
Lead	25	3	U	3	U	3	U
Magnesium	35000	7,420		5,210		11,700	
Manganese	300	46		453		1,460	
Nickel	100	20		11		38	
Potassium	~	2,930		2,460		4,170	
Selenium	10	10	U	10	U	10	U
Silver	50	5	U	5	U	5	U
Sodium	20000	139,000		50,300		84,500	
Thallium	~	5	U	5	U	5	U
Vanadium	~	10	U	10	U	10	U
Zinc	2000	12		10	U	10	U

Table 2. Groundwater Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDEC TOGS Standards and Guidance Values - GA	MW-1 3/26/2015 Water		MW-2 3/26/2015 Water		MW-3 3/26/2015 Water	
		Result	Q	Result	Q	Result	Q
Mercury by 7473	ug/L	ug/L		ug/L		ug/L	
Dilution Factor		1		1		1	
Mercury	0.7	0.20	U	0.20	U	0.20	U
Mercury by 7473, Dissolved	ug/L	ug/L		ug/L		ug/L	
Dilution Factor		1		1		1	
Mercury	0.7	0.20	U	0.20	U	0.20	U

NOTES:

ug/L = micrograms per liter

Any Regulatory Exceedences are shaded and bold

Q is the Qualifier Column with definitions as follows:

J=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

B=analyte found in the analysis batch blank

--this indicates that no regulatory limit has been established for this analyte

Table 3. Soil Vapor Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDOH Soil Vapor Intrusion Matrix 1 & 2 Action Levels	SV-1		SV-2		SV-3		SV-4		SV-5	
		3/26/2015		3/26/2015		3/26/2015		3/26/2015		3/26/2015	
		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor		Soil Vapor	
Compound		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Volatile Organics, EPA TO15 Full List	ug/m3	ug/m3		ug/m3		ug/m3		ug/m3		ug/m3	
Dilution Factor		19.76		1.415		3.476		1.0144		20.57	
1,1,1,2-Tetrachloroethane	NE	14	U	0.97	U	2.40	U	0.70	U	14	U
1,1,1-Trichloroethane	100	11	U	2.90	D	1.90	U	0.55	U	11	U
1,1,2,2-Tetrachloroethane	NE	14	U	0.97	U	2.40	U	0.70	U	14	U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NE	15	U	1.10	U	2.70	U	0.78	U	16	U
1,1,2-Trichloroethane	NE	11	U	0.77	U	1.90	U	0.55	U	11	U
1,1-Dichloroethane	NE	8	U	0.57	U	1.40	U	0.41	U	8.30	U
1,1-Dichloroethylene	NE	7.80	U	0.56	U	1.40	U	0.40	U	8.20	U
1,2,4-Trichlorobenzene	NE	15	U	1.10	U	2.60	U	0.75	U	15	U
1,2,4-Trimethylbenzene	NE	9.70	U	4.10	D	2.90	D	3	D	10	U
1,2-Dibromoethane	NE	15	U	1.10	U	2.70	U	0.78	U	16	U
1,2-Dichlorobenzene	NE	12	U	0.85	U	2.10	U	0.61	U	12	U
1,2-Dichloroethane	NE	8	U	0.57	U	1.40	U	0.41	U	8.30	U
1,2-Dichloropropane	NE	9.10	U	0.65	U	1.60	U	0.47	U	9.50	U
1,2-Dichlorotetrafluoroethane	NE	14	U	0.99	U	2.40	U	0.71	U	14	U
1,3,5-Trimethylbenzene	NE	9.70	U	1.30	D	1.70	U	0.90	D	10	U
1,3-Butadiene	NE	8.60	U	11	D	21	D	42	D	8.90	U
1,3-Dichlorobenzene	NE	12	U	0.85	U	2.10	U	0.61	U	12	U
1,3-Dichloropropane	NE	9.10	U	0.65	U	1.60	U	0.47	U	9.50	U
1,4-Dichlorobenzene	NE	12	U	0.85	U	2.10	U	0.61	D	12	U
1,4-Dioxane	NE	7.10	U	0.51	U	1.30	U	0.37	U	7.40	U
2-Butanone	NE	5.80	U	3.40	D	4.50	D	5.90	D	6.10	U
2-Hexanone	NE	16	U	1.20	U	2.80	U	0.83	U	17	U
3-Chloropropene	NE	6.20	U	0.44	U	1.10	U	0.32	U	6.40	U
4-Methyl-2-pentanone	NE	8.10	U	0.58	U	1.40	U	0.42	U	8.40	U
Acetone	NE	910	D	16	D	33	D	56	D	28	D
Acrylonitrile	NE	4.30	U	0.31	U	0.75	U	0.22	U	4.50	U
Benzene	NE	6.30	U	6.50	D	5.30	D	9.60	D	7.90	D
Benzyl chloride	NE	10	U	0.73	U	1.80	U	0.53	U	11	U
Bromodichloromethane	NE	12	U	0.88	U	2.20	U	0.63	U	13	U
Bromoform	NE	20	U	1.50	U	3.60	U	1	U	21	U
Bromomethane	NE	7.70	U	0.55	U	1.30	U	0.39	U	8	U
Carbon disulfide	NE	6.20	U	1.70	D	2.40	D	1.90	D	6.40	U
Carbon tetrachloride	5	3.10	U	0.22	U	0.55	U	0.96	D	3.20	U
Chlorobenzene	NE	9.10	U	0.65	U	1.60	U	0.47	U	9.50	U
Chloroethane	NE	5.20	U	0.37	U	0.92	U	0.27	U	5.40	U
Chloroform	NE	9.60	U	6.60	D	1.70	U	82	D	10	U
Chloromethane	NE	4.10	U	0.29	U	0.72	U	2.50	D	4.20	U
cis-1,2-Dichloroethylene	NE	7.80	U	0.56	U	1.40	U	0.40	U	8.20	U
cis-1,3-Dichloropropylene	NE	9	U	0.64	U	1.60	U	0.46	U	9.30	U
Cyclohexane	NE	20	D	2.80	D	8.90	D	6.70	D	7.10	U
Dibromochloromethane	NE	16	U	1.10	U	2.80	U	0.81	U	17	U
Dichlorodifluoromethane	NE	9.80	U	2.70	D	3.30	D	2.60	D	10	U
Ethyl acetate	NE	14	U	1	U	2.50	U	0.73	U	15	U
Ethyl Benzene	NE	8.60	U	3.30	D	3.80	D	3.20	D	8.90	U

Table 3. Soil Vapor Sample Analytical Results
Remedial Action Work Plan
1520 Fulton Street
Brooklyn, New York

Sample ID Sampling Date Matrix	NYSDOH Soil Vapor Intrusion Matrix 1 & 2 Action Levels	SV-1 3/26/2015 Soil Vapor		SV-2 3/26/2015 Soil Vapor		SV-3 3/26/2015 Soil Vapor		SV-4 3/26/2015 Soil Vapor		SV-5 3/26/2015 Soil Vapor	
		Compound	Result	Q	Result	Q	Result	Q	Result	Q	Result
Hexachlorobutadiene	NE	21	U	1.50	U	3.70	U	1.10	U	22	U
Isopropanol	NE	9.70	U	1	D	2.40	D	2	D	10	U
Methyl Methacrylate	NE	8.10	U	0.58	U	1.40	U	0.42	U	8.40	U
Methyl tert-butyl ether (MTBE)	NE	7.10	U	0.51	U	1.30	U	0.37	U	7.40	U
Methylene chloride	NE	14	U	0.98	U	2.40	U	0.70	U	14	U
n-Heptane	NE	8.10	U	9.50	D	7.30	D	13	D	25	D
n-Hexane	NE	140	D	13	D	35	D	22	D	20	D
o-Xylene	NE	8.60	U	4.70	D	4.50	D	4.50	D	11	D
p- & m- Xylenes	NE	17	U	12	D	14	D	13	D	22	D
p-Ethyltoluene	NE	9.70	U	4.70	D	3.20	D	3.50	D	10	U
Propylene	NE	3.40	U	0.24	U	0.60	U	0.17	U	3.50	U
Styrene	NE	8.40	U	2.10	D	2.70	D	2.60	D	8.80	U
Tetrachloroethylene	100	23	D	110	D	9.70	D	6.50	D	460	D
Tetrahydrofuran	NE	5.80	U	0.42	U	1	U	0.30	U	6.10	U
Toluene	NE	7.40	U	14	D	16	D	17	D	24	D
trans-1,2-Dichloroethylene	NE	7.80	U	0.56	U	1.40	U	0.40	U	8.20	U
trans-1,3-Dichloropropylene	NE	9	U	0.64	U	1.60	U	0.46	U	9.30	U
Trichloroethylene	5	2.70	U	0.19	U	0.47	U	0.14	U	2.80	U
Trichlorofluoromethane (Freon 11)	NE	11	U	1.20	D	2	U	3.50	D	12	U
Vinyl acetate	NE	7	U	0.50	U	1.20	U	0.36	U	7.20	U
Vinyl bromide	NE	8.60	U	0.62	U	1.50	U	0.44	U	9	U
Vinyl Chloride	NE	1.30	U	0.090	U	0.22	U	0.065	U	1.30	U

NOTES:

ug/m3 = micrograms per cubic meter

Any Regulatory Exceedences are bold and color coded by Regulation

Q is the Qualifier Column with definitions as follows:

D=result is from an analysis that required a dilution

U=analyte not detected at or above the level indicated

--this indicates that no regulatory limit has been established for this analyte

APPENDIX 1

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and Hello Living, LLC 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, Hello Living, LLC 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, Horace Zhang, 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 in the nearest public library that maintains evening and weekend hours. 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. Hello Living, LLC will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

Brooklyn Public Library

361 Lewis Avenue

(718) 573-5606

Monday and Friday 10:00 AM – 6:00 PM

Tuesday, Wednesday and Thursday 10:00 AM – 8:00 PM

Saturday – 10:00 AM – 5:00 PM

Sunday - Closed

Digital Documentation. NYC OER strongly encourages the use of digital documents in repositories as a means of minimizing paper use while also increasing convenience in access and ease of use.

Identify Issues of Public Concern. Soil impacts may be of concern to local stakeholders and they will be mitigated and monitored during construction as described above.

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 prepared by Hello Living, LLC, reviewed and approved by OER prior to distribution and mailed by Hello Living, LLC. 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. See flow chart on the following page, which identifies when during the NYC VCP public notices are issued: 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
PROPOSED DEVELOPMENT PLANS



NEW MULTI-FAMILY DEVELOPMENT 1520 FULTON STREET, Brooklyn, NY

PROGRESS SET
ISSUED BY HELLO LIVING LLC
FOR STRUCTURAL DESIGN RFP
2014-10-06

HELLO LIVING

925 PACIFIC STREET SUITE 202
BROOKLYN, NY 11238
T: 718.435.8212

VINCENT MARTINEAU ARCHITECT P.C.

665 Vanderbilt Avenue, Unit 2C
Brooklyn, NY 11238
tel:212-561-5322
Email: Vincent@VMAPC.com

CONSULTANTS

**1520 Fulton Street
Multi-Family Residential**

1520 Fulton Street, Brooklyn NY 11216
USA

SHEET INDEX	
ID	Name
T-001.00	COVER SHEET
SU-001.00	Site Survey
Z-001.00	Zoning Analysis
Z-002.00	Zoning Diagrams
G-001	Building Code
G-002	General Notes
A-101.00	Cellar Floor Plan
A-102.00	Ground Floor Plan
A-103.00	2nd Floor Plan
A-104.00	Typical Floor Plan - Floors 3 thru 8
A-105.00	9th Floor Plan
A-106.00	10th Floor Plan
A-107.00	ROOF PLAN
A-201	Front Elevation (North)
A-202	West Elevation
A-203	South Elevation
A-204	East Elevation
A-301	Section Through Stair
A-302.00	Section
A-501	DOOR SCHEDULE
A-502	Door Details
A-511	Partition Types

MARK	DATE	DESCRIPTION

PROJECT NO:
MODEL FILE:
DRAWN BY:
CHKD BY:
COPYRIGHT

SHEET TITLE

COVER SHEET

T-001.00

BUILDING CODE SUMMARY

BUILDING DATA

Address: 1520 Fulton Street, Brooklyn, NY 11216
BIN: 3053845
Block / Lot: B1864 / L14, 54
Zoning District: Lot 14: C2-4 in R7D Lot 54 R6A
Lot Area: Lot 14: 12,000 sq. feet Lot 54: 2,000 sq. feet
Applicable Code: 2008 New York City Building Code
Construction Type: IB Non-Combustible
Sprinklers: Automatic sprinkler system.
Fire District: Building located within fire district (Brooklyn)
Flood Zone: Flood Zone X; outside of 100 year flood area
TA Approval: Required

SCOPE OF WORK

This work application is for the construction of a new 10 story mixed building with commercial uses on the 1st floor, and 48 residential apartments in the floors above. The development will also include accessory parking and utility spaces in the cellar.
All spaces within the buildings will be protected by an automatic sprinkler system.
The building will be served by 2 exit stairs and by 2 elevators.
The property will be non-combustible construction and does not fall into the high-rise designation.
The property is adjacent to the subway tunnel under Fulton Street and TA approval will be required.
The following work will be part of subsequent applications:

- SOE
Structure
Mechanical
Plumbing
Fire Protection
Fire Alarm

BUILDING CLASSIFICATION STATEMENT (BC 106.4)

BC 302.1 Occupancy Classification

- Group R-2 Residential (Floors 2 thru 10)
Group M Mercantile (1st floor Retail)
Group S-2 Parking Garage (Cellar)

BC 602 Construction Class

Type IB

BC Table 1604.5 Structural Occupancy Category

Occupancy Category II

BC 502.1 Height of Building: 100'-0"

Highest level of Fire Department Access: Grade Level

Lowest level of Fire Department Access: Cellar Level

Building is inside the fire district

Multiple Dwelling Classification: HAEA

CHAPTER 4 - HIGH RISE BUILDINGS

- 403.1 Applicability
The provisions of this section shall apply to buildings having occupied floors located more than 75 feet above the lowest level of fire department vehicle access
403.2 Automatic sprinkler system
Buildings shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1
403.4 Automatic fire detection
Smoke detection shall be provided in accordance with Section 907.2.12.1
403.6 Emergency Voice / Alarm communications system
An emergency voice/alarm communication system shall be provided in accordance with Section 907.2.12.2
403.7 Fire Department communications system
A two way fire department communications system shall be provided for the Fire Department use in accordance with Section 907.2.12.3
403.8 Fire Command
A fire command center complying with Section 911 shall be provided in a location approved by the Fire Department
403.9 Elevators
Elevator operation and installation shall be in accordance with Chapter 30
403.9.1 Elevator lobbies
Elevator lobbies are not required in Group R-2 occupancy
403.13 Smokeproof exit enclosures are not required in occupancy group R-2
403.14 Seismic Considerations, see Chapter 16
403.15 Impact-resistant stair enclosures
Exit stair enclosures shall be constructed of impact-resistant walls.
403.16 Exit Path Markings
Exit paths serving Group R-2 need not provide photoluminescent exit path markings

CHAPTER 5 - BUILDING HEIGHT AND AREA / SEPARATION OF OCCUPANCIES

BC 501.3 Fire Department Access
BC 501.3.1 Frontage
Required frontage > 8% of building perimeter
Frontage = 120'
Perimeter = 640'
Frontage / Perimeter = 120/640 = 19% provided => Complies
BC 501.3.2 Building Access
Building protected by automatic sprinkler system
Direct access to cellar provided within each 100 ft or fraction thereof of horizontal length of every wall that fronts on a street or frontage space - Complies
Only one direct access from the outdoors to the first cellar story is required when such story is used for dwelling units or for uses accessory to the residential use in the building - Complies
BC 503 Height and Area Limitations
BC Table 503 Allowable Height and Building Areas
IB CONSTRUCTION TYPE
Use MHeight = Unlimited (protected with sprinkler system)
Area = Unlimited
Use R-2 Height = Unlimited (protected by sprinkler system)
Area = Unlimited
BC 508.2.1 Incidental use areas and occupancy classification
Spaces listed in table 508.2 and incidental to the main occupancy are classified as per main use occupancy classification, or may be classified as their actual classification and shall comply with 508.3 Mixed occupancies requirements.
BC Table 508.2 Incidental Use Areas and separation requirements
Furnace / Boiler room 2 hour required
Mech. / Electrical equip. rm 1 hour required
Storage rooms >100 s.f. 1 hour required
Waste collection Rm > 100 s.f. 1 hour required
508.3.4 Mixed Occupancies / Separated Occupancies
BC Table 508.3.3
M and R-2 2 Hour separation required (or 1hr w/sprinklers)
BC 509.9 Separation of tenancies
Different tenancies must be separated by fire barriers having a 1 hour fire rating.

CHAPTER 6 - TYPE OF CONSTRUCTION

BC 602.2 Construction Classification

Table with 3 columns: BUILDING ELEMENT, TYPE IB, CONSTRUCTION. Rows include Structural Frame, Bearing Walls, Interior bearing walls, Floor construction, and Roof construction.

BC Table 602 - Fire resistance for exterior walls based on separation distance

Table with 2 columns: Building located inside fire district, Distance < 5 feet, Distance > 5 to <10 feet, Distance >10 to < 30 feet, Distance > 30 feet.

Note: Fire Wall required to be 3 hours fire rated for buildings in R2 & M occupancy group, of construction type IB, as per BC 705.

CHAPTER 7 - FIRE RESISTANCE RATINGS

BC 703.2 Fire Resistance Ratings
Materials used in the construction of the building shall comply to fire resistance requirements of the code and in particular for teh following conditions:
Load bearing or non-loadbearing application
Combustible components permitted in noncombustible construction.
Structural restrained classification
BC 703.3 Methods of Determining Fire Resistance
Methods of testing to determine fire resistance must be based on ASTM E119.
The following methods to determine the permitted fire resistance of a material are permitted by the code:
Fire resistance designs documented in approved sources (UL or other source approved by the Code)
Prescriptive designs of fire resistive elements as per BC Section 720.
Calculated design method in accordance with BC section 721.
Engineering methods based on ASTM E119.

BC 704.12 Opening protection

Fire protective assemblies not required where building is equipped with an automatic sprinkler system and exterior opening is protected with an approved water curtain installed in accordance with NFPA 13
BC 705.4 Fire Resistance Rating
Table 705.4 Fire Wall Fire Resistance Ratings
3 hours for buildings in R2 & B occupancy group, of construction type IB.
BC 706 Fire barriers
BC 706.3 Fire resistance ratings
BC 706.3.1 Shaft enclosures: see below (707.4)
BC 706.3.2 Exit enclosure: 2 hour (1019.1)
BC 706.3.3 Exit passageway: 2 hour (1020.3)
BC 706.3.4 Horizontal exit: N/A
BC 706.3.5 Incidental use areas: See section BC 508
BC 706.3.6 Separation of occupancies See section BC 508
BC 707 Shaft enclosures
BC 707.4 Fire resistance rating
Mechanical shafts: 2 hour
BC 71 Penetrations
Membrane penetration shall be protected by approved penetration firestop
BC 715 Opening Protection
Table 715.3
2 hour F.R. wall - 1 1/2 hour fire door assembly
1 hour F.R. exit passage way or enclosure - 1 hour fire door assembly
1 hour F.R. wall - 3/4 hour fire door assembly

CHAPTER 8 - INTERIOR FINISHES

803.1 Classification
Class A: Flame spread 0-25
Class B: Flame spread 26-75
Class C: Flame spread 76-200
Table 803.5 Interior finish requirements by occupancy (sprinklered bldg)
R-2 Exits B
Exit access B
Rooms and enclosed spaces C
B Exits B
Exit access B
Rooms and enclosed spaces B
S Exits B
Exit Access C
Rooms and enclosed spaces C

CHAPTER 9 - FIRE PROTECTION SYSTEMS

Building is fully sprinklered; see fire protection drawings.
BC 907.2.9 Fire Alarm
An automatic fire alarm system alarm notification appliances is required on an R2 building with dwelling units located 3 or more stories above the lowest floor of exit discharge.
Location of smoke detectors: Required in any mechanical or electrical room more than 75 s.f.
BC 907.2.10 Smoke Alarms
Required on ceiling or wall outside of each room used for sleeping, within 15 feet from the door to the room.
Required in each room used for sleeping
BC 910.5 Smoke venting of closed shafts
Every required shaft having a floor area of 4 s.f. shall be provided with a smoke vent. Smoke vent may be constructed as windows, louvers or vent ducts. Their dimension shall be no less than 3 1/2" of the shaft floor area, but in no event less than 72 sq. inches. Of the total vent area required, at least one third shall be clear opening to the outdoor

OCCUPANCY CHART

Table with 2 columns: Residential Accessory (Mechanical and Storage), Business Areas, Residential Exercise Room, Residential, Terrace 1, TOTAL.

CHAPTER 10 - MEANS OF EGRESS

Table 1004.1.2 Floor area per occupant
Business Areas: 100 s.f. per occupant
Residential: 200 s.f. within dwelling unit per occupant
Exercise Rooms 50 gross
Unconcentrated Assembly 15 net
Accessory Storage 300 gross
Mechanical, Equipment Room
Parking Garage 200 gross

ACCESSIBLE MEANS OF EGRESS

TABLE 1005.1 Egress width per occupants served
Stairways: 0.3 inches per occupant
Other Components: 0.2 inches per occupant
1007.1 Accessible means of egress
2 means of accessible egress shall be provided to each accessible portion of the space
1007.2 The accessible means of egress will include:
Interior accessible routes
Stairways within vertical stairway enclosures
Elevators
Exit discharges.
Stairways will have railings on both sides.

1007.2.2 Exit Discharge
Where an exit discharge is not accessible, an exterior area for assisted rescue shall be provided in accordance with Section 1007.8. An exterior area for assisted rescue shall not be required where an exit discharge is on an assisted rescue path from a stairway or an elevator.

BC 1007.2.2 Exit Discharge
Where an exit discharge is not accessible, an exterior area of assisted rescue shall be provided in accordance with Section 1007.8. An exterior area for assisted rescue shall not be required where an exit discharge is on an assisted rescue path from a stairway or an elevator.

BC 1007.3 Exit Stairways
Accessible stairways shall incorporate an area of rescue assistance within an enlarged floor-level landing or shall be accessed from either an area of rescue assistance complying with Section 1007.6 or a horizontal exit

The clear width of 48 inches between handrails and the area of rescue assistance is not required at exit stairways in buildings or facilities equipped throughout with an automatic sprinkler system

Clear width of 48 inches between handrails is not required for enclosed exit stairways accessed from a horizontal exit.

Areas of rescue assistance are not required at exit stairways serving open parking garages

BC 1007.6 Elevators
To be considered part of an accessible means of egress, an elevator shall comply with the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1 and Section 1109.6. Energy power shall be provided in accordance with Sections 2702 and 3003.

Elevators are not required to be accessed from an area of rescue assistance or horizontal exit in buildings and facilities equipped throughout with an automatic sprinkler system.

BC 1007.6 Area of Rescue Assistance
Closed shaft having a floor area of 4 s.f. shall be provided with a smoke vent. Smoke vent may be constructed as windows, louvers or vent ducts. Their dimension shall be no less than 3 1/2" of the shaft floor area, but in no event less than 72 sq. inches. Of the total vent area required, at least one third shall be clear opening to the outdoor

BC 1007.6.1 Size
Each area of rescue assistance shall be sized to accommodate one wheelchair space of 30 inches by 48 inches for each 200 occupants or portion thereof, based on the occupant load of the area of rescue assistance and areas served by the area of rescue assistance. Such wheelchair spaces shall not reduce the required means of egress width. Access to any of the required wheelchair spaces in an area of rescue assistance shall not be obstructed by more than one adjoining wheelchair space.

BC 1007.6.3 Two-way communication
Areas of rescue assistance shall be provided with a two-way communication system between the areas of rescue assistance and central control point.

B.C. 1007.6.4 Instructions
In areas of rescue assistance that have a two-way emergency communications system, instructions on the use of the area under emergency conditions shall be posted adjoining the communications systems

B.C. 1007.6.5 Identification
Each Door providing access to an area of rescue assistance from an adjacent floor area shall be identified by a sign stating "Area of Rescue Assistance" and including the International Symbol of Accessibility. The area of rescue assistance sign shall be illuminated in accordance with Section 1011.2. Additionally, tactile signage complying with ICC A117.1 shall be located at each door to an area of rescue assistance

B.C. 1007.8 Exterior Area for assisted rescue
The exterior area of assisted rescue must be open to the outside air and meet the requirements of Section 1007.6.1. Separation walls shall comply with the requirements of Section 704 for exterior walls. All walls of openings within 10 feet horizontally of the perimeter of the exterior area of assisted rescue shall be constructed as required for a minimum 1 hr fire-resistance rating with 3/4 hour opening protectives. Such construction shall extend 10 feet vertically above the floor level of the exterior area of assisted rescue or to the roof line, whichever is lower.

BC 1007.8.1 Openness
The exterior area for assisted rescue shall be at least 50 percent open, and the open area above the guards shall be so distributed as to minimize the accumulation of smoke or toxic gases

BC 1008 Doors
Doors part of an access to an exit or part of an exit will measure 36" in width

BC 1008.1.1.3
Height of doors shall not be less than 80 inches. Door openings within a dwelling unit shall not be less than 78 inches in height. Exterior door openings in dwelling units, other than required exit door shall not be less than 76 inches in height.

BC 1008.1.5 Landing at Doors
Landings shall have a width not less than the width of the stairway or the door, whichever is greater. Doors in the fully open position shall not reduce a required dimension by more than 7 inches. When landing serves an occupant load of less than 50, doors in any position can reduce the landing 75 percent of its required width. Landings shall have a length measured in the direction of travel of not less than 44 inches.

BC 1009 Stairways
BC 1009.1 Stairway width: 44" wide stair

BC 1009.2 Headroom
Stairway headroom is 84" minimum, except that in R-2 occupancies the min. headroom permitted is 80"

BC 1009.4 Stairway landings
The width of landings shall not be less than the width of stairways they serve. Every landing shall have a minimum dimension measured in the direction of travel equal to the width of the stairway. Doors opening onto a landing shall not reduce the landing to less than 75 percent of the required width. When fully open, the door shall not project more than 7 inches into a landing.

BC 1009.11 Handrails
Two handrails required.
Handrail height 34" minimum, 38" maximum above stair nosing
Handrail outside diameter 1.25" minimum, 2" maximum

BC 1009.12 Stairway to Roof
In R2 buildings, 2 stories or more in height, all stairs should extend to the roof.

BC 1009.3 Stair treads and risers
General rule: max. riser = 7" / min. tread = 11"
In R-2 occupancy: max. riser = 7.75 / min. tread = 9.5

BC 1009.11 Handrails
Two handrails are required in stairs that are less than 44" wide and that also serve as an accessible means of egress.

BC 1011 Exit signs
Exit signs are required at all exits and exit access doors.

BC 1012.2 Guard Height

Guard height shall be minimum 42" in height

BC 1013.4.1 Exit Access in Group B
In Group B occupancies, the minimum clear aisle width shall be determined by Section 1005.1 for the occupant load served, but shall not be less than 36 inches.

BC 1013.5 Egress Balconies
Balconies used for egress purposes shall conform to the same requirements as corridors for width, headroom, dead ends and projections. Exterior balconies shall be designed to minimize accumulation of snow or ice that impedes the means of egress.

BC 1013.5.1 Wall separation
Wall separation is not required where the exterior egress balcony is served by at least two stairs and where any dead-end portion of the balcony is separated.

BC 1013.5.2 Openness
The long side of an egress balcony shall be at least 50% open, and the open area above the guards shall be so distributed as to minimize the accumulation of smoke or toxic gases

BC 1013.6 Exit Access in R-2 Occupancies
In buildings in occupancy Group R-2 exceeding three stories or more in height or occupied by more than two dwelling units on any story, a door from a dwelling unit shall open into an intervening public hall. Such public hall shall be constructed as a public corridor in accordance with Section 1016.

BC 1014. 2.1 (2) Exit Access Doorways
Where a building is equipped throughout with an automatic sprinkler system, the separation distance of the exit doors shall not be less than 1/3 of the length of the maximum overall diagonal dimension of the area served.

BC 1015 Exit travel distance
BC Table 1015.1
B occupancy travel distance = 300 feet
R-2 occupancy travel distance = 200 feet
S-2 Occupancy travel distance = 200 feet without sprinkler, 250 with sprinkler

BC 1015.1 Travel distance limitations
Travel distance in open parking garages is permitted to be measured to the closest riser of open stairs

BC 1015.3 Exterior egress balcony increase
Travel distances specified in Section 1015.1 shall be increased up to an additional 100 feet provided the last portion of the exit access leading to the exit occurs on an exterior egress balcony constructed in accordance with Section 1013.5. The length of such balcony shall not be less than the amount of the increase taken.

BC 1016.2 Public corridors
For B & R-2, corridors are required to be 1 hour fire resistant (non combustible)
The minimum corridor width shall be as follows
24 inches; for access to and utilization of electrical, mechanical or plumbing systems or equipment
36 inches; with a required occupant capacity of 50 or less, except otherwise required by chapter 11
30 inches; within a dwelling unit in occupancy groups R-2 except as otherwise required by Section 1107

BC 1016.3 Dead Ends
Where more than one exit is required, the exit access shall be arranged such that there are no dead end corridors more than 20 feet in length.

In R-2 occupancies, the dead end in a corridor shall not exceed 40 feet.

In B occupancies, where the building is equipped throughout with an automatic sprinkler system, the length of dead-end corridors shall not exceed 50 feet.

1018.1 Minimum Number of Exits
Table 1018.1 Occupant load of 1-500 shall have minium of 2 exits

1018.1.1 Open Parking Garages
Parking garages shall not have less than 2 exits from each parking tier. An unenclosed vehicle ramp constructed in accordance with Section 1010.2 may serve as one of the required exits when provided with pedestrian facilities along the ramp.

1018.1.2 Open or enclosed parking garage
In open or enclosed parking garages three stories or less in height and serving not more than one level below grade, ramps with a maximum slope of one unit vertical in seven units horizontal may serve as secondary exits

1019 Vertical exit enclosures
1019.1 Enclosure requirements
In R2 occupancies, where F.R. enclosure is required, it should be 2 hour fire rated masonry equivalent.

1019.2 Buildings with one exit
Table 1019.2
In B occupancy, building may have 1 means of egress if building has 2 stories, with 30 occupants per floor and 75 feet travel distance

CHAPTER 11 - ACCESSIBILITY
BC 1101.2 Design
Buildings will be designed in accordance with ICC A117.1

BC 1104 Accessible Routes
Accessible route will be provided to the building entrance from the street.

BC 1104.4 Multilevel Buildings
In Group R occupancy, levels that do not contain accessible elements are not required to be served by an accessible route from an accessible level.

BC 1105 Accessible Entrances
Building Entrances will be accessible

BC 1105.6.1 Entrances to B units shall comply with sect 1003.5 of ICC A117.1

BC 1106.1 Parking and Passenger Loading Facilities
Where parking is provided, 5 percent of the total number of parking spaces, but not less than one parking space, shall be accessible parking spaces

BC 1107 Dwelling Units
BC 1107.3 Common Spaces
Rooms and spaces available to the general public or available for use by residents of accessible units shall be accessible. Accessible spaces shall include, but not be limited to spaces for residents' use, such as refuse disposal and storage locations, mailbox areas, recreational facilities, storage rooms, parking areas, and any exterior spaces including balconies.

CHAPTER 12 - INTERIOR ENVIRONMENT
BC 1203.4 Natural ventilation
BC 1203.4.1.2.1 Minimum opening
The minimum operable area to the outdoor shall be 5% of the habitable room to be ventilated.

BC 1203.4.1.2.4 Maximum depth of rooms
In dwelling units in group R2 containing more than 3 habitable rooms, and of Type I or II construction, rooms may be greater than 30 feet in depth, provided they are properly ventilated and the windows are located so as to properly light all portions of the room in accordance to BC1205.

BC 1205.2.1 Lighting
Minimum opening of glazed area to be no less than 10% of the room floor area.

BC 1207 Sound Transmission
BC 1207.2 Airborne sound
Walls, partitions and floor/ceiling assemblies separating dwelling units from each other, and /or from public and service areas, from stair, or from elevators, or from other mechanical rooms and shafts, shall have an air STC class for air-borne noises of not less than 50, based upon lab tests, and of not less than 45 if field tested.

Dwelling unit entrance door assemblies shall have an STC rating of not less than 35.

BC 1207.3 Structure-borne sound
Floor/ceiling assemblies shall have an IIC (impact/insulation class) rating of not less than 50 if measured in a lab, and not less than 45 if field tested.

CHAPTER 16 - STRUCTURAL DESIGN
BC 1607 Live Loads
BC Table 1607.1

Residential Multi-Family Dwelling
Private Rooms and Corridors serving them: Uniform Load: 40psf
Public Rooms and Corridors serving them: Uniform Load: 100psf

Balconies (exterior): Uniform load: 100 psf
Garages: Uniform Load: 40 psf
Yards and Terraces: Uniform load: 100 psf

Office
Office Uniform Load: 100psf
Concentrated Load: 2000 lbs

CHAPTER 32 - ENCROACHMENTS INTO THE PUBLIC RIGHT OF WAY

BC 3202.2.1.3 Balconies
Balconies, including railings and supporting brackets, no part of which extends more than 22 inches beyond the ground level, may be constructed to project not more than 22 inches beyond the street line

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CONSULTANTS

1520 Fulton Street Multi-Family Residential

1520 Fulton Street, Brooklyn NY 11216 USA

PROJECT NO:
MODEL FILE:
DRAWN BY:
CHKD BY:
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SHEET TITLE

PUBLIC RIGHT OF WAY

Building Code
not more than 22 inches beyond the

G-001

PROGRESS SET
ISSUED BY HELLO LIVING LLC
FOR STRUCTURAL DESIGN RFP
2014-10-06

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CONSULTANTS

**1520 Fulton Street
 Multi-Family Residential**

1520 Fulton Street, Brooklyn NY 11216
 USA

WINDOW SCHEDULE					
ID	SIZE		TYPE	MATERIAL	NOTES
	WIDTH	HEIGHT			
W05	2'-6"	4'		Metal - Aluminum	
W05	4'	6'		Metal - Aluminum	
W05	7'	6'		Metal - Aluminum	
W05	9'-4"	7'-8"		Metal - Aluminum	
W07	5'	6'-8"		Wood - Pine Horizontal	
W07	10'	6'-8"		Wood - Pine Horizontal	
W08	6'	6'-8"		Wood - Pine Horizontal	

3 Window Schedule

ID	TYPE	DOOR				FRAME			DETAILS			RATING	HW SET	NOTES	
		W	HT	THK	MATL	GLZ	W	THK	HEAD	JAMB	SILL				
10	---	10'	6'	0'-1 1/2"	---	---	0'-2"	0'	---	---	---	---	---	---	---
11	---	3'-6"	6'	0'-1 1/2"	---	---	0'-2"	0'	---	---	---	---	---	---	---
12	---	3'-6"	6'	0'-1 1/2"	---	---	0'-2"	0'	---	---	---	---	---	---	---
12	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
12	Flush	3'	6'-8"	0'-1 1/4"			2'-00"	0'-4"							
13	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
14	Flush	2'-6"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
14	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
15	Flush	2'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
16	Flush	2'-6"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
17	Flush	2'-6"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
18	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
19	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
21	Flush	3'	6'-8"	0'-1 1/4"			2'-00"	0'-4"							
31	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
32	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
32	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
33	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
34	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
34	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
35	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
36	Flush	3'	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
36	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
36	No Grill	3'	6'-8"	0'-1 1/4"			2'-00"	0'-4"							
36	Style 7	3'	10'	0'-1 1/2"			0'-2"	0'-4"							
37	---	3'	6'	0'-1 1/2"	---	---	0'-2"	0'	---	---	---	---	---	---	---
37	---	3'-6"	6'	0'-1 1/2"	---	---	0'-2"	0'	---	---	---	---	---	---	---
37	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
37	Style 7	3'	10'	0'-1 1/2"			0'-2"	0'-4"							
38	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
39	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
40	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							
41	Flush	3'-2"	6'-8"	0'-1 1/4"			0'-3/4"	0'-4"							

1 Door Schedule

TYPE	DOOR TYPES						
	---	Flush	Flush	Flush	Flush	No Grill	Style 7
VIEW							
DIMS	---	2'-6"x6'-8"	2'x6'-8"	3'-2"x6'-8"	3'x6'-8"	3'x6'-8"	3'x10'
NOTES	---						

2 Door Types

**PROGRESS SET
 ISSUED BY HELLO LIVING LLC
 FOR STRUCTURAL DESIGN RFP
 2014-10-06**

DOOR SCHEDULE

A-501

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 RAR. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Completion.

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 will be determined when a disposal facility is chosen. 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 Brooklyn, New York 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 RAR.

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 RAR.

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

1.7 MATERIALS REUSE ON-SITE

No materials are planned for reuse on Site.

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

No imported backfill is planned for this project.

1.10 FLUIDS MANAGEMENT

No liquids are anticipated to be generated as part of the project.

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 STORM-WATER POLLUTION PREVENTION

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAWP (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

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 the Remedial Action Report.

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.

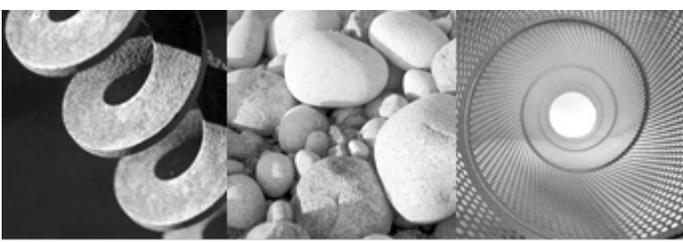
This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying the Remedial Action Report.

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



Geotechnical
Environmental
Water Resources
Ecological

Construction Health and Safety Plan (CHASP)

**1520 Fulton Street
Brooklyn, New York
OER Project Number: 15EH-N385K**

Submitted to:
New York City Office of Environmental Remediation
253 Broadway, 14th Floor
New York, NY 10007

Hello Living, LLC
925 Pacific Street, Suite 202
Brooklyn, New York 11238

May 2015
1412490

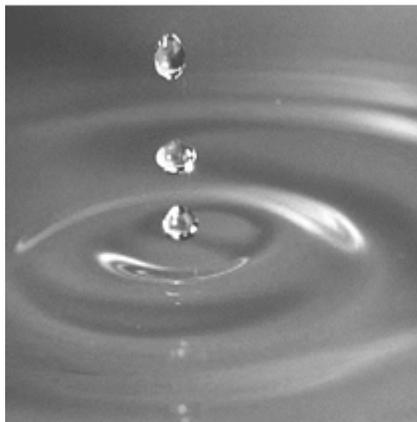


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- A. Site-Specific Information
- B. Cold Stress Guidelines
- C. Heat Stress Guidelines
- D. Safety Data Sheets (SDSs)
- E. Incident Reporting Form

1. Background Information

1.1 General

Engineer	GEI Consultants, Inc., P. C. 110 Walt Whitman Road, Suite 204 Huntington Station, New York 11746
Project Name	1520 Fulton Street Brooklyn, New York

This Construction Health and Safety Plan (CHASP) establishes policies and procedures to protect Hello Living, LLC and GEI Consultants, Inc. personnel from the potential hazards posed by the activities at the 1520 Fulton Street site located in New York, New York (see **Appendix A** – Site-Specific Information).

Reading of and adherence to the CHASP is required of all onsite Hello Living and GEI personnel. Subcontractors for this project will be required to develop their own CHASP for protection of their employees, but at a minimum must adhere to applicable requirements set forth in this CHASP. Additionally, federal, state and local representatives, as well as Hello Living and GEI representatives may be required to sign and adhere to this CHASP, depending on the nature of their presence onsite during activities conducted by Hello Living and GEI.

The plan identifies measures to minimize accidents and injuries, which may result from project activities, emergencies, or during adverse weather conditions. Activities performed under this CHASP will comply with applicable parts of OSHA Regulations, primarily 29 Code of Federal Regulations (CFR) Parts 1910 and 1926.

Included in **Appendix A** is a route to the nearest medical facility to the Site with directions and contact information. **Appendix B** and **Appendix C** detail the signs, symptoms, care and procedures to both cold and heat stress, respectively. **Appendix D** contains the incident reporting form to be filled out in the event of an injury, accident or near-miss onsite.

1.2 Property Description

The Site is located in the Bedford-Stuyvesant section of Brooklyn, New York and is identified as Block 1864 and Lots 14 and 54 on the New York City Tax Map (see **Figure 1**). The Site is 0.27-acres and is bounded by Fulton Street to the north, Herkimer Street to the south, commercial office building to the east, and a mixed commercial/residential building to the west. The property along Fulton Street (Lot 14) is currently vacant; the property was previously being used

as a gasoline service station and automotive repair garage. The adjoining parcel extending back to Herkimer Street (Lot 54) is currently vacant.

1.3 Site Activities

The proposed project will include the construction of a new 10-story mixed use development. The proposed new development will include commercial uses on the first floor, 48 residential apartments above and accessory parking, as well as utility rooms in the cellar. The aggregate permitted Floor Area Ratio is approximately 4.00 and the anticipated gross building floor area will be 60,790 sq. feet (above grade) and the building will measure 100 feet in height, which is the permitted height limit by zoning. The property is currently occupied by a building that will have to be demolished prior to the construction of the new building. The overall footprint of the structure will include a below-grade cellar level over nearly all the property that will be used for parking and mechanical rooms, as well as a storm water tank near the north wall. The property that extends back to Herkimer Street will be used mainly for the down-ramp into the lower parking area. Residential floors 8 to 10 stories in height (from ground floor) will cover approximately 70 percent of the building footprint, back from the street frontage. The rear of the structure will consist of single-story space. The cellar slab grade will be approximately 11 feet below the ground floor level. Additionally, three elevator pits will be installed approximately 5.5 feet below the cellar slab grade. The proposed excavation volume is 6,740 cubic yards. A vapor barrier and sub-slab depressurization system will be installed at the base of the building's foundation and along the foundation sidewalls. Groundwater was not encountered within the planned depth of the excavation.

Site work will consist of:

- Building demolition
- Foundation excavation, loading and removal of site soils
- Installation of Vapor Barrier and Sub-Slab Depressurization System
- Site grading
- Building construction

1.4 Hazard/Risk Analysis

1.4.1 Physical Hazards

Physical hazards associated with heavy equipment operations may be present during site activities. These activities would require the use of heavy equipment by subcontractors such as a backhoe or a drill rig, which is associated with, but not limited to, the following hazards:

- bodily injuries
- slipping, tripping or falling

- heavy lifting
- caught in-between injuries
- struck by injuries
- cold/heat stress
- noise

1.4.2 Fire and Explosion

Fire extinguishers are located on heavy equipment operating onsite and within any work vehicles onsite. All fires should be reported to 911 emergency services. The CM Contractor and the Construction Health & Safety Officer (CHSO) will determine if it is necessary to shut down site work for the day due to fire related issues.

1.4.3 Cold Stress

During the winter months, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment. The procedures to be followed regarding the avoidance of cold stress are provided in **Appendix B – Cold Stress Guidelines**.

1.4.4 Heat Stress

A heat stress prevention program will be implemented when ambient temperatures exceed 70°F. The procedures to be followed are provided in **Appendix C – Heat Stress Guidelines**.

1.4.5 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps, generators, and other equipment associated with earthwork tasks. Site workers who will perform suspected or established high noise tasks and operations shall wear hearing protection. Other workers who do not need to be in proximity of the noise should distance themselves from the equipment generating the noise.

1.4.6 Hand and Power Tools

In order to complete the various tasks for the project, personnel will use hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Work gloves, safety glasses, and hard hats will be worn by the operating personnel at all times when using hand and power tools. Ground Fault Circuit Interrupter (GFCI)-equipped circuits will be used for all power tools.

The CM Contractor is responsible for the safe condition of tools and equipment used by employees but the employees have the responsibility for properly using and maintaining tools.

Saw blades, knives, or other tools be directed away from aisle areas and other employees working in close proximity. Knives and scissors must be sharp. Dull tools can be more hazardous than sharp ones.

Appropriate personal protective equipment (PPE), e.g., safety goggles, gloves, etc., should be worn due to hazards that may be encountered while using portable power tools and hand tools. Floors must be kept as clean and dry as possible to prevent accidental slips with or around dangerous hand tools.

Around flammable substances, sparks produced by iron and steel hand tools can be a potential ignition source. Where this hazard exists, spark-resistant tools made from brass, plastic, aluminum, or wood will provide for safety.

The following general precautions should be observed by power tool users:

- Never carry a tool by the cord or hose.
- Never yank the cord or the hose to disconnect it from the receptacle.
- Keep cords and hoses away from heat, oil, and sharp edges.
- Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits and cutters.
- All observers should be kept at a safe distance away from the work area.
- Secure work with clamps or a vise, freeing both hands to operate the tool.
- Avoid accidental starting. The worker should not hold a finger on the switch button while carrying a plugged-in tool.
- Tools should be maintained with care. They should be kept sharp and clean for the best performance. Follow instructions in the user's manual for lubricating and changing accessories.
- Be sure to keep good footing and maintain good balance.
- The proper apparel should be worn. Loose clothing, ties, or jewelry can become caught in moving parts.

- All portable electric tools that are damaged shall be removed from use and tagged "Do Not Use."

Staff and subcontractors should follow all associated OSHA standards (29 CFR 1926), the most updated of which can be found at <http://www.osha.gov>. OSHA standards supersede any guidelines stated within this CHASP.

1.4.7 Slips, Trips, and Falls

Working in and around the site will pose slip, trip and fall hazards due to slippery surfaces. Excavation at the sites will cause uneven footing in the trenches and around the spoil piles. Employees will wear proper footwear (i.e. steel toe/shank boots) and will employ good work practice and housekeeping procedures to minimize the potential for slips, trips, and falls.

1.4.8 Manual Lifting

Manual lifting of objects and equipment may be required. Failure to follow proper lifting technique can result in back injuries and strains. Site workers should use power equipment to lift heavy loads whenever possible and should evaluate loads before trying to lift them (i.e., they should be able to easily tip the load and then return it to its original position). Carrying heavy loads with a buddy and proper lifting techniques include:

- make sure footing is solid
- make back straight with no curving or slouching
- center body over feet
- grasp the object firmly and as close to your body as possible
- lift with legs
- turn with your feet, don't twist

1.4.9 Projectile Objects, Debris and Overhead Dangers

Overhead dangers, including but not limited to falling debris and equipment, can occur while heavy machinery is in operation or work is taking place overhead. Staff will be instructed to maintain a minimum distance from large overhead operations. Staff must also maintain proper communication with heavy equipment operators and their handlers, especially if work necessitates their presence beyond the minimum safe distance. Additionally, employees should be cognizant of low-hanging overhead power lines, as these can snag on vehicles entering and exiting the site. Vehicles that are large enough to damage overhead power lines require spotters when entering and exiting the site. Proper PPE will be worn at all times during these types of activities including steel-toed or equivalent boots, safety vests and hard hats.

1.4.10 Heavy Equipment Operation

Heavy equipment may be present onsite. Staff should be cautious when working near or operating heavy equipment, and maintain a safe distance from the equipment. Personnel should maintain eye contact with the vehicle spotter or operator before traversing any paths that may cross that of the machinery. Safety vests are to be worn when working near operating heavy equipment.

1.4.11 Confined Spaces

If any work in confined spaces is required, it will be performed in accordance with 29 CFR 1910.146 (effective April 15, 1993), as applicable. Copies of the standards will be kept on file in the CM Contractor's main office, if work in confined spaces will be performed. Confined space work will not be performed without first notifying and receiving approval from the CM, if applicable.

1.4.12 Illumination

Illumination requirements identified by OSHA are directed to work efforts inside buildings and/or during non-daylight hours. OSHA illumination requirements will be followed when work is taking place inside the buildings. All exterior site activities at the site will occur during daylight hours. However, if yard areas are used after dark they will be equipped with illumination that meets or exceeds requirements specified in 29 CFR 1926.56, Illumination.

1.4.13 Lockout/Tagout

Site personnel will assume that all electrical equipment at surface and overhead locations is energized, until the equipment has been designated as de-energized by a representative from the utility company. If the equipment cannot be de-energized, work will stop and the CM and appropriate contacts will be consulted. The CM will notify the client prior to working adjacent to this equipment, and will verify that the equipment is energized or de-energized in the vicinity of the work being conducted.

All power lines which have been indicated to be de-energized must be locked out, such that the lines cannot be energized when personnel are working near them. The lines shall not be unlocked and re-energized until the CM notifies the client that they have completed work in the area and that all personnel are clear of the area. Client representatives will thoroughly familiarize personnel with site-specific lockout/tagout procedures during the site orientation, if applicable.

If power lines cannot be de-energized, the CM will consult with utility safety personnel to determine the safe working distance from the energized line. Work tasks will only commence

after determination that a safe working distance can be maintained and all personnel working in the area have been informed of the limitation.

1.4.14 Fall Hazards

Fall hazards exist onsite in several areas. Workers must follow all safeguards for fall protection as defined in OSHA 29 CFR 1926, Subpart M-Fall Protection. In general, workers should use the following guidelines:

- Use at least one of the following whenever employees are exposed to a fall of 6 feet or more above a lower level:
 - Guardrail Systems
 - Safety Net Systems
 - Personal Fall Arrest Systems
- Cover or guard floor holes as soon as they are created during new construction.
- For existing structures, survey the site before working and continually audit as work continues. Guard or cover any openings or holes immediately.
- Construct all floor-hole covers so they will effectively support two times the weight of employees, equipment, and materials that may be imposed on the cover at any one time. Floor hole covers are to be secured so they are not moved off of the hole and labeled so workers are aware what is under the cover.
- In general, it is better to use fall *prevention* systems, such as guardrails, than fall *protection* systems, such as safety nets or fall arrest devices, because they provide more positive safety means.
- Construct all scaffolds according to the manufacturer's instructions and 29 CFR 1926.451.
- Install guardrail systems along all open sides and ends of platforms.
- Use at least one of the following for scaffolds more than 10 feet above a lower level:
 - [Guardrail Systems](#)
 - [Personal Fall Arrest Systems](#)
- Provide safe access to scaffold platforms [*For additional information, see [Scaffold Access](#)*].
- Do not climb cross-bracing as a means of access.

- Guard all protruding ends of steel rebar with rebar caps or wooden troughs, *or*
- Bend rebar so exposed ends are no longer upright.
- When employees are working at any height above exposed rebar, fall protection/prevention is the first line of defense against impalement.

1.4.15 Ladder Safety

Portable ladders must be safely positioned each time they are used. Staff and subcontractors should follow all associated OSHA standards (CFR 1926.1053), the most updated of which can be found at <http://www.osha.gov>. OSHA standards supersede any guidelines stated within this CHASP.

1.4.16 Scaffolding Safety

Scaffolding presents significant fall hazards and various types of scaffolds may be present onsite. Staff and subcontractors should follow all associated OSHA standards (CFR 1926 Subpart L - Scaffolds), the most updated of which can be found at <http://www.osha.gov>.

1.4.17 Welding

The intense light associated with welding operations can cause serious and sometimes permanent eye damage if operators do not wear proper eye protection. Additionally, sparks from the welding process present a risk to the employee conducting welding and nearby employees. Any flammable or combustible materials that may be exposed to sparks or other heat sources must be protected or relocated to prevent fire hazards. Fire extinguishers will be located in areas where welding or hot work will be taking place. Staff must wear helmets that comply with ANSI Z49.1, with filter lenses that comply with ANSI Z87.1. Boots must comply with ASTM F2412 and ASTM F2413 for fire resistance. Welding operators must also wear flame-resistant welder's gloves.

Several chemicals may be used in the process of welding. Staff must be aware of the variety of chemicals used, and must possess appropriate welding training to perform welding activities. Additionally, compressed gas cylinders used in welding must be stored, placed and transported according to OSHA standards. Staff and subcontractors should follow all associated OSHA standards (CFR 1926), the most updated of which can be found at <http://www.osha.gov>.

1.4.18 Asbestos-Containing Material

Although the site does not contain asbestos-containing materials (ACM), workers should be aware of the risks associated with asbestos exposure. Chronic exposure to asbestos may cause

asbestosis and mesothelioma. The primary route of exposure for asbestos is inhalation during the disturbance and/or removal of asbestos from pipe insulation and cement pipes.

Asbestos is strictly regulated under OSHA 29 CFR 1910.1001/1926.1101. Employees that may be potentially exposed to ACM must participate in a medical surveillance program, have specific training in the hazards and controls of exposure to asbestos and wear respirators with high efficiency particulate (HEPA) filters. All work must be conducted in demarcated regulated areas to minimize the amount of people within the exposure area. Employers must conduct air sampling and provide signs and labels regarding the presence of asbestos. Staff and subcontractors should follow all associated OSHA standards (CFR 1926), the most updated of which can be found at <http://www.osha.gov>.

The potential hazards for this project are listed in the following Activity Hazard Analysis and Site Hazards sections.

SITE HAZARDS	
Potential Hazard	Control Measures
Construction Safety	<ul style="list-style-type: none"> ▪ Identify yourself and your work location to heavy equipment operators, so they may incorporate you into their operations. Coordinate hand signals with operators. ▪ Stay Alert! Pay attention to equipment backup alarms and swing radii. ▪ Wear a high visibility vest when working near equipment or motor vehicle traffic. ▪ Position yourself in a safe location when filling out logs and talking with the contractor. ▪ Notify the contractor immediately if any problems arise. ▪ Do not stand or sit under suspended loads or near any pressurized equipment lines. ▪ Do not use cellular telephones near operating equipment. ▪ Follow general traffic safety guidelines
Scaffolding Safety and Power Tools	<ul style="list-style-type: none"> ▪ Follow OSHA Construction Safety Requirements 29 CFR 1926 Subpart L - Scaffolds. ▪ Do not use impact tools (i.e. chisels, hammers) with mushroomed heads. ▪ Do not use wooden-handled tools if the handle is damaged, splintered, loose or cracked. ▪ Inspect, maintain and replace tools as needed. ▪ Do not use wrenches if jaws are sprung. ▪ Tools should be directed away from aisles, other employees and trafficked areas. ▪ Wear appropriate PPE when using tools. ▪ Floors must be kept clean and as dry as possible to prevent slips, trips and falls around tools. ▪ Never carry a tool by the cord or hose. ▪ Never yank the cord or the hose to disconnect it from the receptacle. ▪ Keep cords and hoses away from heat, oil, and sharp edges. ▪ Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits and cutters. ▪ All observers should be kept at a safe distance away from the work area. ▪ Secure work with clamps or a vise, freeing both hands to operate the tool. ▪ Avoid accidental starting. The worker should not hold a finger on the switch button while carrying a plugged-in tool. ▪ Tools should be maintained with care. They should be kept sharp and clean for the best performance. Follow instructions in the user's manual for lubricating and changing accessories. ▪ Be sure to keep good footing and maintain good balance. ▪ The proper apparel should be worn. Loose clothing, ties, or jewelry can become caught in moving parts. ▪ All portable electric tools that are damaged shall be removed from use and tagged "Do Not Use." ▪ Keep all tools in good condition with regular maintenance.

SITE HAZARDS	
Potential Hazard	Control Measures
	<ul style="list-style-type: none"> ▪ Use the right tool for the job. ▪ Examine each tool for damage before use. ▪ Operate according to the manufacturer's instructions. ▪ Provide and use the proper protective equipment.
Heavy Equipment Operation	<ul style="list-style-type: none"> ▪ Maintain awareness of location of equipment. ▪ Subcontractor use of a spotter for equipment operation. ▪ Safety vest is to be worn around all operating equipment. ▪ Maintain eye contact with the operator. ▪ Stay out of the swing radii of the apparatus.
Slips, Trips, Falls	<ul style="list-style-type: none"> ▪ Keep trafficked areas clear of debris and tools. Keep work areas and traffic areas dry.
Lock Out/Tag Out	<ul style="list-style-type: none"> ▪ Maintain contact with utility to determine if energized lines or equipment has been de-energized ▪ Follow OSHA Lock Out/Tag Out requirements in 29 CFR 1910.147.
Welding	<ul style="list-style-type: none"> ▪ Wear appropriate PPE (welding helmet, apron, fire-resistant gloves and boots, leggings) as needed. ▪ Follow OSHA Construction Safety Requirements 29 CFR 1926 Subpart J – Welding and Cutting.
Fire	<ul style="list-style-type: none"> ▪ Keep fire extinguishers in working order by inspecting on a regular basis. ▪ Keep the appropriately rated and sized fire extinguishers on site as specified by 29 CFR 1926.150. ▪ Keep flammable materials away from ignition sources. ▪ Follow OSHA Construction Safety Requirements 29 CFR 1926 Subpart F – Fire Protection and Prevention and NFPA standards. ▪ Wear appropriate PPE when working around flammable materials.
Ladder Safety	<ul style="list-style-type: none"> ▪ Follow safety guidelines for safe ladder use. ▪ Follow OSHA Construction Safety Requirements 29 CFR 1926.1053.
Fall Hazards	<ul style="list-style-type: none"> ▪ Use appropriate fall protection at heights of 6 feet or greater. ▪ Avoid working in areas with a drop off of more than 2 feet. ▪ Erect appropriate barriers and guard rails. ▪ Wear appropriate fall protection PPE. ▪ Mark fall hazards so they are visible to employees. ▪ Follow OSHA Construction Safety Requirements 29 CFR 1926 Subpart M – Fall Protection.
Physical Injury	<ul style="list-style-type: none"> ▪ Wear work boots in good condition with non-slip soles. ▪ Maintain good visibility of the work area. ▪ Avoid walking on uneven or debris ridden ground surfaces. ▪ Use proper lifting techniques. Ask fellow worker for help.
Noise	<ul style="list-style-type: none"> ▪ Wear hearing protection when near loud noises. ▪ Wear hearing protection whenever you need to raise your voice above normal conversational speech due to a loud noise source; this much noise indicates the need for protection.
Vehicular Traffic	<ul style="list-style-type: none"> ▪ Wear traffic safety vest at all times. ▪ Use cones, flags, barricades, and caution tape to define work area. ▪ Use a "spotter" to locate oncoming vehicles. ▪ Use vehicle to block work area. ▪ Engage police detail if needed.
Utilities	<ul style="list-style-type: none"> ▪ Check that contractor has cleared underground utilities before any intrusive activities, and that contractor has coordinate with utility locating services, property owner(s) or utility companies. ▪ Utilities are to be considered live or active until documented otherwise. ▪ For overhead utilities within 50 feet, have contractor determine with the utility company the appropriate safe distance. Minimum distance for clearance is based on voltage of the line. ▪ An observer will be established when operating drilling rigs near overhead utilities.

ACTIVITY HAZARDS		
Activity	Potential Hazards	Protective Equipment
Entering Construction Site	Heavy equipment, dust, noise.	Hardhat, reflective safety vest, steel-toed, steel-shank boots, safety glasses, protective leather work gloves, and earplugs. Follow general traffic safety guidelines. Employ dust suppression controls (i.e. watering) to keep dust levels down to prevent inhalation of excavated materials.
General Construction (Foundation Work, Earthwork, Soil Vapor Barrier System Installation)	Heavy equipment, dust, noise. Contact with excavated soils.	Hardhat, reflective safety vest, steel-toed, steel-shank boots, safety glasses, protective leather work gloves, and earplugs. Follow general traffic safety guidelines. Employ dust suppression controls (i.e. watering) to keep dust levels down to prevent inhalation of excavated materials.
Personal Protective Equipment (PPE) is the <i>initial level of protection</i> based on the activity hazards and Site conditions which have been identified.		

1.5 Evaluation of Potential Chemical Hazards

The characteristics of potential compounds at the Site are discussed below for information purposes. Adherence to the safety and health guidelines in this CHASP should reduce the potential for exposure to the compounds discussed below. Table 1-1 presents chemical data regarding potential exposure and monitoring for the chemical types listed below.

Potential exposure to contaminants included encounters with groundwater, soil and soil vapor.

1.5.1 Volatile Organic Compounds (VOCs)

Out of the 15 soil samples collected during the remedial investigation (RI), VOC exceedances of the Unrestricted SCOs was limited to one soil boring location (B-2 0-2 feet and B-2 12-14 feet), located adjacent to the gasoline USTs. The VOC compounds exceeding the Unrestricted Use SCOs were 1,2,4-*t*Trimethylbenzene, 1,3,5-*t*Trimethylbenze and methylene chloride in both the shallow and deep interval, as well as acetone, and total xylenes in the deeper interval. An exceedance of total PCB's in the soil samples was identified in the shallow interval (0 to 2 feet from sample B-3, located south of the gasoline pumping station within the commercial building.

The three groundwater samples collected were compared to the NYSDEC Division of Water Technical and Operation Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS). VOC exceedances of the AWQS were limited to chloroform in samples MW-2 and MW-3, with concentrations of 19 µg/L and 9.50 µg/L, respectively, above the guidance value of 7 µg/L

For the soil vapor samples the analytical results identified petroleum-related VOCs and chlorinated VOCs at low to moderate concentrations. Petroleum-related VOCs (BTEX) were detected at all five sampling locations, with a maximum concentration of 64.90 micrograms per

cubic meter ($\mu\text{g}/\text{m}^3$) at SV-5. Detections of regulated chlorinated VOCs were primarily limited to tetrachloroethylene (PCE), which was detected in each of the five soil vapor samples.

VOCs may cause contact dermatitis. Direct contact can be irritating to the skin and produce itching, burning, swelling and redness. Direct contact or exposure to vapors may be irritating to the eyes. Conjunctivitis may result from prolonged exposure. High levels of exposure to SVOCs, though not anticipated during work activities conducted during this project, may increase the risk of cancer including lung, kidney and skin cancer. Poisoning may occur by ingestion of large doses, inhalation or skin absorption.

The major route of entry for the work activities to be conducted at this site is through direct contact. Exposure is most likely when handling soil samples. Inhalation may occur when the soil is disturbed causing respirable and nuisance dust particles to become airborne. Details for monitoring procedures can be found in Section 2.

1.5.2 Semi-volatile organic compounds

SVOC exceedances of the Residential Use SCOs were limited to one of the 14 analytical samples collected. The shallow interval (0 to 2 feet) from sample B-4, collected interior of the commercial building southwest of the gasoline pumping station. The SVOC compounds exceeding the Unrestricted Use SCOs were polycyclic aromatic hydrocarbons (PAHs) including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

SVOC exceedances of the AWQS were limited to one sample, MW-2. Compounds detected in MW-2 included PAHs; benzo(a)anthracene, with concentration of $0.092 \mu\text{g}/\text{L}$, benzo(a)pyrene, with concentration of $0.072 \mu\text{g}/\text{L}$, benzo(b)fluoranthene, with concentration $0.072 \mu\text{g}/\text{L}$, benzo(k)fluoranthene, with concentration of $0.082 \mu\text{g}/\text{L}$, chrysene, with concentration of 0.092 and indeno(1,2,3-cd)pyrene, with concentration of $0.051 \mu\text{g}/\text{L}$. The AWQS for benzo(a)pyrene is non-detect and the remaining AWQS values for the PAHs with exceedances are $0.002 \mu\text{g}/\text{L}$. Bis(2-ethylhexyl)phthalate was also detected with a concentration of $6.24 \mu\text{g}/\text{L}$, above the guidance value of $5 \mu\text{g}/\text{L}$.

PAHs are generally produced as byproducts of fuel burning and are commonly found in urban fill-type material. It is important to note that a limited amount of fill comprised of recycled concrete aggregate (RCA), brick and glass were identified within shallow intervals..

1.5.3 Metals

All soil samples contained metals as part of the soil structure. Metals exceedances of the Residential Use SCOs were limited to the shallow interval (0 to 2 feet) identified in four samples including B-1, B-3, B-4 and B-5. The exceedances of the Unrestricted Use SCOs were included arsenic (B-3), copper (B-1), lead (B-1, B-4 and B-5), selenium (B-4) and mercury (B-3 and B-4).

The exceedances of arsenic, and selenium were marginal, remaining within the same order of magnitude as the respective Unrestricted Use SCO. Lead exceedances ranged from 445 mg/Kg to 668 mg/Kg, above the Unrestricted Use SCO of 63 mg/Kg. The copper exceedance was of similar magnitude (637 mg/Kg, above the Unrestricted Use SCO of 50 mg/Kg. The mercury concentrations detected above the Unrestricted Use SCO (0.18 mg/Kg) ranged from 1.95 mg/k to 11.70 mg/Kg.

Metals exceedances of the AWQS in the unfiltered samples were identified in each of the three samples. The compounds exceeding the AWQS included chromium, lead, manganese and sodium in each of the three samples, as well as arsenic, barium, cadmium, copper, magnesium, nickel and selenium in MW-2 and MW-3. The metals concentrations exceeding the AWQS in the dissolved samples were significantly less than those in the unfiltered samples and were limited to manganese in MW-2 and MW-3 and sodium in all three samples. The exceedances were relatively low, remaining within one order of magnitude as the respective standard.

Exposure to high concentrations of copper through inhalation can cause irritation of the eyes, nose, pharynx, nasal septum. Ingestion may cause a metallic taste. Skin irritation may result from direct contact with skin. Damage to the liver and kidneys may occur.

Exposure to high concentrations of selenium may cause eye, skin, nose and throat irritation, headache, chills, fever, bronchitis, a metallic taste in the mouth, garlic breath, gastrointestinal disturbance, dermatitis, and eye and skin burns.

The primary route of exposure is through inhalation of dust particles when soil is disturbed and becomes airborne.

1.5.4 Asbestos-Containing Materials

As asbestos containing materials (ACM) have not been identified onsite, they are not currently monitored for at the site. However, in the course of earthwork, staff should be cognizant of potential ACM and report any suspected ACM to the CM Contractor and the CHSO, who will then determine the appropriate course of action.

1.5.5 Polychlorinated Biphenyls

As polychlorinated Biphenyls (PCBs) have not been identified onsite, they are not considered a potential concern at the site.

1.6 Biological Hazards

During the course of the project, there is a potential for workers to come into contact with biological hazards such as animals, insects and plants. Workers will be instructed in hazard recognition, health hazards, and control measures during site-specific training.

1.6.1 Animals

During the conduct of site operations, wild animals such as stray dogs or cats, raccoons, and mice may be encountered. Workers will use discretion and avoid all contact with wild animals. If these animals present a problem, efforts will be made to remove these animals from the site by contacting a licensed animal control technician.

1.6.2 Insects

Insects, including bees, wasps, hornets, and spiders, may be present at the site making the chance of a bite possible. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition. Any individuals who have been bitten or stung by an insect should notify the SSO. The following is a list of preventive measures:

- Apply insect repellent prior to performing any field work and as often as needed throughout the work shift.
- Wear proper protective clothing (work boots, socks and light colored pants).
- Field personnel who may have insect allergies should have bee sting allergy medication onsite and should provide this information to the SSO prior to commencing work.

1.6.3 Tick Borne Illnesses

Lyme disease is caused by infection from a deer tick that carries a spirochete. During the painless tick bite, the spirochete may be transmitted into the bloodstream that could lead to the worker contracting Lyme disease.

Lyme disease may cause a variety of medical conditions including arthritis, which can be treated successfully if the symptoms are recognized early and medical attention is received. Treatment with antibodies has been successful in preventing more serious symptoms from developing. Early signs may include a flu-like illness, an expanding skin rash, and joint pain. If left untreated, Lyme disease can cause serious nerve or heart problems, as well as a disabling type of arthritis.

Symptoms can include a stiff neck, chills, fever, sore throat, headache, fatigue and joint pain. This flu-like illness is out of season, commonly happening between May and October when ticks are most active. A large expanding skin rash may develop around the area of the bite. More than one rash may occur. The rash may feel hot to the touch and may be painful. Rashes vary in size, shape, and color, but often look like a red ring with a clear center. The outer edges expand in size. It's easy to miss the rash and the connection between the rash and a tick bite. The rash

develops from three days to as long as a month after the tick bite. Almost one third of those with Lyme disease never get the rash.

Joint or muscle pain may be an early sign of Lyme disease. These aches and pains may be easy to confuse with the pain that comes with other types of arthritis. However, unlike many other types of arthritis, this pain seems to move or travel from joint to joint.

Lyme disease can affect the nervous system. Symptoms include stiff neck, severe headache, and fatigue usually linked to meningitis. Symptoms may also include pain and drooping of the muscles on the face, called Bell's Palsy. Lyme disease may also mimic symptoms of multiple sclerosis or other types of paralysis.

The disease can also cause serious, but reversible heart problems, such as irregular heartbeat. Finally, Lyme disease can result in a disabling, chronic type of arthritis that most often affects the knees. Treatment is more difficult and less successful in later stages. Often, the effects of Lyme disease may be confused with other medical problems.

It is recommended that personnel check themselves when in areas that could harbor deer ticks, wear light color clothing and visually check themselves and their buddy when coming from wooded or vegetated areas. If a tick is found biting an individual, the PM should be contacted immediately. The tick can be removed by pulling gently at the head with tweezers. The affected area should then be disinfected with an antiseptic wipe. The employee will be offered the option for medical treatment by a physician, which typically involves prophylactic antibiotics. If personnel feel sick or have signs similar to those above, they should notify the PM immediately.

The deer tick can also cause **Babesiosis**, an infection of the parasite *Babesia Microti*. Symptoms of Babesiosis may not be evident, but may also include fever, fatigue and hemolytic anemia lasting from several days to several months. Babesiosis is most commonly diagnosed in the elderly or in individuals whose immune systems are compromised.

Ehrlichiosis is a tick-borne disease which can be caused by either of two different organisms. Human monocytic ehrlichiosis (HME) is caused by *Ehrlichia chaffeensis*, which is transmitted by the lone star tick (*Amblyomma americanum*). Human granulocytic anaplasmosis (HGA), previously known as human granulocytic ehrlichiosis (HGE), is caused by *Anaplasma phagocytophilia*, which is transmitted by the deer tick (*Ixodes scapularis*).

In New York State, most cases of ehrlichiosis have been reported on Long Island and in the Hudson Valley. Ehrlichiosis is transmitted by the bite of infected ticks, including the deer tick and the lone star tick. The symptoms of HME and HGE are the same and usually include fever, muscle aches, weakness and headache. Patients may also experience confusion, nausea, vomiting and joint pain. Unlike Lyme disease or Rocky Mountain spotted fever, a rash is not common. Infection usually produces mild to moderately severe illness, with high fever and

headache, but may occasionally be life-threatening or even fatal. Symptoms appear one to three weeks after the bite of an infected tick. However, not every exposure results in infection.

Rocky Mountain spotted fever (RMSF) is a tick-borne disease caused by a rickettsia (a microbe that differs somewhat from bacteria and virus). Fewer than 50 cases are reported annually in New York State. In the eastern United States, children are infected most frequently, while in the western United States, disease incidence is highest among adult males. Disease incidence is directly related to exposure to tick-infested habitats or to infested pets. Most of the cases in New York State have occurred on Long Island. RMSF is characterized by a sudden onset of moderate to high fever (which can last for two or three weeks), severe headache, fatigue, deep muscle pain, chills and rash. The rash begins on the legs or arms, may include the soles of the feet or palms of the hands, and may spread rapidly to the trunk or rest of the body. Symptoms usually appear within two weeks of the bite of an infected tick.

*(Information on Ehrlichiosis, Babesiosis, and Rocky Mountain Spotted Fever was derived from the New York State Department of Health).

1.6.4 Wasps and Bees

Wasps (hornets and yellow-jackets) and bees (honeybees and bumblebees) are common insects that may pose a potential hazard to the field team if work is performed during spring, summer or fall. Bees normally build their nests in the soil. However, they use other natural holes such as abandoned rodent nests or tree hollows. Wasps make a football-shaped, paper-like nest either below or above the ground. Yellow-jackets tend to build their nests in the ground but hornets tend to build their nests in trees and shrubbery. Bees are generally more mild-mannered than wasps and are less likely to sting. Bees can only sting once while wasps are capable of stinging multiple times because of a barbless stinger. Wasps sting when they feel threatened. By remaining calm and not annoying wasps by swatting, you lessen the chance of being stung.

Wasps and bees inject a venomous fluid under the skin when they sting. The venom causes a painful swelling that may last for several days. If the stinger is still present, carefully remove it with tweezers. Some people may develop an allergic reaction (i.e. anaphylactic shock) to a wasp or bee sting. If such a reaction develops, seek medical attention at once. Employees should inform the SSO if they are allergic to bees or wasps, and inform the SSO if an epi-pen is required treatment and the location of the pen.

1.6.5 Plants

The potential for contact with poisonous plants exists when performing field work in undeveloped and wooded areas. Poison ivy, sumac, and oak may be present onsite. Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the

spring. Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety "down." Poison sumac has white, "hairy" berry clusters. Poison oak can be present as a sparingly branched shrub. Poison oak is similar to poison ivy in that it has the same leaflet configuration; however, the leaves have slightly deeper notches. Prophylactic application of Tecnu may prevent the occurrence of exposure symptoms. Post exposure over the counter products are available and should be identified at the local pharmacist. Susceptible individuals should be identified to the PM.

Contact with poison ivy, sumac, or oak may lead to a skin rash, characterized by reddened, itchy, blistering skin which needs first aid treatment. If a field worker believes they have contacted one of these plants, immediately wash skin thoroughly with soap and water, taking care not to touch your face or other body parts.

1.7 Sun Exposure

Employees are encouraged to liberally apply sunscreen, with a minimum sun protection factor (SPF) of 15, when working outdoors to avoid sunburn and potential skin cancer, which is associated with excessive sun exposure to unprotected skin. Additionally, employees should wear safety glasses that offer protection from UVA/UVB rays.

1.8 Personal Safety

Field activities have the potential to take site workers into areas which may pose a risk to personal safety. The following website (source) has been researched to identify potential crime activity in the area of the project:

http://www.nyc.gov/html/nypd/html/crime_prevention/crime_statistics.shtml

Type of Crime	Subject Property and Vicinity	New York City Total*
Murder	11	333
Rape	26	1,352
Robbery	316	16,539
Felony Assault	375	20,207
Burglary	362	16,765
Grand Larceny	446	43,862

*New York City Total includes values from the 79th Precinct

2014 crime statistics from this website report that the 79th Precinct, which is closest to the subject property, is shown above in comparison to the current New York City total.

To protect yourself, take the following precautions:

- If deemed necessary, use the buddy system (teams of a minimum of two persons present).
- Let the Site Safety Officer (SSO) know when you begin work in these areas and when you leave.
- Call in regularly.
- Pay attention to what is going on around you.
- If you arrive in an area and it does not look safe to get out of your vehicle, lock the doors and drive off quickly, but safely.

Site workers must not knowingly enter into a situation where there is the potential for physical and violent behaviors to occur. If site workers encounter hostile individuals or a confrontation develops in the work area, suspend work activities, immediately leave the area of concern, and contact local 911 for assistance. Notify the SSO and CHSO of any incidents once you are out of potential danger.

In the event of an emergency, prompt communications with local emergency responders is essential. At least one charged and otherwise functioning cell phone to facilitate emergency communications will be on site.

2. Community Air Monitoring Plan

Hello Living and GEI will implement a Community Air Monitoring Plan (CAMP) in compliance with NYDEP requirements. Hello Living will contract with GEI Consultants, Inc. P.C. to implement the plan.

The CM Contractor will provide the following equipment to implement the CAMP, if deemed necessary:

- Photoionization Meter (PID)
- Dust Monitor/Meter
- Sound Level Meter by the CHSO, type to be appropriate to the activities performed

All monitoring equipment will be calibrated and maintained in accordance with manufacturer's requirements. All calibrations will be recorded in the project notes daily or on a daily calibration form.

3. Project Personnel/Responsibilities and Lines of Authority

GEI Personnel		
Nicholas Recchia	Project Manager	Office: 631-759-2973 Cell: 516-395-8763
Chris Anastasiou	Site Safety Officer (SSO), Field Representative(FR)	Cell: 631-609-7085

Lines of Authority will be as follows:

Onsite – The CM Contractor will have responsibility for safety of its employees during the work performed at the site. The Field Representative (FR) will have a cell phone available to contact the appropriate local authorities, in the event of an emergency. The FR will be available for communication with the SSO and CM and with the client representative. The FR and/or SSO may change due to the nature of work being conducted onsite.

3.1 Construction Manager (CM)

Responsibilities of the CM include the following:

- Verifies implementation of the CHASP.
- Conducts periodic inspections and documents these in the field book.
- Participates in incident investigations.
- Verifies the HASP has all of the required approvals before any site work is conducted.
- Verifies that the client and/or CM site manager is informed of project changes, which require modifications of the CHASP.
- Has overall responsibility for project health and safety.
- Acts as the primary point of contact with the client for site related activities and coordination with non-project related site operations.
- Overseeing of performance of project tasks as outlined in the scope of work.
- Plans field work using appropriate safe procedures and equipment.

- Verifies and documents current OSHA Construction training compliance for all construction trades.
- Verifies that subcontractors acknowledge and sign the projects CHASP.

3.2 Construction Health and Safety Officer (CHSO)

The CHSO is a qualified health and safety professional with experience in construction activities. Responsibilities of the CHSO include the following:

- Serves as the primary contact to review health and safety matters that may arise.
- Approves revised or new safety protocols for field operations.
- Coordinates revisions of this CHASP with field personnel.
- Coordinates upgrading or downgrading of PPE with the site manager.
- Leads the investigation of all accidents/incidents.
- Provide the necessary training of subcontractor trade field crews in accordance with OSHA regulations and provides proof of training to the SSO prior to subcontractor trade personnel entering the site.

3.3 Site Safety Officer (SSO)

Responsibilities of the SSO include the following:

- Verifies that the CHASP is implemented and that all health and safety activities identified in the HASP are conducted and/or implemented.
- Verifies that field work is scheduled with adequate personnel and equipment resources to complete the job safely and enforces site health and safety rules.
- Verifies that adequate communications between trade crews and emergency response personnel is maintained during emergency situations.
- Verifies that field site personnel are adequately trained and qualified to work at the site and that proper PPE is utilized.
- Report all accidents/incidents to the CHSO and CM.
- Stop work if necessary.

- Identifies operational changes which require modifications to the CHASP and ensures that the procedure modifications are implemented and documented through changes to the CHASP, with CHSO approval.
- Determines upgrades or downgrades of PPE based on site conditions and/or real-time monitoring results with CHSO approval.
- Reports to the CHSO and provides summaries of field operations and progress.

3.4 Field Representative (FR)

The FR is responsible for carrying out field work on a monthly, quarterly, or as-needed basis. Responsibilities of the FR include:

- Conducts routine safety inspection of the work area.
- Documenting occurrences of unsafe activity and what actions were taken to rectify the situation.
- Reports any unsafe or potentially hazardous conditions to the SSO and CM.
- Maintains familiarity of the information, instructions, and emergency response actions contained in the CHASP.
- Complies with rules, regulations and procedures set forth in the CHASP.
- Prevents admittance to work site by unauthorized personnel.
- Inspects all tools and equipment, including PPE, prior to use and documents inspection on the daily safety meeting form or in the appropriate field book.
- Verifies that monitoring instruments are calibrated.
- Stops work if necessary.

4. Subcontractors

The CM Contractor may subcontract with various companies to conduct various work onsite on an as-needed basis. Contact information for these subcontractors will be available when such work is being conducted.

The CM Contractor requires its subcontractors to work in a responsible and safe manner. Subcontractors for this project may be required to develop their own CHASP for protection of their employees and must adhere to applicable requirements set forth in this CHASP.

5. Emergency Contact List

EMERGENCY INFORMATION		
Important Phone Numbers		Directions to: Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, NY 11213
Police	911	Head east on Fulton Street towards Albany Avenue for 4174 feet. Turn right at the 1 st cross street onto Albany Avenue and go 0.1 miles. Turn left onto Atlantic Avenue and go 404 feet. Make a slight left towards Atlantic Avenue, middle lane and go 443 feet. Make a left U-turn onto Atlantic Avenue and go 0.1 miles. The hospital will be on the right. Refer to Hospital Route Map in Appendix A .
Fire Department	911	
Ambulance	911	
Occupational Health Clinic Plainview Medical Group	(516) 822-2541	
Local Hospital Interfaith Medical Center	(718) 613-4000	
Developer	Sam Olsen	Office: 203-788-1332
Field Representative	Chris Anastasiou	Cell: 631-609-7085

6. Training Program

6.1 Hazard Communication

In accordance with 29 CFR 1926, site workers shall, at the time of job assignment, have received hazard communication training. All hazardous materials used on the site will be properly labeled, stored, and handled. SDSs will be available to onsite staff.

6.2 Onsite Safety Briefings

Other onsite personnel will be given health and safety briefings by a FR to assist personnel in safely conducting work activities. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. These safety briefing will be documented on a daily safety briefing form or other appropriate media.

7. Medical Support

In case of minor injuries, onsite care shall be administered with the Site first aid kit. For serious injuries, call 911 and request emergency medical assistance. Seriously injured persons should not be moved, unless they are in immediate danger.

Section 5 and **Appendix A** contain detailed emergency information, including directions to the nearest hospital, and a list of emergency services and their telephone numbers. Field personnel will carry a cellular telephone.

8. Personal Protective Equipment

PPE required for each level of protection is as follows.

Safety Equipment	Level A	Level B	Level C	Level D
Hard hats with splash shields or safety glasses			•	•
Steel-toe boots with overboots as appropriate for work being performed and materials handled			•	•
Protective Leather Work Gloves or Chemical-resistant gloves as needed			•	•
Reflective Vest			•	•
Half- or full-face respirators with HEPA cartridges as approved by the CHSO as needed			•	
Long Pants	•	•	•	•
Welding Helmet				•
Welding Gloves, apron, leggings (as needed)				•
Flame-resistant boots for welding				•

PPE can include hardhats, safety glasses or face shields, steel toe/steel shank boots, hearing protection, nitrile gloves, and leather gloves as necessary.

OSHA Requirements for PPE

All PPE used during the course of this field investigation must meet the following OSHA standards:

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133	ANSI Z87.1 1968
Respiratory	29 CFR 1910.134	ANSI Z88.1 1980
Head	29 CFR 1910.135	ANSI Z89.1 1969
Foot	29 CFR 1910.136	ANSI Z41.1 1999 or ASTM F-2412-2005, and ASTM F-2413-2005

CFR = Code of Federal Regulations

ANSI = American National Standards Institute

ASTM = American Society For Testing and Materials

Any onsite personnel who have the potential to don a respirator must have a valid fit test certification and documentation of medical clearance. The CHSO will maintain such information on file for onsite personnel. The CM will obtain such information from the subcontractor's site supervisor prior to the initiation of any such work. Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.134). Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency.
- IDLH concentrations.
- If contaminant levels exceed designated use concentrations.

For most work conducted at the site, Level D PPE will include long pants, hard hats, safety glasses with side shields, and steel toe safety boots with steel shanks. The CHSO will determine if site works deems an upgrade in PPE. The use of respirators is not anticipated.

Use of Level A or Level B PPE is not anticipated. If conditions indicating the need for Level A or Level B PPE are encountered, personnel will leave the work zone and this CHASP will be revised with oversight of the CHSO, personnel will not re-enter the work zone until conditions allow.

9. Supplemental Contingency Plan Procedures

9.1 Fire

In the event of a fire, all personnel will evacuate the area. The FR will contact the local fire department and report the fire. Notification of evacuation will be made to the client, the CM and the CHSO. The FR or appropriate staff member will account for subcontractor personnel and report their status to the CM.

9.2 Severe Weather

The contingency plan for severe weather includes reviewing the expected weather to determine if severe weather is in the forecast. Severe weather includes high winds over 30 mph, heavy rains or snow squalls, thunderstorms, hurricanes, and lightning storms. If severe weather is approaching, the decision to evacuate staff and subcontractor personnel from the site is the responsibility of the FR. Notification of evacuation will be made to the Project Manager, the Construction Project Manager and the CHSO. The FR will account for onsite staff and report their status to the CM. If safe, work can resume 30 minutes after the last flash of lightning or clap of thunder.

9.3 Spills or Material Release

If a hazardous waste spill or material release occurs, the SSO or their representative, if safe, will immediately assess the magnitude and potential seriousness of the spill or release based on the following:

- SDS, if applicable, for the material spilled or released.
- Source of the release or spillage of hazardous material.
- An estimate of the quantity released and the rate at which it is being released.
- The direction in which the spill or air release is moving.
- Personnel who may be or may have been in contact with the material, or air release, and possible injury or sickness as a result.
- Potential for fire and/or explosion resulting from the situation.
- Estimates of area under influence of release.

If the spill or release is determined to be within the onsite emergency response capabilities, the SSO will ensure implementation of the necessary remedial action. If the release is beyond the capabilities of the site personnel, all personnel will be evacuated from the immediate area and the local fire department will be contacted. The SSO will notify the CM and the CHSO.

9.4 Alcohol and Drug Abuse Prevention

Alcohol and drugs will not be allowed on the work site. Project personnel under the influence of alcohol or drugs will not be allowed to enter the site.

10. Decontamination Procedures

10.1 Personnel Decontamination Station

As needed, a personnel decontamination station where workers can drop equipment and remove PPE will be set up as needed by the Contractor. The PPE area will be equipped with basins for water and detergent, and trash bag(s) or cans for containing disposable PPE and discarded materials. Once personnel have decontaminated at this station and taken off their PPE, they will proceed to a portable sink where they will wash themselves wherever they have potentially been exposed to any contaminants (e.g., hands, face, etc.).

Contaminated PPE (gloves, suits, etc.) will be decontaminated and stored for reuse or placed in plastic bags (or other appropriate container) and disposed of in an approved facility.

Decontamination wastewater and used cleaning fluids will be collected and disposed of in accordance with all applicable state and federal regulations.

10.2 Decontamination Equipment Requirements

If heavily contaminated soils are encountered during intrusive work, the following equipment, as needed, will be in sufficient supply to implement decontamination procedures for equipment.

- Buckets
- Alconox™ detergent concentrate
- Hand pump sprayers
- Long handle soft bristle brushes
- Large sponges
- Cleaning wipes for respirators
- Bench or stool(s)
- Methanol
- Liquid detergent and paper towels
- Plastic trash bags

11. Construction Health and Safety Plan Sign-Off

All personnel conducting site activities must read this Construction Health and Safety Plan, be familiar with its requirements, and agree to its implementation.

All other personnel onsite for regulatory, observational and other activities not directly associated with site activities must read this Health and Safety Plan for hazard communication purposes.

Once the Construction Health and Safety Plan has been read, complete this sign-off sheet, and return it to the Project Manager.

Site Name:

1520 Fulton Street Brooklyn, New York

Activity:

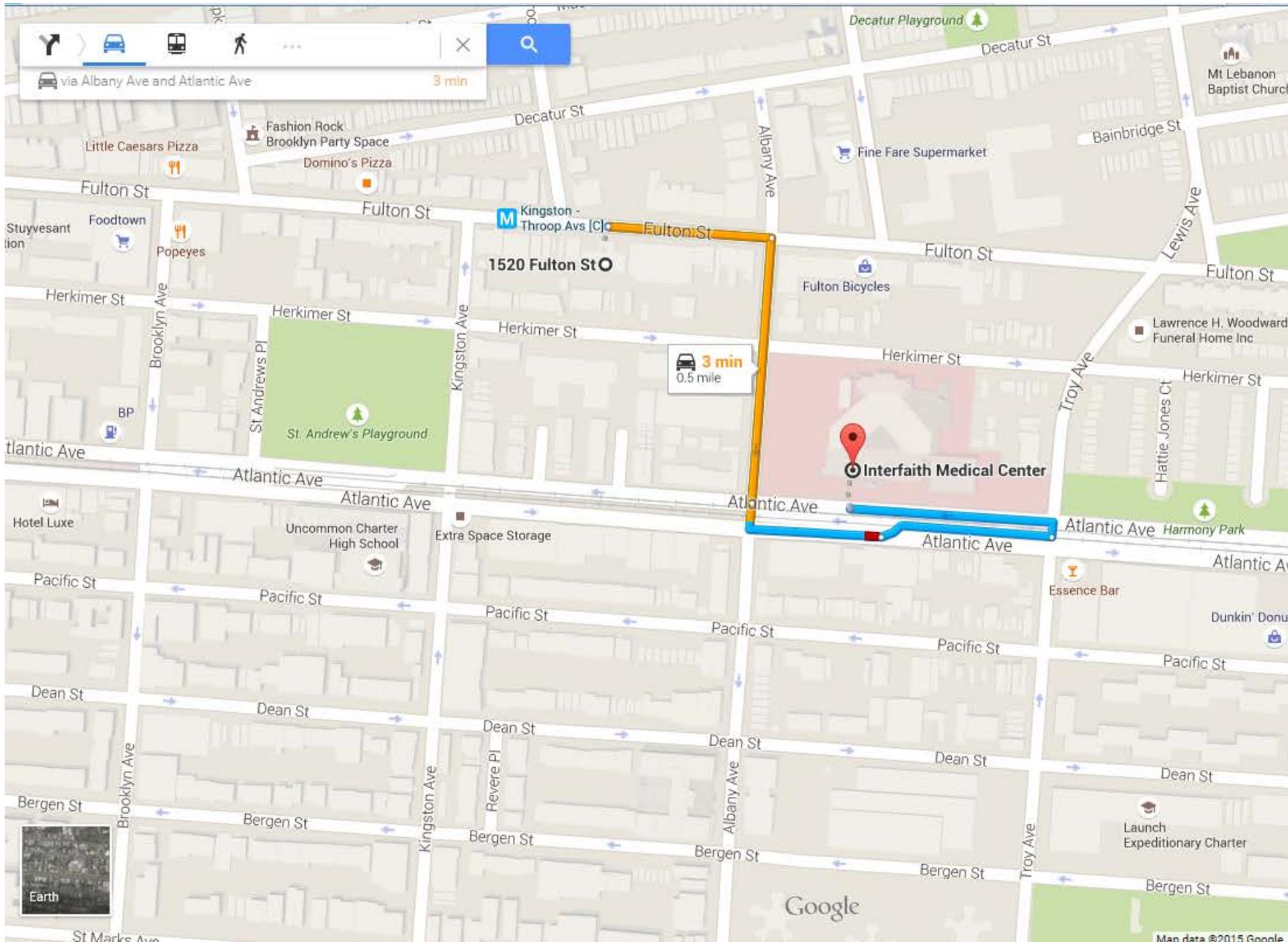
- Building Demolition
- Foundation excavation, loading and removal of site soils
- Site grading
- Installation of Vapor Barrier and Sub-Slab Depressurization System
- Building construction

I have received and read the Health and Safety Plan, been briefed on it, and agree to its implementation.

Name	Signature	Date	Company

CONSTRUCTION HEALTH AND SAFETY PLAN
1520 FULTON STREET
BROOKLYN, NEW YORK
MAY 2015

APPENDIX A
SITE-SPECIFIC INFORMATION



via Albany Ave and Atlantic Ave 3 min

1520 Fulton St

3 min
0.5 mile

Interfaith Medical Center



Google

Map data ©2015 Google

CONSTRUCTION HEALTH AND SAFETY PLAN
1520 FULTON STREET
BROOKLYN, NEW YORK
MAY 2015

APPENDIX B
COLD STRESS GUIDELINES

Cold Stress Guidelines

	Symptoms	What to do
<ul style="list-style-type: none"> ▪ Mild Hypothermia 	<ul style="list-style-type: none"> ▪ Body Temp 98-90°F ▪ Shivering ▪ Lack of coordination, stumbling, fumbling hands ▪ Slurred speech ▪ Memory loss ▪ Pale, cold skin 	<ul style="list-style-type: none"> ▪ Move to warm area ▪ Stay active ▪ Remove wet clothes and replace with dry clothes or blankets ▪ Cover the head ▪ Drink warm (not hot) sugary drink
<ul style="list-style-type: none"> ▪ Moderate Hypothermia 	<ul style="list-style-type: none"> ▪ Body temp 90-86°F ▪ Shivering stops ▪ Unable to walk or stand ▪ Confused irrational 	<ul style="list-style-type: none"> ▪ All of the above, plus: ▪ Call 911 ▪ Cover all extremities completely ▪ Place very warm objects, such as hot packs on the victim's head, neck, chest and groin
<ul style="list-style-type: none"> ▪ Severe Hypothermia 	<ul style="list-style-type: none"> ▪ Body temp 86-78°F ▪ Severe muscle stiffness ▪ Very sleepy or unconscious ▪ Ice cold skin ▪ Death 	<ul style="list-style-type: none"> ▪ Call 911 ▪ Treat victim very gently ▪ Do not attempt to re-warm
<ul style="list-style-type: none"> ▪ Frostbite 	<ul style="list-style-type: none"> ▪ Cold, tingling, stinging or aching feeling in the frostbitten area, followed by numbness ▪ Skin color turns red, then purple, then white or very pale skin ▪ Cold to the touch ▪ Blisters in severe cases 	<ul style="list-style-type: none"> ▪ Call 911 ▪ Do not rub the area ▪ Wrap in soft cloth ▪ If help is delayed, immerse in warm, not hot, water
<ul style="list-style-type: none"> ▪ Trench Foot 	<ul style="list-style-type: none"> ▪ Tingling, itching or burning sensation ▪ Blisters 	<ul style="list-style-type: none"> ▪ Soak feet in warm water, then wrap with dry cloth bandages ▪ Drink a warm sugary drink

CONSTRUCTION HEALTH AND SAFETY PLAN
1520 FULTON STREET
BROOKLYN, NEW YORK
MAY 2015

APPENDIX C
HEAT STRESS GUIDELINES

HEAT STRESS GUIDELINES			
Form	Signs & Symptoms	Care	Prevention³
Heat Rash	Tiny red vesicles in affected skin area. If the area is extensive, sweating can be impaired.	Apply mild lotions and cleanse the affected area.	Cool resting and sleeping areas to permit skin to dry between heat exposures
Heat Cramps	Spasm, muscular pain (cramps) in stomach area and extremities (arms and legs).	Provide replacement fluids with minerals (salt) such as Gatorade.	Adequate salt intake with meals ¹ ACCLIMATIZATION ²
Heat Exhaustion	Profuse sweating, cool (clammy) moist skin, dizziness, confusion, pale skin color, faint, rapid shallow breathing, headache, weakness, muscle cramps.	Remove from heat, sit or lie down, rest, replace lost water with electrolyte replacement fluids (water, Gatorade) take frequent sips of liquids in amounts greater than required to satisfy thirst.	ACCLIMATIZATION ² Adequate salt intake with meals 1 only during early part of heat season. Ample water intake, frequently during the day
Heat Stroke	HOT Dry Skin. Sweating has stopped. Mental confusion, dizziness, nausea, severe headache, collapse, delirium, coma.	HEAT STROKE IS A MEDICAL EMERGENCY - Remove from heat. - COOL THE BODY AS RAPIDLY AS POSSIBLE by immersing in cold (or cool) water, or splash with water and fan. Call for Emergency Assistance. Observe for signs of shock.	ACCLIMATIZATION ² Initially moderate workload in heat (8 to 14 days). Monitor worker's activities.

Footnotes:

- 1) American diets are normally high in salt, sufficient to aid acclimatization. However, during the early part of the heat season, (May, June), one extra shake of salt during one to two meals per day may help, so long as this is permitted by your physician. Check with your personal physician.
- 2) ACCLIMATIZATION - The process of adapting to heat is indicated by worker's ability to perform hot jobs less fluid loss, lower concentrations of salt loss in sweat, and a reduced core (body) temperature and heart rate.
- 3) Method to Achieve Acclimatization - Moderate work or exercise in hot temperatures during early part of heat season. Adequate salt (mineral) and water intake. Gradually increasing work time in hot temperatures. Avoid alcohol. Normally takes 8 to 14 days to achieve acclimatization. Lost rapidly, if removed from strenuous work (or exercise) in hot temperature for more than approximately five days.

CONSTRUCTION HEALTH AND SAFETY PLAN
1520 FULTON STREET
BROOKLYN, NEW YORK
MAY 2015

APPENDIX D
SAFETY DATA SHEETS (SDSs)

Appendix

Material Data Sheets

**VOLATILE ORGANIC COMPOUNDS
(VOCs)**

Volatile Organic Compounds - VOCs

What are VOCs?

Volatile Organic Compounds (VOCs) are chemicals that evaporate easily at room temperature. The term "organic" indicates that the compounds contain carbon. VOC exposures are often associated with an odor while other times there is no odor. Both can be harmful. There are thousands of different VOCs produced and used in our daily lives. Some examples are:

- Benzene
- Toluene
- Methylene Chloride
- Formaldehyde
- Xylene
- Ethylene glycol
- Texanol
- 1,3-butadiene

Where do VOCs come from?

Many products emit or "off-gas" VOCs. Some examples of VOC emission sources are:

- Paints
- Varnishes
- Moth balls
- Solvents
- Gasoline
- Newspaper
- Cooking
- Cleaning Chemicals
- Vinyl floors
- Carpets
- Photocopying
- Upholstery Fabrics
- Adhesives
- Sealing Caulks
- Cosmetics
- Air Fresheners
- Fuel Oil
- Vehicle Exhaust
- Pressed wood furniture
- Environmental Tobacco Smoke (Secondhand smoke)

What levels of VOC are typical in the home?

As of July, 2003 neither Minnesota nor the federal government have set standards for VOC levels in non-occupational settings. However, some guidelines are available. MDH has established Health Risk Values (HRVs) for some contaminants in air for several different exposure situations. For more information on these HRVs go to MDH Health Risk Values Website.

Many studies have shown VOC levels are higher in indoor air than outdoor air. The U.S. Environmental Protection Agency (EPA) Total Exposure Assessment Methodology (TEAM) studies have found indoor VOC levels that were 2 to 5 times higher than outdoors.

Levels of VOC exposure in indoor air vary widely depending on:

- the volume of air in the room/building
- the rate at which the VOC is off-gassed
- the building ventilation rate
- outdoor concentrations

Along with the concentration of VOCs in a given environment, the time an individual spends in that environment is important in determining exposure.

What are the health effects of VOC exposure?

Acute

- Eye irritation / watering
- Nose irritation
- Throat irritation
- Headaches
- Nausea / Vomiting
- Dizziness
- Asthma exacerbation

Chronic

- Cancer
- Liver damage
- Kidney damage
- Central Nervous System damage.



Indoor Air Unit
 P.O. Box 64975
 St. Paul, MN, 55164-0975
 651-201-4601 or 800-798-9050
www.health.state.mn.us/dhrs/eh/air

Volatile Organic Compounds - VOCs - page 2

Most studies to date have been conducted on single chemicals. Less is known about the health effects of combined chemical exposure. The best health protection measure is to limit your exposure to products and materials that contain VOCs when possible. If you think you may be having health problems caused by VOC exposure consult an occupational/environmental health physician who specializes in this area

Are some people at greater risk from VOC exposure than others?

Persons with respiratory problems such as asthma, young children, elderly, and persons with heightened sensitivity to chemicals may be more susceptible to illness from VOC exposure.

How can I tell what levels of VOC are in my home?

Some home screening kits are available to measure total volatile organic compound (TVOC) levels, and some individual VOCs. These home sampling kits should be viewed as providing "ballpark" amount of VOCs in the indoor air. Conditions such as ventilation, temperature and humidity can cause VOC concentrations to fluctuate daily

Prior to testing conduct an inspection of your home for some common sources of VOCs such as:

- New carpeting
- New furniture
- Idling automobile in attached garage
- Recent painting
- Chemicals stored in the home
- Recently applied adhesives
- New plastic or electronic devices

Once you determine the probable source of VOCs, steps can be taken to reduce your exposure. If you are unable to determine the source, a professional indoor air quality investigator / industrial hygienist can be consulted. MDEH has a service provider list along with recommendations on selection. MDH also has a guidance document that can be used for investigating possible VOC contamination entitled "Indoor Air Sampling at VOC contaminated sites"

How do I reduce the levels of VOCs in my home?

Most products containing VOCs will off-gas within a short period of time although some will continue to give off trace amounts of VOCs for a long period of time. The best means of reducing VOC exposure is to eliminate products containing VOCs or use low emitting VOC products.

Some steps you can take to reduce your exposure to VOC in the home are:

- Source control
 - eliminate products from home that have high levels of VOCs
 - purchase new products that contain low or no VOCs (environmentally preferable purchasing)
- Ventilation - open doors and windows, use fans.
- Control climate - as temperature and humidity increase some chemicals will off gas more.
- Treat the source - airtight sealers can be used to coat over some products. However, caution is advised in choosing the coating product as this could introduce new VOCs into the air while controlling for others.
- Air cleaners - look for ones with activated charcoal filtration designed to remove chemicals from the air.
- Remove unused chemicals from the home. Check with city or county for household hazardous waste collection sites.
- Perform renovations when home is unoccupied.

For more information on VOCs or other Indoor Air Quality Issues Contact:

**The Minnesota Department of Health
Indoor Air Unit**

625 Robert Street North, PO Box 64975

St. Paul, MN 55164-0975

651/201-4601 or 800/798-9050

View the Air Quality web page at:

www.health.state.mn.us/divs/eh/air

To require this document in another form contact:

Call 651/201-4601. TTY: 651/201-5797 or Minnesota Relay
Service TTY: 1-800/627-3529.

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**SEMI-VOLATILE ORGANIC COMPOUNDS
(SVOCs)**



U.S. Environmental Protection Agency

Mid-Atlantic Brownfields

Serving: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia

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Semi-Volatile Organic Compounds

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This Fact Sheet is presented by the U. S. Environmental Protection Agency, Region III (EPA) to assist in the selection of analytical parameters and the associated Quality Assurance and Quality Control (QA/QC) procedures to be utilized in Phase II Environmental Assessments under the U.S. Environmental Protection Agency (EPA) Brownfields initiative. This fact sheet is presented for informational purposes only, and should not be construed as a federal policy or directive. The Brownfields Coordinator for this region may be reached at 215-814-5000.

A semivolatile organic compound is an organic compound which has a boiling point higher than water and which may vaporize when exposed to temperatures above room temperature. Semivolatile organic compounds include phenols and polynuclear aromatic hydrocarbons (PAH).

LIST OF SEMIVOLATILE ORGANIC COMPOUNDS *

- Phenol
- Bis(2-chloroethyl)ether
- 2-Chlorophenol
- 1,3-Dichlorobenzene
- 1,4-Dichlorobenzene
- 1,2-Dichlorobenzene
- 2-Methylphenol
- Bis(2-chloroisopropyl)ether
- 4-Methylphenol
- n-Nitroso-di-n-propylamine
- Hexachloroethane
- Nitrobenzene
- Isophorone
- 2-Nitrophenol
- 2,4-Dimethylphenol
- Bis(2-chloroethoxy)methane
- 2,4-Dichlorophenol
- 1,2,4-Trichlorobenzene
- Naphthalene
- 4-Chloroaniline
- Hexachlorobutadiene
- 4-Chloro-3-methylphenol
- 2-Methylnaphthalene
- Hexachlorocyclopentadiene
- 2,4,6-Trichlorophenol
- 2,4,5-Trichlorophenol
- 2-Chloronaphthalene
- 2-Nitroaniline
- Dimethylphthalate
- Acenaphthylene
- 2,6-Dinitrotoluene

- 3-Nitroaniline
- Acenaphthene
- 2,4-Dinitrophenol
- 4-Nitrophenol
- 4-Bromophenyl-phenylether
- Hexachlorobenzene
- Pentachlorophenol
- Phenanthrene
- Anthracene
- Carbazole
- Di-n-butylphthalate
- Fluoranthene
- Pyrene
- Butylbenzylphthalate
- 3,3'-Dichlorobenzidine
- Benzo(a)anthracene
- Chrysene
- Bis(2-ethylhexyl)phthalate
- Di-n-octylphthalate
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(a)pyrene
- Indeno(1,2,3-cd)pyrene
- Dibenz(a,h)anthracene
- Benzo(g,h,i)perylene

* Please note: The list above corresponds to the EPA Contract Laboratory Program (CLP) semivolatile organic list, and is not a complete list of all toxic semivolatile organic compounds. If the site history suggests a semivolatile organic compound may be present which is not on this list, the compound should be included in the requested analysis.

ANALYSIS METHODS

Please note that the methods listed below are EPA approved and the most commonly used by EPA and their contractors. However, they are not the only methods for the analysis of semivolatile organic compounds. In addition, these are not drinking water test methods.

METHOD	APPLICABLE MATRICES
EPA 625 or 1625 (1)	Aqueous
EPA SW-846 3010 or 3020/8250 or 8270 (2)	Aqueous
EPA SW-846 3500 or 3550/8250 or 8270 (2)	Soil/Sediment & Waste
EPA CLP Statement of Work 3/90	Aqueous & Soil/Sediment
EPA SW-846 8100 or 8310 (2) 610 (1)	Water and Soil/Sediment for PAH
EPA SW-846 8040 (2) or 604 (1)	Water and Soil/Sediment for Phenols

1. U.S. Environmental Protection Agency (EPA). 1992. *Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*. Washington, D.C. July.
2. EPA. 1986. *Test Methods for Evaluating Solid Waste*. SW-846. Washington, D.C. September.

COLLECTION MEDIA/VOLUME

Listed below are the EPA-recommended preservation and holding times as well as suggested glassware.

MATRIX	GLASSWARE	VOLUME	PRESERVATIVE	HOLDING TIME
Soil/Sediment	8-oz wide mouthed jar	1 8-oz jar	ice to 4° C	14 days
Aqueous	32-oz amber bottle	2 amber bottles	ice to 4° C	7 days
Waste	8-oz wide mouth jar	1 8-oz jar	none required (ice preferred)	none (try not to exceed 14 days)

MINIMUM LABORATORY QUALITY CONTROL MEASURES

The laboratory should have Standard Operating Procedures available for review for the semivolatile organic compound analyses and for all associated methods needed to complete the semivolatile analysis, such as total solids, instrument maintenance, sample handling, and sample documentation procedures. In addition, the laboratory should have a Laboratory Quality Assurance/Quality Control Statement available for review which includes all key personnel qualifications.

QC TYPE	FREQUENCY OF ANALYSIS	ACCEPTABLE LIMITS
Gas Chromatograph/Mass Spectrometer (GC/MS) Tuning	Once per day or more frequently if required by method	See method criteria for acceptable limits
Initial Calibration	Prior to analysis of samples (minimum three concentration levels for every compound and an instrument blank)	% Relative Standard Deviation of Response Factors of ≤ 30 (see method for any allowable variations), and a minimum Response Factor of ≥ 0.05 (see method for calculation)
Continuing Calibration	Once per day (mid-level standard containing all compounds) or more frequently if required by method	% Difference for Response Factor of ≤ 25 (see method for any allowable variations), and a minimum Response Factor of ≥ 0.05 (see method for calculation)
Method Blank	Once per extraction batch	See method for allowable limits
Internal Standards	Six per sample (see method for suggested internal standard compounds)	-50% to + 100% of Daily standard area and retention time shift (limits depend if packed or capillary column, see method)

Matrix Spike/Matrix Spike Duplicate	One set of MS/MSD per 20 samples or analysis set	See method for allowable limits
Surrogate Spikes	Added to each sample (see method for suggested surrogate compounds)	Report recovery

MINIMUM DATA PACKAGE REQUIREMENTS

- Sample results in a tabular form (if soil or sediment) reported on a dry weight basis.
- Report % moisture or % solids for all soil and sediment samples.
- Report sample volumes or weights, as well as any dilution factors, for each sample analysis.
- Return copy of the chain of custody form sent with the samples with laboratory receipt acknowledgment, and the internal or laboratory chain of custody forms.
- Method blank results.
- GC/MS tuning data summary.
- GC/MS initial and continuing calibration data summary forms.
- GC/MS internal standard data for samples and associated daily standard.
- Surrogate spike recoveries, either on a separate table or with the results, including laboratory QC limits.
- Matrix spike recovery tables, including laboratory recovery and relative percent difference QC limits.
- Date samples were analyzed, on a separate sheet, tune sheet, or results page.
- Optional: sample, standard and blank chromatograms, quantitation sheets, mass spectra, instrument run logs, and total solids logs.

Note: The optional QC must be maintained by laboratory for at least one year for possible future QC audits.

[[Region 3 HSCD](#) | [Region 3](#) | [EPA Superfund](#)]

United States Environmental Protection Agency, 1650 Arch Street, Philadelphia, PA 19103-2029
Phone: (800) 438-2474

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Last updated on Wednesday, September 28th, 2005
URL: <http://www.epa.gov/reg3hwmd/bfs/regional/analytical/semi-volatile.htm>

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

What are polycyclic aromatic hydrocarbons?

(Pronounced pōlī-sī/kŭk ār'e-mātīk hī'dre-kar/benz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

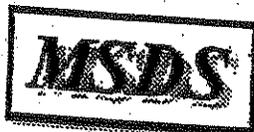
What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.

- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.



Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08855



24 Hour Emergency Telephone: 800-833-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 813-896-8888
Outside U.S. And Canada
Chemtrec: 703-527-3887

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

All non-emergency questions should be directed to Customer Service (1-800-562-2537) for assistance.

ANTHRACENE

1. Product Identification

Synonyms: Paranaphthalene; Green Oil; Anthracene 90-95%
CAS No.: 120-12-7
Molecular Weight: 178.23
Chemical Formula: (C₆H₄CH)₂
Product Codes: B490

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	H
Anthracene	120-12-7	99 - 100%	-

3. Hazards Identification

Emergency Overview

WARNING! MAY CAUSE IRRITATION TO SKIN, EYES, AND

unconscious person. Get medical attention.

Skin Contact:

Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Call a physician if irritation persists.

5. Fire Fighting Measures

Fire:

Flash point: 121C (250F) CC

Low fire hazard when exposed to heat or flames.

Explosion:

Above the flash point, explosive vapor-air mixtures may be formed. Will burst into flame on contact with chromic acid.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

Material Safety Data Sheet

Pyrene, 98+%(gc)

ACC# 27452

Section 1 - Chemical Product and Company Identification

MSDS Name: Pyrene, 98+%(gc)

Catalog Numbers: AC180830000, AC180830250, AC180831000, AC180832500

Synonyms: Benzo[def]phenanthrene

Company Identification:

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

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
129-00-0	Pyrene, ca	96.0	204-927-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow powder.

Danger! Cancer hazard. May be fatal if inhaled. Causes respiratory tract irritation. May be harmful if swallowed. Causes skin irritation. May cause eye irritation. May cause cancer based on animal studies. The toxicological properties of this material have not been fully investigated.

Target Organs: None known.

Potential Health Effects

Eye: May cause eye irritation.

Skin: Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. Dermal applications may cause hyperemia (an excess of blood in a part), weight loss, and hematopoietic changes.

Ingestion: May cause digestive tract disturbances. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.

Inhalation: May be fatal if inhaled. Causes respiratory tract irritation. Inhalation of dust may cause respiratory tract irritation.

Chronic: May cause cancer according to animal studies. Chronic effects may include leukocytosis and lengthened chronaxy of the leg muscle flexors.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Pyrene, ca	0.2 mg/m ³ TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m ³ TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches). 80 mg/m ³ IDLH (listed under Coal tar pitches).	0.2 mg/m ³ TWA (as benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Pyrene, ca: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Powder

Appearance: yellow

Odor: None reported.

pH: Not available.

Vapor Pressure: < 1 mm Hg @20C

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 404 deg C @ 760.00mmHg

Freezing/Melting Point: 156 deg C

Decomposition Temperature: Not available.

Solubility: 1.271

Specific Gravity/Density: Not available.

Molecular Formula: C₁₆H₁₀

Molecular Weight: 202.25

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Physical: No information available.

Other: Reported BCF: rainbow trout, 72); goldfish, 457; fathead minnow, 600-970. Based on these values, minimal to moderate bioconcentration of pyrene in aquatic organisms would be expected.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 129-00-0 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 129-00-0: Effective 6/1/87, Sunset 6/1/97

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 129-00-0: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 129-00-0: 1000 lb TPQ (lower threshold); 10000 lb TPQ (upper threshold)

SARA Codes

CAS # 129-00-0: acute, chronic.

Section 313

No chemicals are reportable under Section 313.

Clean Air Act:

International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

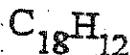
BENZ(a)ANTHRACENE

1,2-Benzoanthracene

Benzo(a)anthracene

2,3-Benzphenanthrene

Naphthanthracene



Molecular mass: 228.3

CAS # 56-55-3

RTECS # CV9275000

ICSC # 0385

EC # 601-033-00-9

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
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, 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.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING

**ENVIRONMENTAL
DATA**

In the food chain important to humans, bioaccumulation takes place, specifically in seafood.

NOTES

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name.

ADDITIONAL INFORMATION

ICSC: 0385

© IPCS, CEC, 1993

BENZ(a)ANTHRACENE

**IMPORTANT
LEGAL
NOTICE:**

Neither the CEC or the IPCS nor any person acting on behalf of 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.

Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

Flash Point: Not applicable.

Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: ; Flammability: 1; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash hands before eating. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Avoid breathing dust.

Storage: Store in a tightly closed container. Store in a cool, dry area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Conditions to Avoid: Dust generation.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 218-01-9: GC0700000

LD50/LC50:

Not available.

Carcinogenicity:

CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Suspect carcinogen (listed as Polycyclic aromatic hydrocarbons).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information available.

Teratogenicity: No information available.

Reproductive Effects: No information available.

Neurotoxicity: No information available.

Mutagenicity: Chrysene was mutagenic to *S. Typhimurium* in the presence of an exogenous metabolic system.

Other Studies: Genotoxicity : *Salmonella typhimurium* TA97,TA98,TA100 with metabolic activation positive (Sakai.M.et al *Mutat.Res*1985); *Saccharomyces cerevisiae* (Miotic recombination) D3 strain 330mg/kg negative.

Section 12 - Ecological Information

Ecotoxicity: Water flea LC50 = 1.9 mg/L; 2 Hr.; Unspecified Fish toxicity : LC50 (96hr) *Neaethes arenacedentata* >1ppm.(Rossi,S.S. et al *Marine Pollut. Bull.* 1978)

Invertebrate toxicity : lethal treshold concentration (24hr) *Daphnia Magna* 0,7æg/l.(* Newsted,J.L. et al *Environ. Toxicol. Chem.* 1987) Bioaccumulation : 24hr *Daphnia Magna* log bioconcentration factor 3.7845 (*)

Environmental: Degradation studies : biodegradated by white rot fungus (Proc.Annu.Meet.Am.Wood-Preserv.Assoc.1989) May be utilised by axenic cultures of microorganisms e.g. *Pseudomonas pancimobilis* EPA505, which may have novel degradative systems(Mueller,J.G. et al *ppl.Environ.Microbiol.*1990; Mueller, J.G. et al *Environ.Sci.Technol.*1991).

Physical: Not found.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Chrysene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 218-01-9: 0.35 μ g/day NSRL (oral)

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 45 May cause cancer.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

S 60 This material and its container must be disposed of as hazardous waste.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 218-01-9: No information available.

Canada - DSL/NDSL

CAS# 218-01-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

Canadian Ingredient Disclosure List

CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/30/1999

Material Safety Data Sheet

Benzo[a]pyrene, 98%

ACC# 37175

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo[a]pyrene, 98%

Catalog Numbers: AC105600000, AC105600010, AC105601000, AC377200000, AC377200010, AC377201000 AC377201000

Synonyms: 3,4-Benzopyrene; 3,4-Benzpyrene; Benzo[def]chrysene.

Company Identification:

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	ETNECS/ELINCS
50-32-8	Benzo[a]pyrene	>96	200-028-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow to brown powder.

Danger! May cause heritable genetic damage. Cancer hazard. May cause harm to the unborn child. May impair fertility. May cause eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Target Organs: Reproductive system.

Potential Health Effects

Eye: May cause eye irritation.

Skin: May cause skin irritation. May be harmful if absorbed through the skin.

Ingestion: May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.

Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. May be harmful if inhaled.

Chronic: May cause cancer in humans. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzo[a]pyrene	0.2 mg/m ³ TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m ³ TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches). 80 mg/m ³ IDLH (listed under Coal tar pitches).	0.2 mg/m ³ TWA (as benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Benzo[a]pyrene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Powder

Appearance: yellow to brown

Odor: faint aromatic odor

pH: Not available.

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 495 deg C @ 760 mm Hg

Freezing/Melting Point: 175 - 179 deg C

Decomposition Temperature: Not available.

Solubility: 1.60x10⁻³ mg/l @25°C

Specific Gravity/Density: Not available.

Molecular Formula: C₂₀H₁₂

Molecular Weight: 252.31

RCRA U-Series:

CAS# 50-32-8: waste number U022.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOL (Benzo{a} pyrene)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOL (Benzo{a} pyrene)
Hazard Class:	9	9
UN Number:	UN3077	UN3077
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 50-32-8 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 50-32-8: acute, chronic.

Section 313

This material contains Benzo[a]pyrene (CAS# 50-32-8, >96%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 50-32-8 can be found on the following state right to know lists: California,

shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.

J.T. Baker SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 2 - Moderate
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Inhalation of dust or vapors can cause headache, nausea, vomiting, extensive sweating, and disorientation. The predominant reaction is delayed intravascular hemolysis with symptoms of anemia, fever, jaundice, and kidney or liver damage.

Ingestion:

Toxic. Can cause headache, profuse perspiration, listlessness, dark urine, nausea, vomiting and disorientation. Intravascular hemolysis may also occur with symptoms similar to those noted for inhalation. Severe cases may produce coma with or without convulsions. Death may result from renal failure.

Skin Contact:

Can irritate the skin and, on prolonged contact, may cause rashes and allergy. "Sensitized" individuals may suffer a severe dermatitis.

Eye Contact:

Vapors and solid causes irritation, redness and pain. Very high exposures can damage the nerves of the eye.

Chronic Exposure:

Has led to cataract formation in eyes. May cause skin allergy.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin, blood or vascular disorders or impaired respiratory function may be more susceptible to the effects of the substance. Particularly susceptible individuals are found in the general population, most commonly in dark skinned races.

manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Keep away from moisture and oxidizers. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

- OSHA Permissible Exposure Limit (PEL):
10 ppm, 50 mg/m³.

- ACGIH Threshold Limit Value (TLV):

TWA= 10 ppm, 52 mg/m³

STEL= 15 ppm, 79 mg/m³.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidizers, strong alkalis and strong mineral acids, mixtures of aluminum trichloride and benzoyl chloride. Reacts violently with chromic anhydride. Melted naphthalene will attack some forms of plastics, rubber, and coatings.

Conditions to Avoid:

Avoid heat, sparks, flames and other ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 490 mg/kg;

Inhalation rat LC50: 340 mg/m³, 1 hour;

Skin rabbit LD50: > 20 g/kg;

Irritation data: skin (open Draize) rabbit 495 mg, mild; eye (standard Draize) rabbit 100 mg, mild;

Investigated as a tumorigen, mutagen and reproductive effector.

----- \Cancer Lists\ -----

Ingredient

---NTP Carcinogen---

Known

Anticipated

IARC Categ

Naphthalene (91-20-3)

No

No

None

12. Ecological Information

Environmental Fate:

When released into the soil, this material may biodegrade to a moderate extent.

When released into the soil, this material is expected to leach into groundwater.

When released into the soil, this material is expected to quickly evaporate. When released into water, this material is expected to quickly evaporate. When released into the

water, this material may biodegrade to a moderate extent. When released into the water, this material is expected to have a half-life between 1 and 10 days. This

material may bioaccumulate to some extent. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced

hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.

Environmental Toxicity:

No information found.

Ingredient

Naphthalene (91-20-3)

	---Canada---			
	Korea	DSL	NDSL	Phil.
	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1 \

Ingredient

Naphthalene (91-20-3)

	-SARA 302-		-----SARA 313-----	
	RO	TPQ	List	Chemical C
	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2 \

Ingredient

Naphthalene (91-20-3)

	CERCLA	-RCRA-	-TSCA-
	100	261.33	8(d)
		U165	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
 Reactivity: No (Pure / Solid)

Australian Hazchem Code: 2Z

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 2 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.

Label Precautions:

- Avoid contact with eyes, skin and clothing.
- Avoid prolonged or repeated contact with skin.
- Avoid breathing dust.
- Avoid breathing vapor.
- Keep container closed.
- Use only with adequate ventilation.
- Wash thoroughly after handling.

This information was last updated on July 15, 2004. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

given here.)

ORL-RAT LDLO 1500 mg kg⁻¹

IPR-RAT LDLO 250 mg kg⁻¹

ITR-RAT LDLO 25 mg kg⁻¹

IPR-MUS LDLO 100 mg kg⁻¹

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

Hazard class 4.1. Packing group III. UN No 1325.

Personal protection

Safety glasses and gloves. Good ventilation and an inert atmosphere if working with powdered material.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on September 17, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

given here.)

IPR-MUS LD50 3.5 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)

R11 R36 R37 R38 (all for the powdered material only).

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

UN Nos: 3089 (very fine powder), 3077 (fine powder); otherwise considered non-hazardous for air, sea and road freight.

Personal protection

Suitable ventilation if handling powder.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on November 16, 2004. Although we have tried to make it as accurate and useful as possible, we can take no responsibility for its use or misuse.

spontaneously. May react violently with titanium, ammonium nitrate, potassium perchlorate, hydrazoic acid. Incompatible with acids, oxidizing agents, sulfur.

Toxicology

Carcinogen. Toxic by all routes of entry. May cause sensitization by skin contact. Typical TLV 0.05 mg/m³

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

IPR-RAT LD50 250 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)

R10 R17 R36 R37 R38 R40 R42 R43.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

UN No 3089. Packing group II. Hazard class 4.1.

Personal protection

Good ventilation. Wear gloves and safety glasses when handling the powder.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)

S16 S22 S26 S36.

PESTICIDES AND PCBs



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Assessing Health Risks from Pesticides

January 1999
735-F-99-002

The Federal Government, in cooperation with the States, carefully regulates pesticides to ensure that they do not pose unreasonable risks to human health or the environment. As part of that effort, the Environmental Protection Agency (EPA) requires extensive test data from pesticide producers that demonstrate pesticide products can be used without posing harm to human health and the environment. EPA scientists and analysts carefully review these data to determine whether to register (license) a pesticide product or a use and whether specific restrictions are necessary. This fact sheet is a brief overview of EPA's process for assessing potential risks to human health when evaluating pesticide products.

Background

There are more than 865 active ingredients registered as pesticides, which are formulated into thousands of pesticide products that are available in the marketplace. About 350 pesticides are used on the foods we eat, and to protect our homes and pets.

EPA plays a critical role in evaluating these chemicals prior to registration, and in reevaluating older pesticides already on the market, to ensure that they can be used with a reasonable certainty of no harm. The process EPA uses for evaluating the health impacts of a pesticide is called risk assessment.

EPA uses the National Research Council's four-step process for human health risk assessment:

Step One: Hazard Identification

Step Two: Dose-Response Assessment

Step Three: Exposure Assessment

Step Four: Risk Characterization

Step One: Hazard Identification (Toxicology)

The first step in the risk assessment process is to identify potential health effects that may occur from different types of pesticide exposure. EPA considers the full spectrum of a pesticide's potential health effects.

Generally, for human health risk assessments, many toxicity studies are conducted on animals by pesticide companies in independent laboratories and evaluated for acceptability by EPA scientists. EPA evaluates pesticides for a wide range of adverse effects, from eye and skin irritation to cancer and birth defects in laboratory animals. EPA may also consult the public literature or other sources of supporting information on any aspect of the chemical.

Step Two: Dose-Response Assessment

Paracelsus, the Swiss physician and alchemist, the "father" of modern toxicology (1493-1541) said,

"The dose makes the poison."

In other words, the amount of a substance a person is exposed to is as important as how toxic the chemical might be. For example, small doses of aspirin can be beneficial to people, but at very high doses, this common medicine can be deadly. In some individuals, even at very low doses, aspirin may be deadly.

Dose-response assessment involves considering the dose levels at which adverse effects were observed in test animals, and using these dose levels to calculate an equal dose in humans.

Step Three: Exposure Assessment

People can be exposed to pesticides in three ways:

1. Inhaling pesticides (inhalation exposure),
2. Absorbing pesticides through the skin (dermal exposure), and
3. Getting pesticides in their mouth or digestive tract (oral exposure).

Depending on the situation, pesticides could enter the body by any one or all of these routes. Typical sources of pesticide exposure include:

- **Food**
Most of the foods we eat have been grown with the use of pesticides. Therefore, pesticide residues may be present inside or on the surfaces of these foods.

- **Home and Personal Use Pesticides**
You might use pesticides in and around your home to control insects.

EPA: Pesticides - Assessing Health Risks from Pesticides

Page 2 of 5

Step Two: Dose-Response Assessment

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Dose-response assessment involves considering the dose levels at which adverse effects were observed in test animals, and using these dose levels to calculate an equal dose in humans.

Step Three: Exposure Assessment

People can be exposed to pesticides in three ways:

considered, and broad conclusions are made. EPA's role is to evaluate both toxicity and exposure and to determine the risk associated with use of the pesticide.

Simply put,

$$\text{RISK} = \text{TOXICITY} \times \text{EXPOSURE}.$$

This means that the risk to human health from pesticide exposure depends on both the toxicity of the pesticide and the likelihood of people coming into contact with it. At least *some* exposure and *some* toxicity are required to result in a risk. For example, if the pesticide is very poisonous, but no people are exposed, there is no risk. Likewise, if there is ample exposure but the chemical is non-toxic, there is no risk. However, usually when pesticides are used, there is some toxicity and exposure, which results in a potential risk.

EPA recognizes that effects vary between animals of different species and from person to person. To account for this variability, *uncertainty factors* are built into the risk assessment. These uncertainty factors create an additional margin of safety for protecting people who may be exposed to the pesticides. FQPA requires EPA to use an extra 10-fold safety factor, if necessary, to protect infants and children from effects of the pesticide.

Types of Toxicity Tests EPA Requires for Human Health Risk Assessments

EPA evaluates studies conducted over different periods of time and that measure specific types of effects. These tests are evaluated to screen for potential health effects in infants, children and adults.

Acute Testing: Short-term exposure; a single exposure (dose).

- Oral, dermal (skin), and inhalation exposure
- Eye irritation
- Skin irritation
- Skin sensitization
- Neurotoxicity

Sub-chronic Testing: Intermediate exposure; repeated exposure over a longer period of time (i.e., 30-90 days).

- Oral, dermal (skin), and inhalation
- Neurotoxicity (nerve system damage)

Chronic Toxicity Testing: Long-term exposure; repeated exposure lasting for most of the test animal's life span. Intended to determine the effects of a pesticide after prolonged and repeated exposures.

- Chronic effects (non-cancer)
- Carcinogenicity (cancer)

Developmental and Reproductive Testing: Identify effects in the fetus of an exposed pregnant female (birth defects) and how pesticide exposure affects the ability of a test animal to successfully reproduce.

Mutagenicity Testing: Assess a pesticide's potential to affect the cell's genetic components.

Hormone Disruption: Measure effects for their potential to disrupt the endocrine system. The endocrine system consists of a set of glands and the hormones they produce that help guide the development, growth, reproduction, and behavior of animals including humans.

Risk Management

Once EPA completes the risk assessment process for a pesticide, we use this information to determine if (when used according to label directions), there is a reasonable certainty that the pesticide will not harm a person's health.

Using the conclusions of a risk assessment, EPA can then make a more informed decision regarding whether to approve a pesticide chemical or use, as proposed, or whether additional protective measures are necessary to limit occupational or non-occupational exposure to a pesticide. For example, EPA may prohibit a pesticide from being used on certain crops because consuming too much food treated with the pesticide may result in an unacceptable risk to consumers. Another example of protective measures is requiring workers to wear personal protective equipment (PPE) such as a respirator or chemical resistant gloves, or not allowing workers to enter treated crop fields until a specific period of time has passed.

If, after considering all appropriate risk reduction measures, the pesticide still does not meet EPA's safety standard, the Agency will not allow the proposed chemical or use. Regardless of the specific measures enforced, EPA's primary goal is to ensure that legal uses of the pesticide are protective of human health, especially the health of children, and the environment.

Human Health Risk Assessment and the Law

Federal law requires detailed evaluation of pesticides to protect human health and the environment. In 1996, Congress made significant changes to strengthen pesticide laws through the Food Quality Protection Act (FQPA). Many of these changes are key elements of the current risk assessment process. FQPA required that EPA consider:

- **A New Safety Standard:** FQPA strengthened the safety standard that pesticides must meet before being approved for use. EPA must ensure with a reasonable certainty that no harm will result from the legal uses of the pesticide.
- **Exposure from All Sources:** In evaluating a pesticide, EPA must estimate the combined risk from that pesticide from all non-occupational sources, such as:
 - Food Sources
 - Drinking Water Sources
 - Residential Sources
- **Cumulative Risk:** EPA is required to evaluate pesticides in light of similar toxic effects that different pesticides may share, or "a common mechanism of toxicity." At this time, EPA is developing a methodology for this type of assessment.
- **Special Sensitivity of Children to Pesticides:** EPA must ascertain whether there is an increased susceptibility from exposure to the pesticide to infants and children. EPA must build an additional 10-fold safety factor into risk assessments to ensure the protection of infants and children, unless it is determined that a lesser margin of safety will be safe for infants and children.

For More Information

<http://www.epa.gov/pesticides/factsheets/riskassess.htm>

If you would like more information about EPA's pesticide programs, contact the Communication Service Branch at (703) 305-5017 or visit the [Pesticides Web site](#).

For more information on specific pesticides, or to inquire about the symptoms of pesticide poisoning, call the National Pesticide Information Center (NPIC), a toll-free hotline information at: 1-800-858-7378, or visit their [Web site](#) [\[EPA Disclaimer\]](#)

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Last updated on Monday, May 19th, 2003
URL: <http://www.epa.gov/pesticides/factsheets/riskassess.htm>

What is a Pesticide?

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Pests can be insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses. Though often misunderstood to refer only to *insecticides*, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. Under United States law, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

Many household products are pesticides. Did you know that all of these common products are considered pesticides?

- Cockroach sprays and baits
- Insect repellents for personal use.
- Rat and other rodent poisons.
- Flea and tick sprays, powders, and pet collars.
- Kitchen, laundry, and bath disinfectants and sanitizers.
- Products that kill mold and mildew.
- Some lawn and garden products, such as weed killers.
- Some swimming pool chemicals.

By their very nature, most pesticides create some risk of harm to humans, animals, or the environment because they are designed to kill or otherwise adversely affect living organisms. At the same time, pesticides are useful to society because of their ability to kill potential disease-causing organisms and control insects, weeds, and other pests. In the United States, the Office of Pesticide Programs of the Environmental Protection Agency is chiefly responsible for regulating pesticides. Biologically-based pesticides, such as pheromones and microbial pesticides, are becoming increasingly popular and often are safer than traditional chemical pesticides.

Here are some common kinds of pesticides and their function:

Algicides

Control algae in lakes, canals, swimming pools, water tanks, and other sites.

Antifouling agents

Kill or repel organisms that attach to underwater surfaces, such as boat bottoms.

Antimicrobials

Kill microorganisms (such as bacteria and viruses).

Attractants

Attract pests (for example, to lure an insect or rodent to a trap). (However, food is not considered a pesticide when used as an attractant.)

Biocides

Kill microorganisms.

Disinfectants and sanitizers

Kill or inactivate disease-producing microorganisms on inanimate objects.

Fungicides

Kill fungi (including blights, mildews, molds, and rusts).

Fumigants

Produce gas or vapor intended to destroy pests in buildings or soil.

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

- PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.
- PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.
- PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.
- PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these

aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

- Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.
- Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.
- Breathing air near hazardous waste sites and drinking contaminated well water.
- In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects

POLYCHLORINATED BIPHENYLS

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported. In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

- You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.
- Children should be told not play with old appliances,

electrical equipment, or transformers, since they may contain PCBs.

- Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.
- If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



METALS

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Contact**Heavy Metals**Ads by GoogleHeavy Metals AnalysisArsenic PoisoningSoil ContaminationEnvironmentEnvironment Health and Safety**Introduction**

The **term heavy metal** refers to any metallic chemical element that is toxic or poisonous at low concentrations. Examples of heavy metals are mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), and lead (Pb).

Heavy metals are natural components of the Earth's crust. They cannot be degraded or destroyed, and they enter our bodies via food, drinking water and air. As trace elements, some heavy metals (e.g. copper) are essential to maintain the metabolism of the human body. However, at higher concentrations they can cause metal poisoning could result, for instance, from drinking-water contamination (e.g. lead pipes), high concentrations near emission sources, or intake via the food chain.

Heavy metals are dangerous because they tend to **bioaccumulate**. Bioaccumulation means an increase of a chemical in a biological organism over time, compared to the chemical's concentration in the environment. Heavy metals accumulate in living things any time they are taken up and stored faster than they are broken down and excreted.

Heavy metals can enter a water supply by industrial and consumer waste, or even from acidic rain that releases heavy metals into streams, lakes, rivers, and groundwater.

Environmental and health risks.

Now we are going to describe the effects of the heavy metals in the environment. The three most prominent are Lead, Cadmium, and Mercury.

Effects of Antimony on the environment

Antimony is a metal used in the compound antimony trioxide, a flame retardant. It can also be found in pigments, dyes, and ceramics and glass. Exposure to high levels of antimony for short periods of time causes nausea and vomiting. There is little information on the effects of long-term antimony exposure, but it is a suspected human carcinogen. Antimony compounds do not bioaccumulate in aquatic life.

Effects of Cadmium on the environment

Cadmium derives its toxicological properties from its chemical similarity to zinc an essential micronutrient for humans. Cadmium is biopersistent and, once absorbed by an organism, remains resident for months (for humans) although it is eventually excreted.

In humans, long-term exposure is associated with renal dysfunction. High exposure can lead to obstructive pulmonary disease, which has been linked to lung cancer, although data concerning the latter are difficult to interpret due to confounding factors. Cadmium may also produce bone defects (*osteomalacia*, *osteoporosis*) in humans and animals. In animals, it is linked to increased blood pressure and effects on the myocardium in animals, although most human findings are inconclusive.

The average daily intake for humans is estimated as 0.15µg from air and 1µg from water. Smoking can lead to the inhalation of around 2-4µg of cadmium, but levels may vary widely.

In what form is emitted Cadmium?

Cadmium is produced as an inevitable by-product of zinc (or occasionally lead) refining, since these within the raw ore. However, once collected the cadmium is relatively easy to recycle.

The most significant use of cadmium is in nickel/cadmium batteries, as rechargeable or secondary p high output, long life, low maintenance and high tolerance to physical and electrical stress. Cadmium corrosion resistance, particularly in high stress environments such as marine and aerospace applications, reliability is required; the coating is preferentially corroded if damaged. Other uses of cadmium are PVC, in alloys and electronic compounds. Cadmium is also present as an impurity in several product fertilisers, detergents and refined petroleum products.

In the general, non-smoking population the major exposure pathway is through food, via the addition of agricultural soil from various sources (atmospheric deposition and fertiliser application) and uptake. Additional exposure to humans arises through cadmium in ambient air and drinking water.

Effects of Chromium on the environment

Chromium is used in metal alloys and pigments for paints, cement, paper, rubber, and other materials. Chromium can irritate the skin and cause ulceration. Long-term exposure can cause kidney and liver damage, circulatory and nerve tissue. Chromium often accumulates in aquatic life, adding to the danger of e been exposed to high levels of chromium.

Effects of Copper on the environment

Copper is an essential substance to human life, but in high doses it can cause anemia, liver and kidney and intestinal irritation. People with Wilson's disease are at greater risk for health effects from overexposure. Copper normally occurs in drinking water from copper pipes, as well as from additives designed to c

Effects of Lead on the environment

In humans exposure to lead can result in a wide range of biological effects depending on the level and duration. Various effects occur over a broad range of doses, with the developing foetus and infant being more susceptible. High levels of exposure may result in toxic biochemical effects in humans which in turn cause problems such as anaemia, effects on the kidneys, gastrointestinal tract, joints and reproductive system, and acute lead poisoning of the nervous system.

Lead poisoning, which is so severe as to cause evident illness, is now very rare indeed. At intermediate levels, however, there is persuasive evidence that lead can have small, subtle, subclinical effects, particularly on the development of children. Some studies suggest that there may be a loss of up to 2 IQ points for a child with a blood lead level of 10 to 20µg/dl in young children.

Average daily lead intake for adults in the UK is estimated at 1.6µg from air, 20µg from drinking water and 1.6µg from food. Although most people receive the bulk of their lead intake from food, in specific populations other sources are important, such as water in areas with lead piping and plumbers' solvent water, air near point of source, lead paint flakes in old houses or contaminated land. Lead in the air contributes to lead levels in food through deposition of rain containing the metal, on crops and the soil. For the majority of people in the UK, however, the average daily intake is well below the provisional tolerable weekly intake recommended by the UN Food and Agriculture Organisation.

In what form is emitted lead?

Lead in the environment arises from both natural and anthropogenic sources. Exposure can occur through food, air, soil and dust from old paint containing lead. In the general non-smoking, adult population the major pathway is from food and water. Food, air, water and dust/soil are the major potential exposure pathways for young children. For infants up to 4 or 5 months of age, air, milk formulae and water are the significant exposure pathways.

Lead is among the most recycled non-ferrous metals and its secondary production has therefore grown despite declining lead prices. Its physical and chemical properties are applied in the manufacturing, construction and other industries. It is easily shaped and is malleable and ductile. There are eight broad categories of use: (no longer allowed in the EU), rolled and extruded products, alloys, pigments and compounds, cable and ammunition.

Effects of Mercury on the environment

Mercury is a toxic substance which has no known function in human biochemistry or physiology and is highly toxic in living organisms. Inorganic mercury poisoning is associated with tremors, gingivitis and/or minor neurological effects together with spontaneous abortion and congenital malformation.

Monomethylmercury causes damage to the brain and the central nervous system, while foetal and perinatal exposure given rise to abortion, congenital malformation and development changes in young children.

In what form is emitted Mercury?

Mercury is a global pollutant with complex and unusual chemical and physical properties. The major source of mercury is the degassing of the Earth's crust, emissions from volcanoes and evaporation from natural bodies of water.

World-wide mining of the metal leads to indirect discharges into the atmosphere. The usage of mercury in industrial processes and in various products (e.g. batteries, lamps and thermometers). It is also used in dental amalgam for fillings and by the pharmaceutical industry. Concern over mercury in the environment has led to the development of toxic forms in which mercury can occur.

Mercury is mostly present in the atmosphere in a relatively unreactive form as a gaseous element. The short lifetime (of the order of 1 year) of its gaseous form means the emission, transport and deposition of mercury is highly variable.

Natural biological processes can cause methylated forms of mercury to form which bioaccumulate and concentrate in living organisms, especially fish. These forms of mercury: monomethylmercury and dimethylmercury are highly toxic, causing neurotoxicological disorders. The main pathway for mercury to humans is through the inhalation of gaseous mercury.

The main sources of mercury emissions in the UK are from the manufacture of chlorine in mercury cells, production, coal combustion and crematoria. UK emissions of mercury are uncertain and it is estimated to be between 13 to 36 tonnes per year (DERA). Emissions are estimated to have declined by around ¾'s between 1990 and 2000 due to improved controls on mercury cells and their replacement, and the fall in coal use.

Whilst there has been a decline in the level of European emissions of mercury, emissions from outside the EU are increasing - increasing the level of ambient concentrations in the continent.

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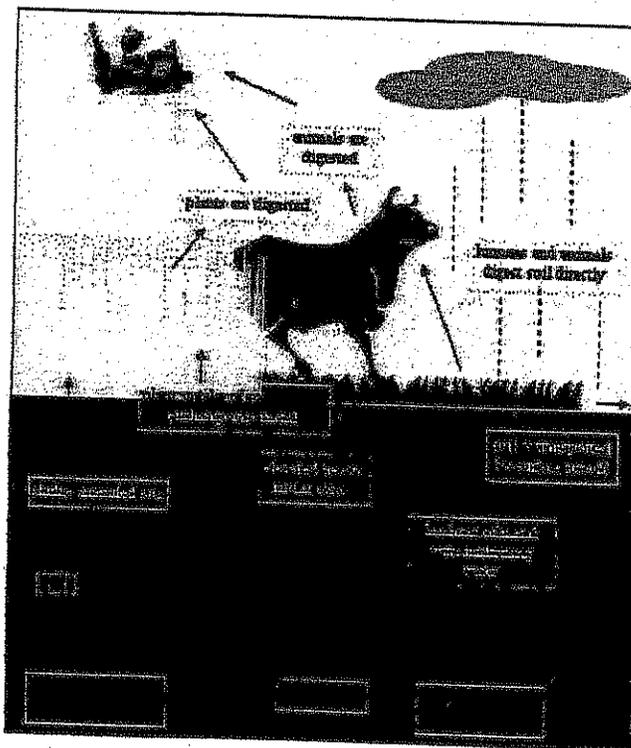
effects of Nickel on the environment

Small amounts of Nickel are needed by the human body to produce red blood cells, however, in excess become mildly toxic. Short-term overexposure to nickel is not known to cause any health problems, can cause decreased body weight, heart and liver damage, and skin irritation. The EPA does not cur levels in drinking water. Nickel can accumulate in aquatic life, but its presence is not magnified along

Effects of Selenium on the environment

Selenium is needed by humans and other animals in small amounts, but in larger amounts can cause system, fatigue, and irritability. Selenium accumulates in living tissue, causing high selenium concentration organisms, and causing greater health problems in human over a lifetime of overexposure. These include and fingernail loss, damage to kidney and liver tissue, damage to circulatory tissue, and more severe system.

Heavy Metals adsorption process:



In the picture we can observe the way that follows the heavy metals from the first step of the pollution human body by means the food.

The most important disasters with heavy metals:

1932

Minamata
Sewage containing mercury is released by Chisso's chemicals works into Minimata Bay in Japan. The mercury accumulates in sea creatures, leading eventually to mercury poisoning in the population.
1952
Minamata Syndrome
In 1952, the first incidents of mercury poisoning appear in the population of Minimata Bay in Japan, caused by consumption of fish polluted with mercury, bringing over 500 fatalities. Since then, Japan has had the strictest environmental laws in the industrialised world.
1986-11-01
Sandoz
Water used to extinguish a major fire carries c. 30 t fungicide containing mercury into the Upper Rhine. Fish are killed over a stretch of 100 km. The shock drives many FEA projects forwards. See also "Pollution of the Rhine at Basel / Sandoz".
1998-04
Spanish nature reserve contaminated after environmental disaster
Toxic chemicals in water from a burst dam belonging to a mine contaminate the Coto de Donana nature reserve in southern Spain. C. 5 million m ³ of mud containing sulphur, lead, copper, zinc and cadmium flow down the Rio Guadimar. Experts estimate that Europe's largest bird sanctuary, as well as Spain's agriculture and fisheries, will suffer permanent damage from the pollution.

Suggested reading for Heavy Metals

Heavy Metal Analysis Test
 Hair Analysis Reveals Toxic Metals Full
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 Real-time, In-Situ Characterization No
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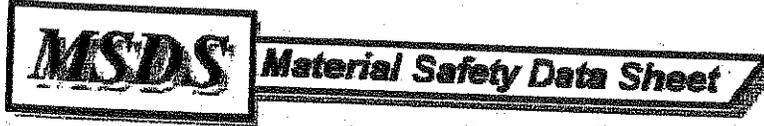
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MSDS Number: A7441 * * * * * Effective Date: 11/12/03 * * * * * Supercedes: 02/23/01



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222 Red School Lane
Phillipsburg, NJ 08855



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CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-8866
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC, and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, explosion or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-900-582-2537) for assistance.

ARSENIC, 1,000 UG/ML OR 10,000 UG/ML

1. Product Identification

Synonyms: None
CAS No.: Not applicable to mixtures.
Molecular Weight: Not applicable to mixtures.
Chemical Formula: Not applicable to mixtures.
Product Codes: 5704, 5718, 6442

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Arsenic	7440-38-2	0.1 - 1%	Yes
Nitric Acid	7697-37-2	< 4%	Yes
Water	7732-18-5	> 95%	No

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. AFFECTS LIVER, KIDNEYS, LUNGS AND TEETH. CANCER HAZARD. CONTAINS INORGANIC ARSENIC WHICH CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure.

J.T. Baker SAF-T-DATA^(SM) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Cancer Causing)

Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe (Corrosive)

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: White (Corrosive)

Potential Health Effects

Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a poison. The health effects from exposure to diluted forms of this chemical are not well documented. They are expected to be less severe than those for concentrated forms which are referenced in the descriptions below.

Inhalation:

Corrosive! Inhalation of vapors can cause breathing difficulties and lead to pneumonia and pulmonary edema, which may be fatal. Other symptoms may include coughing, choking, and irritation of the nose, throat, and respiratory tract. Arsenic may cause inflammation of the mucous membranes with cough and foamy sputum, restlessness, dyspnea, cyanosis, and rales. Symptoms like those from ingestion exposure may follow. May cause pulmonary edema.

Ingestion:

Corrosive! Swallowing nitric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. Arsenic is highly toxic! May cause burning in esophagus, vomiting, and bloody diarrhea. Symptoms of cold and clammy skin, low blood pressure, weakness, headache, cramps, convulsions, and coma may follow. May cause damage to liver and kidneys. A suspected fetal toxin. Death may occur from circulatory failure. Estimated lethal dose 120 milligrams.

Skin Contact:

Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and stain skin a yellow or yellow-brown color.

Eye Contact:

Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.

Chronic Exposure:

Long-term exposure to concentrated vapors may cause erosion of teeth and lung damage. Long-term exposures seldom occur due to the corrosive properties of the acid. Arsenic on repeated or prolonged skin contact may cause bronzing of the skin, edema, dermatitis, and lesions. Repeated or prolonged inhalation of dust may cause damage to the nasal septum. Chronic exposure from inhalation or ingestion may cause hair and weight loss, a garlic odor

to the breath and perspiration, excessive salivation and perspiration, central nervous system damage, hepatitis, gastrointestinal disturbances, cardiovascular damage, and kidney and liver damage. Arsenic compounds are known human carcinogens and may be teratogenic based on effects in laboratory animals.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, eye disease, or cardiopulmonary diseases may be more susceptible to the effects of this substance.

4. First Aid Measures

Immediate first aid treatment reduces the health effects of this substance. First aid procedures given apply to concentrated solutions. Exposures to dilute solutions may not require these extensive first aid procedures.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

If swallowed, give large quantities of water to drink and get medical attention immediately. Never give anything by mouth to an unconscious person.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately. Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to this substance.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

If emesis is unsuccessful after two doses of Ipecac, consider gastric lavage. Monitor urine arsenic level. Alkalinization of urine may help prevent disposition of red cell breakdown products in renal tubular cells. If acute exposure is significant, maintain high urine output and monitor volume status, preferably with central venous pressure line. Abdominal X-rays should be done routinely for all ingestions. Chelation therapy with BAL, followed by n-penicillamine is recommended, but specific dosing guidelines are not clearly established.

5. Fire Fighting Measures

Fire:

Not combustible, but concentrated material is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

Explosion:

Concentrated material reacts explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc. Reacts with most metals to release hydrogen gas which can form explosive

mixtures with air.

Fire Extinguishing Media:

If involved in a fire, use water spray.

Special Information:

Increases the flammability of combustible, organic and readily oxidizable materials. In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® or TEAM® 'Low Na+' acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

For Nitric Acid:

OSHA Permissible Exposure Limit (PEL):

2 ppm (TWA)

ACGIH Threshold Limit Value (TLV):

2 ppm (TWA); 4 ppm (STEL)

For Inorganic Arsenic compounds (as As):

- OSHA Permissible Exposure Limit (PEL):

10 ug/m³ (TWA), 5 ug/m³ (Action Level), cancer hazard.

- ACGIH Threshold Limit Value (TLV):

0.01 mg/m³ (TWA), A1, confirmed human carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airtight hood, or full-facepiece self-contained breathing apparatus. Canister-type respirators using sorbents are ineffective.

Skin Protection:

Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:

Any area where inorganic arsenic is stored, handled, used, etc., must be established as a 'Regulated Area' with controlled access, limited to authorized persons. Containers of inorganic arsenic and Regulated Areas must be labeled to show a **CANCER SUSPECT AGENT** is present. Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing arsenic or lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (arsenic: 29 CFR 1910.1018; lead: 29 CFR 1910.1025).

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Odorless.

Solubility:

Infinitely soluble.

Specific Gravity:

No information found.

pH:

No information found.

% Volatiles by volume @ 21C (70F):

> 99

Boiling Point:

No information found.

Melting Point:

No information found.

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

No information found.

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Containers may burst when heated.

Hazardous Decomposition Products:

When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate. Emits toxic fumes of arsenic when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

A dangerously powerful oxidizing agent, concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.

Conditions to Avoid:

Heat, incompatibles.

11. Toxicological Information

Toxicological Data:

For arsenic: oral rat LD50: 763 mg/kg. Investigated as a tumorigen, mutagen, reproductive effector. For Nitric Acid: Investigated as a mutagen and reproductive effector.

Carcinogenicity:

For arsenic and inorganic arsenic compounds:

Regulated by OSHA as a carcinogen.

EPA / IRIS classification: Group A - Known human carcinogen.

-----\Cancer Lists\-----

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Arsenic (7440-38-2)	Yes	No	1
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
(NITRIC ACID)

Hazard Class: 8

UN/NA: UN3264

Packing Group: III

Information reported for product/size: 500ML

International (Water, I.M.O.)

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
(NITRIC ACID)

Hazard Class: 8

UN/NA: UN3264

Packing Group: III

Information reported for product/size: 500ML

International (Air, I.C.A.O.)

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
(NITRIC ACID)

Hazard Class: 8

UN/NA: UN3264

Packing Group: III

Information reported for product/size: 500ML

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan	Australia
Arsenic (7440-38-2)	Yes	Yes	No	Yes
Nitric Acid (7697-37-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	--Canada--		Phil.
		DSL	NDSL	
Arsenic (7440-38-2)	Yes	Yes	No	Yes
Nitric Acid (7697-37-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
Arsenic (7440-38-2)	No	No	Yes	Arsenic comp
Nitric Acid (7697-37-2)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8 (d)
Arsenic (7440-38-2)	1	No	No
Nitric Acid (7697-37-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Mixture / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: None allocated.

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 3 Flammability: 0 Reactivity: 0

Label Hazard Warning:

DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL

BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. AFFECTS LIVER, KIDNEYS, LUNGS AND TEETH. CANCER HAZARD. CONTAINS INORGANIC ARSENIC WHICH CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure.

Label Precautions:

- Do not get in eyes, on skin, or on clothing.
- Do not breathe vapor or mist.
- Use only with adequate ventilation.
- Wash thoroughly after handling.
- Keep container closed.

Label First Aid:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

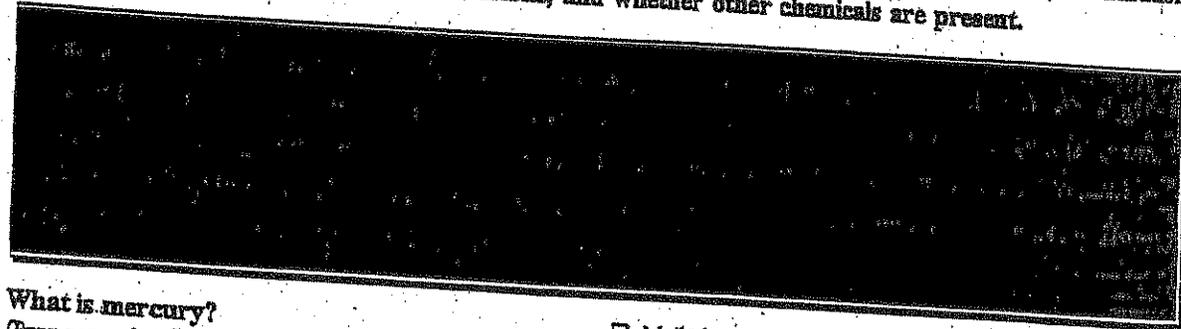
No Changes.

Disclaimer:

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is mercury?

(Pronounced *mīr'kyə-rē*)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.

- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

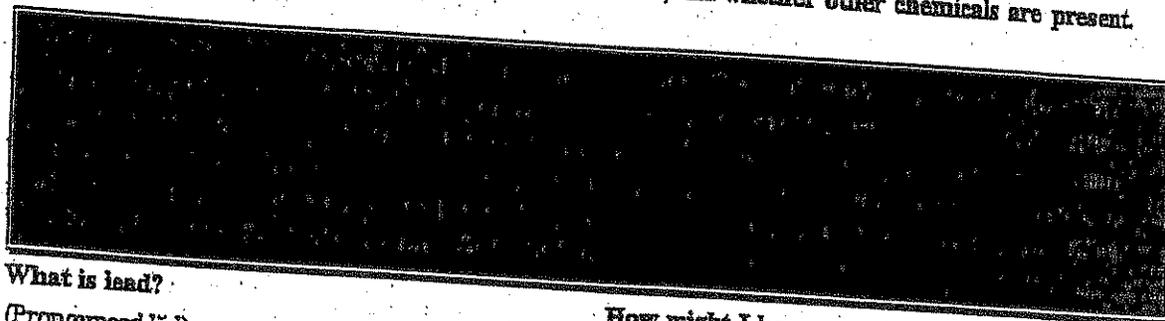
- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.



What is lead?

(Pronounced lēd)

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays.

Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.
- Much of the lead in inner-city soils comes from old houses painted with lead-based paint.

How might I be exposed to lead?

- Eating food or drinking water that contains lead.
- Spending time in areas where lead-based paints have been used and are deteriorating.
- Working in a job where lead is used.
- Using health-care products or folk remedies that contain lead.
- Engaging in certain hobbies in which lead is used (for example, stained glass).

How can lead affect my health?

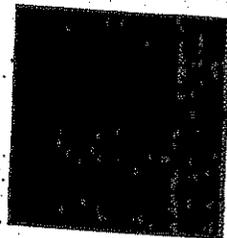
Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the reproductive system. The effects are the same whether it is breathed or swallowed.

At high levels, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can also damage the male reproductive system. The connection between these effects and exposure to low levels of lead is uncertain.

How likely is lead to cause cancer?

The Department of Health and Human Services has determined that lead acetate and lead phosphate may reasonably

Safety (MSDS) data for beryllium



General

Synonyms: glucinium

Molecular formula: Be

CAS No: 7440-41-7

EINECS No: 231-150-7

EU No: 004-001-00-7

Physical data

Appearance: silvery solid or grey foil

Melting point: 1278 C

Boiling point: 2970 C

Vapour density:

Vapour pressure:

Density (g cm^{-3}): 1.85

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility: insoluble

Stability

Stable. Incompatible with acids, bases, oxidizing agents, halogen

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0

Boiling Point:

340C (644F)

Melting Point:

217C (423F)

Vapor Density (Air=1):

6.15

Vapor Pressure (mm Hg):

1 @ 145C (293F) (sublimes)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Darkens on exposure to light.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Fluorine, chromic acid, oxidizing agents.

Conditions to Avoid:

No information found.

11. Toxicological Information

Oral mouse LD: > 17,000 mg/kg. Irritation skin, Draize mouse: 118 ug mild.
Investigated as a tumorigen and mutagen. IARC 3.

-----\Cancer Lists\-----

Ingredient

---NTP Carcinogen---
Known Anticipated

IARC Categ

Anthracene (120-12-7)

No

No

3

12. Ecological Information

Anthracene (120-12-7)

No No Yes No

----- \Federal, State & International Regulations - Part 2 \

Ingredient	CERCLA	-RCRA-	-TSCA-
Anthracene (120-12-7)	5000	261.33	8(d)
		No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 1 Flammability: 1 Reactivity: 0

Label Hazard Warning:

WARNING! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION.

Label Precautions:

- Keep container closed.
- Use with adequate ventilation.
- Avoid breathing dust.
- Wash thoroughly after handling.
- Avoid contact with eyes, skin and clothing.

Label First Aid:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician if irritation develops or persists.

Product Use:

Laboratory Reagent

Revision Information:

No Changes.

Disclaimer:

Safety (MSDS) data for zinc

Click here for data on zinc in student-friendly format from the HSci project

General

Synonyms: zinc dust, zinc powder, blue powder, granular zinc, zinc foil, LS 2, LS 6, merrillite, zinc metal

Molecular formula: Zn

CAS No: 7440-66-6

EINECS No: 231-175-3

EC number: 030-001-00-1

Physical data

Appearance: silver or blueish-white foil or powder

Melting point: 420 C

Boiling point: 908 C

Vapour density:

Vapour pressure:

Density (g cm^{-3}): 7.14

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Incompatible with amines, cadmium, sulfur, chlorinated solvents, strong acids, strong bases. Air and moisture sensitive. **Powder or dust is very flammable.**

Abbreviations used in Toxicity data

The table below gives the main abbreviations which will be found in the toxicity data for chemicals listed on these (and many other) web pages.

asn	Aspergillus nidulans
ast	Ascites tumor
bcs	Bacillus subtilis
bfa	body fluid assay
bmr	bone marrow
brd	bird (domestic or lab)
bwd	wild bird species
chd	child
ckn	chicken
CL	ceiling concentration
clr	Chlamydomonas reinhardi
ctl	cattle
cyt	cytogenetic analysis
D	day
dck	duck
dlt	cominant lethal test
dmg	Drosophila melanogaster
dnd	DNA damage
dni	DNA inhibition
dnr	nNA repair
dns	unscheduled DNA synthesis
dom	domestic animal (goat, sheep)
dpo	Drosophila pseudo-obscura
emb	embryo
esc	Escherichia cold
eug	Euglena gracilis

itt	intratesticular
iu	international unit
iut	intrauterine
ivg	intravaginal
ivn	intravenous
kdy	kidney
kg	kilogram
kfp	Klebsiella pneumoniae
L	liter
LC50	lethal concentration 50 percent kill
LCLo	lowest published lethal concentration
LD50	lethal dose 50 percent kill
LDlo	lowest published lethal dose
leu	leukocyte
Liq	liquid
lng	lung
lvr	liver
lym	lymphocyte
M	minute
m3	cubic meter
mam	mammal (species unspecified)
man	man
ug	microgram
umol	micromole
mg	milligram
mky	monkey
mL	milliliter
MLD	mild irritation effects
mma	microsomal mutagenicity assay
mno	mutation in microorganisms
mmol	millimole
mmr	mammary gland
mnt	miconucleus test
MOD	moderate irritation effects

ppt	parts per trillion (v/v)
preg	pregnant
qal	quail
rat	rat
rbt	rabbit
rec	rectal
rns	rinsed with water
S	second
sal	salmon
sat	<i>Salmonella typhimurium</i>
sce	sister chromatic exchange
scu	subcutaneous
SEV	severe irritation effects
skn	administration onto skin
sln	sex chromosome loss and nondisjunction
slt	specific locus test
slw	silkworm
smc	<i>Saccharomyces cerevisiae</i>
spm	sperm morphology
spr	sperm
sql	squirrel
smm	<i>Serratia marcescens</i>
ssp	<i>Schizosaccharomyces pombe</i>
STEL	short term exposure limit
TC	toxic concentration (other than lowest concentration)
TCLo	lowest published toxic concentration
TD	toxic dose (other than lowest toxic dose)
TDL0	lowest published toxic dose
tes	testis
TLV	Threshold Limit Value
tod	toad
trk	turkey
tn	heritable translocation test
TWA	time weighted average

Risk Phrases

Chemical data sheets available in many countries now contain codes for certain "risk phrases", shown as R23, R45 etc. These risk phrase codes have the following meanings:

- R1 Explosive when dry.
- R2 Risk of explosion by shock, friction, fire or other source of ignition.
- R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.
- R4 Forms very sensitive explosive metallic compounds.
- R5 Heating may cause an explosion.
- R6 Explosive with or without contact with air.
- R7 May cause fire.
- R8 Contact with combustible material may cause fire.
- R9 Explosive when mixed with combustible material.
- R10 Flammable.
- R11 Highly flammable.
- R12 Extremely flammable.
- R13 Extremely flammable liquefied gas
- R14 Reacts violently with water.
- R15 Contact with water liberates extremely flammable gases.
- R16 Explosive when mixed with oxidizing substances.
- R17 Spontaneously flammable in air.
- R18 In use, may form inflammable/explosive vapour-air mixture.
- R19 May form explosive peroxides.
- R20 Harmful by inhalation.
- R21 Harmful in contact with skin.
- R22 Harmful if swallowed.
- R23 Toxic by inhalation.
- R24 Toxic in contact with skin.
- R25 Toxic if swallowed.

- R61 May cause harm to the unborn child.
 - R62 Risk of impaired fertility.
 - R63 Possible risk of harm to the unborn child.
 - R64 May cause harm to breastfed babies.
 - R65 Harmful: may cause lung damage if swallowed.
 - R66 Repeated exposure may cause skin dryness or cracking.
 - R67 Vapours may cause drowsiness and dizziness.
 - R68 Possible risk of irreversible effects.
-

It is current safety policy at Oxford University that a written COSHH assessment **must** be provided when a substance to be used has been assigned any of the risk phrases R42, R43, R45, R46, R48, R49, R60 or R61. Other hazards may also dictate the preparation of a suitable COSHH assessment.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on October 28, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

- [Class 8 Corrosive substances](#)
- [Class 9 Miscellaneous dangerous substances](#)

See also [Packing Group](#).

For further details on the transport of dangerous goods, see the [OECD Directorate web site](#).

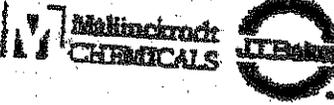
Return to the [Safety Glossary](#).

Return to the [Safety home page](#) of the Physical and Theoretical Chemistry Laboratory, Oxford University.

- S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S27 Take off immediately all contaminated clothing.
- S28 After contact with skin, wash immediately with plenty of soap-suds.
- S29 Do not empty into drains.
- S30 Never add water to this product.
- S33 Take precautionary measures against static discharges.
- S35 This material and its container must be disposed of in a safe way.
- S36 Wear suitable protective clothing.
- S37 Wear suitable gloves.
- S38 In case of insufficient ventilation, wear suitable respiratory equipment.
- S39 Wear eye / face protection.
- S40 To clean the floor and all objects contaminated by this material, use (there follows suitable cleaning material).
- S41 In case of fire and / or explosion do not breathe fumes.
- S42 During fumigation / spraying wear suitable respiratory equipment.
- S43 In case of fire use ... (there follows the type of fire-fighting equipment to be used.)
- S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible.)
- S46 If swallowed, seek medical advice immediately and show this container or label.
- S47 Keep at temperature not exceeding...
- S48 To be kept wet with (there follows a material name).
- S49 Keep only in the original container.
- S50 Do not mix with ...
- S51 Use only in well ventilated areas.
- S52 Not recommended for interior use on large surface areas

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
228 First School Lane
Phillipsburg, NJ 08865



24 Hour Emergency Telephone: 908-490-0104
DANGERED: 1-800-424-9990

National Response to Chemical
DANGERED: 800-424-9990

Outside U.S. and Canada
Telephone: 908-490-0907

NOTE: CHEMICAL, DANGERED and National
Response Center emergency numbers to be
used only in the event of chemical emergency:
leaking spill, fire, exposure or accident
involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-520-0527) for assistance.

COPPER METAL

MSDS Number: C5170 — Effective Date: 05/17/01

1. Product Identification

Synonyms: C.I. 77400; Arwood Copper
CAS No.: 7440-50-8
Molecular Weight: 63.546
Chemical Formula: Cu
Product Codes:
J.T. Baker: 1714, 1720, 1732, 1736
Mallinckrodt: 1733, 4649

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Copper	7440-50-8	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING: HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS THE LIVER AND KIDNEYS. CHRONIC EXPOSURE MAY CAUSE TISSUE DAMAGE.

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard since the bulk solid does not burn, but very finely divided particles (ultra-fine powder) may burn in air.

Explosion:

Not considered to be an explosion hazard. Reactions with incompatibles may pose an explosion hazard. Liquid copper explodes on contact with water. High concentrations of finely divided copper particles in the air may present an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations

(CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Avoid exposure to air and moisture. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Copper Dust and Mists, as Cu:

- OSHA Permissible Exposure Limit (PEL) -

1 mg/m³ (TWA)

- ACGIH Threshold Limit Value (TLV) -

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Copper becomes dull when exposed to air; on exposure to moist air it gradually converts to the carbonate. On long standing, a white, highly explosive peroxide deposit may form.

Hazardous Decomposition Products:

No information found.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Copper is incompatible with oxidizers, alkalis, acetylene, chlorine plus oxygen difluoride, phosphorus, nitric acid, potassium peroxide, 1-bromo-2-propyne, sulfur plus chlorates. Reacts violently with ammonium nitrate, bromates, iodates, chlorates, ethylene oxide, hydrozoic acid, potassium oxide, dimethyl sulfoxide plus trichloroacetic acid, hydrogen peroxide, sodium peroxide, sodium azide, sulfuric acid, hydrogen sulfide plus air, and lead azide. A potentially explosive reaction occurs with acetylenic compounds. Copper ignites on contact with chlorine, fluorine (above 121C), chlorine trifluoride, and hydrazinum nitrate (above 70C). An incandescent reaction occurs with potassium dioxide.

Conditions to Avoid:

Incompatibles and prolonged exposure to air and moisture.

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a tumorigen and a reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Copper (7440-50-8)	No	No	None

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

or use of this information to any person or for use in any situation.

Section 1 - Product and Company Identification
CHROMIUM

Product Identification: CHROMIUM
Date of MSDS: 11/01/1993 **Technical Review Date:** 11/10/1995
FSC: 6810 **NEIN:** LIIN: 00N066370
Submitter: N EN
Status Code: C
MFN: 01
Article: N
Kit Part: N

Manufacturer's Information

Manufacturer's Name: HIGH-PURITY STANDARDS
Post Office Box: 30188
Manufacturer's Address1:
Manufacturer's Address2: CHARLESTON, SC 29417
Manufacturer's Country: US
General Information Telephone: 803-556-3411
Emergency Telephone: 803-556-3411
Emergency Telephone: 803-556-3411
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: N
Published: Y
CAGE: 0YZE5
Special Project Code: N

Contractor Information

Contractor's Name: HIGH-PURITY STANDARDS INC
Post Office Box: 30180
Contractor's Address1: 2040 SAVAGE RD
Contractor's Address2: CHARLESTON, SC 29417
Contractor's Telephone: 803-556-3411
Contractor's CAGE: 0YZE5

Section 2 - Composition/Information on Ingredients
CHROMIUM

METALS, HYDROXIDES, CARBONATES, CYANIDES.

Hazardous Decomposition Products:

NO, NO*2.

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

NOT RELEVANT

Section 11 - Toxicological Information
CHROMIUM

Toxicological Information:

N/P

Section 12 - Ecological Information
CHROMIUM

Ecological Information:

N/P

Section 13 - Disposal Considerations
CHROMIUM

Waste Disposal Methods:

FOLLOW FEDERAL, STATE AND LOCAL REGULATIONS FOR ACID WASTE.

Section 14 - MSDS Transport Information
CHROMIUM

Transport Information:

N/P

Section 15 - Regulatory Information
CHROMIUM

SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P

Section 16 - Other Information
CHROMIUM

Other Information:

N/P

HAZCOM Label Information

Product Identification: CHROMIUM

CAGE: 0YZE5

Assigned Individual: N

Company Name: HIGH-PURITY STANDARDS INC

Company PO Box: 30180

Company Street Address1: 2040 SAVAGE RD

Company Street Address2: CHARLESTON, SC 29417 US

Health Emergency Telephone: 803-556-3411

Label Required Indicator: Y

Date Label Reviewed: 11/10/1995

Status Code: C

Manufacturer's Label Number:

Date of Label: 11/10/1995

Year Procured: N/K

Organization Code: G

Chronic Hazard Indicator: N

Eye Protection Indicator: YES

Skin Protection Indicator: YES

Respiratory Protection Indicator: YES

Signal Word: CAUTION

Health Hazard: Slight

Contact Hazard: Slight

Fire Hazard: None

Reactivity Hazard: None

8/9/2002 9:23:55 AM

CONSTRUCTION HEALTH AND SAFETY PLAN
1520 FULTON STREET
BROOKLYN, NEW YORK
MAY 2015

APPENDIX E

Incident Report Form





Accident/Incident Report Form

Please complete this form and send it to your Branch Manager, HR and CHSO **within 24 hours** of the incident.

SECTION A ACCIDENT/INCIDENT DETAILS

EMPLOYEE INFORMATION:		OTHER INJURED (IF APPLICABLE):	
Name: _____		Name: _____	
Home Address: _____ Street Address City State Zip Code		Home Address: _____ Street Address City State Zip Code	
Contact Information: () () Primary Secondary		Contact Information: () () Primary Secondary	
Date of Birth: _____		Date of Birth: _____	
Date of Hire: _____		Date of Hire: _____	
Branch: _____		Branch: _____	
Supervisor: _____		Supervisor: _____	

Date and Time Accident/Incident	Date and Time Reported	LOCATION OF INCIDENT/ACCIDENT
____/____/____ Month Day Year ____ A.M. ____ P.M.	____/____/____ Month Day Year ____ A.M. ____ P.M.	Project Name: _____ Client and Location: _____ or _____ Office Location: _____

INCIDENT TYPE: (Check All That Applies)	WITNESS INFORMATION
<input type="checkbox"/> Personal Injury/Illness <input type="checkbox"/> Vehicle Accident <input type="checkbox"/> Property Damage <input type="checkbox"/> Environmental Spill <input type="checkbox"/> Other	Name: _____ Contact Number: _____ Company: _____

WHAT HAPPENED TO THE INJURED PARTY: First Aid Administered Refused Treatment/Transport Transported to Hospital
 Returned to Work Went Home Went to Physician Unknown

Clinic/Hospital or Treating Physician: _____ Phone: _____
 Name Street Address City State Zip Code

SECTION B PERSONAL INJURY

Cause of Injury: _____

Part of Body Injured: _____ Multiple Injuries: Y N

Was PPE worn when injured? : Y N What PPE was worn? _____

WAS INJURY A RESULT OF THE USE A MOTOR VEHICLE: YES NO (If yes, complete Section C)

NEAR MISS REPORT

A near miss is a potential hazard or incident that has not resulted in any personal injury. Unsafe working conditions, unsafe employee work habits, improper use of equipment, or use of malfunctioning equipment have the potential to cause work related injuries. It is everyone's responsibility to report and/or correct these potential accidents/incidents immediately. Please complete this form as a means to report these near-miss situations. Send a copy of the completed form to the Project Manager, Regional Health and Safety Officer and the Corporate Health and Safety Officer.

Location: _____

Site Name: _____

Date: _____

Time: _____ a.m. p.m.

Weather conditions, site operations taking place during near miss. _____

Please check all appropriate conditions:

Unsafe Act

Unsafe equipment

Unsafe Condition

Unsafe use of equipment

Description of incident or potential hazard: _____

Employees or sub-contractors involved if applicable. _____

Employee Signature _____ Date _____

Print Name _____

NEAR MISS INVESTIGATION

Description of the near-miss condition: _____

Causes (primary & contributing) _____

Corrective action taken (Remove the hazard, replace, repair, or retrain in the proper procedures for the task) _____

Actions not yet taken _____

Signed: _____ Date Completed: _____

Print Name

Not completed for the following reason: _____ Date: _____

