399 EXTERIOR STREET SITE
399 EXTERIOR STREET
BRONX, NEW YORK 10451
NYSDEC BCP ID: C203139

INTERIM REMEDIAL MEASURE WORK PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 1233-702

PREPARED FOR:

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PWGC Project Number: LST1802.A

JANUARY 2021

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BRONX, NEW YORK 10451

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ACRONYM	DEFINITION
µg/kg	micrograms per kilogram
AA	Alternatives Analysis
ACBM	Asbestos Containing Building Material
AOC	Area of Concern
ASP	Analytical Services Protocol
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below ground surface
BUD	Beneficial Use Determination
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
COPC	Contaminants of Potential Concern
CP	Commissioner Policy
DER	Division of Environmental Remediation
DER-10	Technical Guidance for Site Investigation and Remediation
DMM	Division of Materials Management
EC	Engineering Control
ECL	Environmental Conservation Law
EDD	Electronic Data Deliverable
EIMS	Environmental Information Management System
ELAP	Environmental Laboratory Accreditation Program
EM	Electromagnetic
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FER	Final Engineering Report
FIRM	Flood Insurance Rate Maps
GPR	Ground Penetrating Radar
gps	Global Positioning System
GV	Guidance Value
HASP	Health and Safety Plan
IC	Institutional Control
IRM	Interim Remedial Measure
ISCO	In-Situ Chemical Oxidation
LBP	Lead Based Paint
LLC	Limited Liability Company
mg/kg	milligram per kilogram
MW	Monitoring Well
NTU	Nephelometric Turbidity Units
NYCDEP	New York City Department of Environmental Protection
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OSHA	Occupational Safety and Health Administration

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OSWER	Office of Solid Waste and Emergency Response
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PE	Professional Engineer
PFAS	Perfluoroakyl and Polyfluoroakyl Substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PG	Professional Geologist
PID	Photo-ionization Detector
POGWSCO	Protection of Groundwater Soil Cleanup Objective
PPE	Personal Protective Equipment
ppm	parts per million
ppt	parts per trillion
PVC	Polyvinyl Chloride
PWGC	P.W. Grosser Consulting, Inc.
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance / Quality Control
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
RE	Remedial Engineer
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RRUSCO	Restricted-Residential Use Soil Cleanup Objective
SB	Soil Boring
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
sf	square-feet
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SOE	Support of Excavation
SPLP	Synthetic Precipitation Leaching Procedure
SVOC	Semi-volatile Organic Compound
TAGM	Technical and Administrative Guidance Memo
TOGS	Technical and Operation Guidance Series
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound

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CERTIFICATION

I, Paul K Boyce, PE, PG, certify that I am currently a New York State registered professional engineer (PE) and that this Interim Remedial Measure (IRM) Work Plan was prepared in accordance with applicable statutes and regulations and in substantial conformance with the New York State Department of Environmental Conservation's (NYSDEC's) Division of Environmental Remediation's (DER's) Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that the information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

074604	02.19.2021	Paul Boyce
New York State PE #	Date	Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

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1.0 INTRODUCTION

399 Exterior Street LLC entered into a Brownfield Cleanup Agreement (BCA) with the NYSDEC on September 30, 2020, to investigate and remediate a 1.34-acre property located at 399 Exterior Street in the Mott Haven section of the Bronx, New York. 399 Exterior Street LLC is a Volunteer in the Brownfield Cleanup Program (BCP).

The following is an IRM Work Plan for the 399 Exterior Street Site. The proposed scope of work is based upon the findings of a historic Phase II Environmental Site Assessment (ESA). The goal of this proposed IRM is to properly characterize, excavate and remove the identified shallow historic fill material at the site. This non-emergency IRM is not intended to be considered the final remedy for the site but is being undertaken to facilitate and prepare for the future deeper excavation and larger remedial action that is anticipated at the site.

This IRM Work Plan summarizes the nature and extent of contamination as determined from data gathered during the Phase II ESA, performed during May and June of 2019. It provides an evaluation of an IRM as a part of a Track 2 cleanup which is the Volunteer's preferred remedy. The IRM described in this document is consistent with the procedures defined in DER-10 and complies with applicable Standards, Criteria, and Guidance (SCGs). The IRM described in this document also complies with applicable Federal, State and local laws, regulations and requirements.

The current goal based on anticipated use is Track 2 Restricted-Residential.

1.1 Subject Property Location and Description

The subject property is located at 399 Exterior Street in the Mott Haven section of the Bronx, New York and is identified as Block 2349 and Lot 100R on the New York City Tax Map. The subject property is approximately 1.34 acres and is bounded by commercial properties to the north and south, Exterior Street to the east, and New York State Department of Transportation (NYSDOT) owned land to the west. Beyond the NYSDOT owned land is the Harlem River. The subject property is currently improved with an asphalt paved parking lot. The subject property is currently unoccupied.

A Vicinity Map is included as **Figure 1**. A Subject Property Plan is included as **Figure 2**. The subject property is fully described in **Appendix A** – Metes and Bounds. A global positioning system (gps) coordinate for the starting point is included on **Figure 2**.

1.2 Subject Property History

Historical usage of the subject property indicates that it was first developed in the early 1920s and was used as a freight train support facility until circa 1975. Infrastructure supporting the freight train operation was removed from the site at which time the use of the property transitioned to a parking lot. Between 1975 and the early 1990s it appears the site was inactive. From the early 1990s to 2019 the site was operated as a parking area for school buses.

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1.3 Description of Surrounding Property

The adjacent property to the north (441 Exterior Street) is improved with a vacant former commercial cold storage building and asphalt parking lot. The adjacent property to the south (355 Exterior Street) is improved with an asphalt paved parking lot and a warehouse building which is currently vacant. Exterior Street borders the property to the east and NYSDOT owned land borders the property to the west. Beyond the NYSDOT owned land is the Harlem River.

One school is located within 500 feet of the subject property. The school is located hydraulically upgradient of the subject property. A surrounding land use map is included as **Figure 3**.

- Health Opportunities High School & Community School for Social Justice
    - 350 Gerard Avenue, Bronx, NY – Located ~ 500 southeast of the subject property.

There are no other schools, day care facilities, hospitals, or other sensitive receptors within approximately 500 feet of the subject property.

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2.0 DESCRIPTION OF HISTORIC ENVIRONMENTAL INVESTIGATION FINDINGS

The subject property was investigated in accordance with the scope of work presented in the Phase II ESA dated January 2020. The Phase II investigation was conducted in January of 2020. The Phase II ESA Report was submitted to NYSDEC on September 2020 as a part of the BCP Application.

2.1 Summary of Phase I ESA Performed

PWGC prepared a Phase I ESA in December 2018. The Phase I ESA identified the following Recognized Environmental Conditions (RECs) associated with the subject property:

- The subject property has been assigned an E-Designation for Air, Hazardous Materials, and Noise by the New York City Department of Planning.
- The subject property has been historically utilized for commercial and industrial purposes that likely included the storage and use of hazardous substances and/or petroleum products at the subject property.
- Potential vapor encroachment related to historical use of the subject property.

2.2 Summary of Phase II ESA Performed

PWGC performed a Phase II ESA at the subject property in May and June of 2019. To perform this work, the following tasks were completed:

- A geophysical survey was performed at the subject property to confirm the absence/presence of subsurface anomalies.
- A total of eight soil borings were installed at the subject property to characterize subsurface soil quality.
- Two temporary groundwater sampling points were installed at the subject property to characterize groundwater quality.
- One soil vapor sample was collected at the subject property to characterize soil vapor quality.

2.2.1 Geophysical Surveys

To determine if subsurface anomalies were present at the subject property, a geophysical survey was performed.

The surveys identified the following:

- Electromagnetic (EM) Survey
    - The subject property consists of an asphalt and concrete paved parking lot. Portions of the lot were found to be reinforced concrete. The presence of metal in the concrete limited the effectiveness of EM equipment.
    - The survey did not identify the presence of subsurface anomalies in the areas accessible during the investigation.
- Ground Penetrating Radar (GPR) Survey
    - The survey did not identify the presence of subsurface anomalies in the areas accessible during the investigation.

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2.2.2 *Soil Borings*

A total of eight soil borings were installed at the subject property. Soil borings were installed utilizing a Geoprobe® direct-push drill rig outfitted with a duel-core or closed-piston sampler and dedicated acetate liners.

Generally, soil consisted of brown sand and gravel with fill material (brick, asphalt, and wood) from grade to approximately ten feet below grade. Below the fill layer was typically grey silty sand or grey clay which extended within groundwater which was typically encountered around eight to ten feet below grade. Significant evidence of a release was not identified.

2.2.3 *Groundwater Temporary Well Points*

Following the completion of two of the soil borings, Coastal installed a prepacked 2" polyvinyl chloride (PVC) temporary well point in each borehole. MW001 was installed within the boring for SB003 and MW002 was installed within the boring for SB004. Groundwater was encountered at approximately nine feet below surface grade. The screen was set from 5 to 15 feet below surface grade in each borehole. Disposable polyethylene tubing was inserted into the water bearing zone of the temporary well point. The end of the tubing was connected to a peristaltic pump with dedicated silicone tubing. Four casing volumes of water were purged from the temporary well point prior to the collection of samples.

2.2.4 *Soil Vapor Implants*

One temporary soil vapor probes was installed at the subject property. Temporary soil vapor probes were installed utilizing a Geoprobe® direct-push drill rig. At the sample location, a six-inch stainless-steel screen was installed at the base of the sampling point with polyethylene tubing to grade. Coarse sand was placed surrounding the screen and six inches above. The remainder of the soil vapor probe annulus was sealed with bentonite grout to the surface.

2.2.5 *Samples Collected*

The following samples were collected during the Phase II ESA.

- A total of 29 soil samples were collected from the eight soil borings and depth intervals were spread out throughout the site during the initial investigation and supplemental subsurface investigation.
- One groundwater sample was collected from each temporary groundwater sampling point.
- One soil vapor sample was collected from each temporary soil vapor probe. A tracer gas (helium) was utilized to test the seal around the soil vapor points. Once the integrity of the seal was confirmed at each location, three volumes of air were extracted from each point prior to sample collection with a flow rate of less than 0.2 liters/minute. Soil vapor samples were collected using batch certified 6-liter SUMMA vacuum canisters fitted with two-hour flow control regulators with a flow rate of less than 0.2 liters/minute.

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2.2.6 *Chemical Analytical Work Performed*

Samples obtained during the Phase II ESA were collected in pre-cleaned, pre-preserved, laboratory-supplied glassware and stored in a cooler on ice for transport to the laboratory. Samples were submitted to Alpha Analytical of Westborough, Massachusetts, a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory (ELAP ID: 11148).

Soil samples were analyzed for the following:

- Semi-volatile Organic Compounds (SVOCs) by United States Environmental Protection Agency (USEPA) Method 8270 (Full List);
- Pesticides/Polychlorinated Biphenyls (PCBs) by USEPA Methods 8081/8082; and
- Metals by USEPA Methods 6010/7471 (Target Analyte List).

Groundwater samples were analyzed for the following:

- Volatile organic compounds (VOCs) by USEPA Method 8260 (Full List);
- SVOCs by USEPA Method 8270 (Full List);
- Pesticides/PCBs by USEPA Methods 8081/8082; and
- Metals by USEPA Methods 6010/7471 (filtered and unfiltered) (Target Analyte List).

Soil vapor samples were analyzed for VOCs by USEPA Method TO-15.

2.2.7 *Documentation*

Findings of the Phase II ESA for the subject property include the following:

- The water table elevation at the subject property is approximately eight to ten feet below ground surface (bgs).
- Soils at the subject property consists of sand and gravel with fill material (brick, asphalt, and wood) underlain by silty sand and clay. Evidence of historic urban fill material was observed at depths up to ten feet below grade at several locations across the site.
- Soil across the subject property contains SVOCs and metals above restricted-residential use soil cleanup objectives (RRUSCOs). Pesticides and PCBs were not detected at elevated concentrations in soils at the subject property. Soil contamination was predominantly limited from surface to eight to twelve feet bgs with metals extending in at least two samples.
    - The major compounds identified within soils at the subject property include SVOCs, primarily poly-aromatic hydrocarbons (PAHs) including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and/or pyrene and metals including arsenic, barium, copper, lead, and/or mercury. In general, the highest concentrations were detected within the approximately 0 to 8-10 feet bgs interval, although elevated metals extended deeper into the native clay layer in at least two locations.

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- Groundwater at the subject property has minor detections of SVOCs and metals above ambient water quality standards (AWQS) or guidance values (GVs) throughout the property. The compounds detected were also detected in the soils beneath the subject property. Limited SVOCs, and metals were detected in groundwater samples collected from the subject property exceeding their respective AWQS or GVs. VOCs, pesticides and PCBs were not detected at concentrations exceeding their respective NYSDEC AWQS or GVs in groundwater samples collected form the subject property. Since shallow groundwater beneath the subject property discharges into the Harlem River, a down-gradient groundwater sample was not collected.

- Soil vapor does not appear to contain elevated concentrations of contaminants that would create a soil vapor intrusion concern for future development. Petroleum related compounds, such as benzene and toluene were detected in each soil vapor sample. The identified concentrations are relatively low and are not likely to cause a soil vapor concern.

2.3 Evaluation of Identified Contamination

2.3.1 Conceptual Model of Contamination on the Subject Property

Soil samples collected from the subject property identified impact to soils throughout the property. Analytical data identified elevated concentrations of SVOCs and metals exceeding their respective NYSDEC RRUSCOs likely related to the historic usage of the subject property and/or the presence of historic urban fill material.

Groundwater samples collected from the subject property identified impact to groundwater beneath the property. Analytical data identified elevated concentrations of SVOCs, and metals exceeding their respective NYSDEC AWQS or GVs. The SVOCs detected in the groundwater samples were also observed at elevated concentrations in the soil samples.

Analytical data identified multiple VOCs in the soil vapor sample collected from the subject property. The identified concentrations are relatively low and are not likely to cause a soil vapor concern.

2.3.2 Description of Areas of Concern

The Area of Concern (AOCs) at the subject property consisted of subsurface soils throughout the subject property impacted with SVOCs and metals at concentrations exceeding NYSDEC standards.

2.3.3 Identification of Standards, Criteria and Guidance

The applicable SCGs for soil, groundwater, and soil vapor characterization and remediation for this subject property include:

- 6 New York Codes, Rules, and Regulations (NYCRR) Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites, specifically Part 375-6 Remedial Program Soil Cleanup Objectives

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- 29 Code of Federal Regulations (CFR) Part 1910.120 - Hazardous Waste Operations and Emergency Response
- Technical and Operation Guidance Series (TOGS) 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York
- Technical and Administrative Guidance Memo (TAGM) 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels
- 40 CFR Part 144 - Underground Injection Control Program
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- DER-23 - Citizen Participation Handbook for Remedial Programs
- Office of Solid Waste and Emergency Response (OSWER) Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, Resource Conservation and Recovery Act (RCRA) Corrective Action, and Underground Storage Tank (UST) Sites
- Commissioner Policy (CP)-43 - Groundwater Monitoring Well Decommissioning Policy
- DER Technical Guidance for Site Investigation and Remediation (DER-10)
- CP-51 – Soil Cleanup Guidance
- DER Green Remediation (DER 31)
- DER Institutional Controls (DER 33)

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3.0 DESCRIPTION OF INTERIM REMEDIAL MEASURE

Based on the findings of the historical environmental investigation, PWGC proposes that a non-emergency IRM be implemented at the site to address the identified contamination in shallow historic fill and prepare the site for the future deeper excavation and larger remedial action that is anticipated at the site. Contamination areas include metals and SVOCs impacted subsurface soils (historic fill) across the entire site.

The IRM recommendations for the site consist of:

- Demolition and removal of surface improvements (paved asphalt cap);
- Performance of in-situ waste characterization sampling; and
- Excavation and disposal of soils across the site to a minimum depth of four feet below grade.

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4.0 NOTIFICATION REQUIREMENTS

Prior to the start of IRM activities, the property owner or their representative will notify the NYSDEC. A minimum of 7-days' notice for non-intrusive work (material import, material placement, demarcation installation, etc.) and 15-days notification for intrusive work will be provided. **In-Text Table 1** below includes the current contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information.

In-Text Table 1: Notifications*

Contact Name/Organization	Phone	Email
Steven Walsh, NYSDEC	518-402-9824	steven.walsh@dec.ny.gov
John Grathwol, PE, NYSDEC	518-402-9649	john.grathwol@dec.ny.gov
Steven Berninger, NYSDOH	518-402-0443	beei@health.ny.gov

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

This notification will include:

- A detailed description of the work to be performed is included in Section 5.0 of this IRM Work Plan. Changes to the scope of work will be reported to the notification list as soon as possible.
- Work detailed in this IRM Work Plan is tentatively scheduled to begin in the end of December of 2020 and the beginning of January of 2021. A confirmed start date will be provided a minimum of 7-days' notice for non-intrusive work (material import, material placement, demarcation installation, etc.) and 15-days notification for intrusive work.
- Work will be performed in compliance with this IRM Work Plan and 29 CFR 1910.120.
- Health and safety requirements for work covered by this IRM Work Plan are summarized in Section 7.0; a HASP is included as **Appendix B**.
- The planned scope of work covered by this IRM Work Plan includes demolition of surface structures, the characterization of soils, the excavation of soils and the disposal of soils. The disposal facilities will be identified and provided to the notification list for approval prior to shipping material to the facilities.

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5.0 SCOPE OF INTERIM REMEDIAL WORK

5.1 Survey Work

Surveys will be completed by a land surveyor licensed to practice in New York State.

5.1.1 Pre-Remedial Survey

Prior to the performance of remedial activities, an initial survey will be performed by the Remedial Contractor to verify the existing conditions and establish the exact limits of the work. The survey will include the following:

- Property boundary (metes and bounds) and established reference points.
- Ground surface elevations measured across the entire project area at the intersection points of a 50-foot by 50-foot grid.
- Existing features (e.g., structures, limits of paved areas, fences, gates, etc.)

5.2 Pre-Remediation Demolition

5.2.1 Demolition

As previously discussed, the subject property is improved with an asphalt parking lot. To provide access for remedial excavation, the asphalt shall be stripped from the parking lot. Demolition shall include stripping of the asphalt over the parking lot. Demolition activities shall be performed in accordance with Federal, State, and local procedures and regulations.

Construction and demolition (C&D) debris, such as concrete, brick, or stone, may be disposed of at a NYSDEC registered or permitted recycling facility, or an active regulated construction and demolition debris municipal solid waste landfill that is permitted by the NYSDEC and which meets the current design standards for municipal solid waste facilities of 6 NYCRR Part 360.

5.3 In-Situ Soil Characterization

To delineate the horizontal and vertical extents of soils exceeding RRUSCOs and to characterize materials for disposal, in-situ soil sampling may be performed, as necessary, and will follow the procedures outlined below.

In-situ soil samples will be collected from either soil borings installed by direct push drilling methods or from test pits. Samples collected to characterize materials for disposal will be collected across the area in a grid pattern so representative samples of the material to be disturbed are collected. Samples collected to delineate the horizontal and vertical extents of contamination will be collected as step outs from previously known points of impact.

5.3.1 Direct Push Drilling Method

Prior to performing soil borings, 10-mil polyethylene sheeting, sufficiently large to hold the anticipated number of soil cores will be laid on the ground in the area where the soil boring will be performed.

Soil borings will be installed utilizing a Geoprobe® direct-push drill rig outfitted with a dual-core sampler or closed piston sampler and dedicated acetate liners. Soils proposed for disposal

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evaluation will be collected continuously from ground surface to proposed finished elevation utilizing the dual-core sampler. If there are multiple horizons, the core will be stopped at the bottom of the horizon and extracted before advancing deeper for the next horizon. Soils proposed for delineation may be collected from discrete intervals of potential concern. A soil boring log will be developed for each location.

5.3.2 Test Pit Method

Prior to the excavation, 10-mil polyethylene sheeting, sufficiently large to hold the anticipated excavated soil will be laid on the ground in the area where the excavated soil will be placed. Each test pit will be performed in two-foot lifts and placed on the polyethylene sheeting in individual piles.

Soils proposed for disposal evaluation will be collected continuously from ground surface to proposed finished elevation. Soils will be placed on the plastic sheeting in up to two-foot sections as the test pit advances. Field measurements will be collected throughout the process to confirm test pit elevations. A test pit log will be developed for each location.

5.4 Interim Remedial Measure Excavation

Based upon historical investigations, soils on the subject property is impacted with SVOCs and metals. A summary of the proposed IRM excavations is included below and shown on **Figure 4**. The extent of these excavations is subject to change based upon the in-situ soil characterization and excavation conditions.

- IRM Excavation Area 1 – This area measures approximately 26,251-sf and has been documented to contain SVOCs and metals exceeding RRUSCOs from surface grade to 8 feet bgs. This area is anticipated to be excavated 4 feet bgs as a part of the IRM.
- IRM Excavation Area 2 – This area measures approximately 4,136-sf and has been documented to contain SVOCs and metals exceeding RRUSCOs from surface grade to 12 feet bgs. This area is anticipated to be excavated 4 feet bgs as a part of the IRM.
- IRM Excavation Area 3 – This area measures approximately 29,294-sf and has been documented to contain SVOCs and metals exceeding RRUSCOs from surface grade to 6 feet bgs. This area is anticipated to be excavated 4 feet bgs as a part of the IRM.

5.4.1 Support of Excavation (SOE)

To facilitate the IRM excavation, steel sheeting, H-piles and lagging, and/or alternative means of SOE shall be installed around the perimeter of the subject property.

Appropriate management of structural stability during remedial activities including excavation is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of invasive and other work performed under this IRM Work Plan. The Volunteer and its contractors shall obtain any Federal, State or local permits or approvals that may be required to perform work under this IRM Work Plan. Further, the Volunteer and its contractors are solely responsible for the implementation of required, appropriate, or necessary health and safety measures during performance of work under the approved IRM Work Plan.

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5.4.2 Remedial Excavation Protocols

Following installation of SOE, remedial excavation shall take place. Remedial excavation shall follow a grid pattern across the subject property which matches that of the waste characterization sampling performed. The collection of confirmation soil samples is not anticipated.

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6.0 INTERIM REMEDIAL MEASURE MANAGEMENT

6.1 Project Organization and Oversight

The Remedial Engineer (RE) and Qualified Environmental Professional (QEP) for this project are Paul K. Boyce, PE, PG and Andrew Lockwood, PG, respectively. Principal personnel who will participate in the remedial action include an environmental scientist or engineer. The environmental scientist/engineer will document that the remedial actions are implemented in accordance with this IRM Work Plan, HASP, CAMP, Soil/Materials Management Plan (SMMP), and supporting documents, and promptly report any deviations from these documents to the appropriate team members, the RE, and the QEP so that the issue can be rectified in a timely manner. The environmental scientist/engineer will report directly to the QEP and RE and will provide daily summary reports of the remedial activities.

6.1.1 Remedial Engineer

The RE for this project will be Paul K. Boyce, PE, PG. The RE is a registered PE licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program for the 355 Exterior Street Site (NYSDEC BCA Index No. C203129-04-20, Site No. C203129). The RE will certify in the IRM Completion Report that the remedial activities were observed by environmental scientists and/or engineers under his supervision and that the remediation requirements set forth in the IRM Work Plan and other relevant provisions of Environmental Conservation Law (ECL) 27-1419 have been achieved in conformance with that Plan. Other RE certification requirements are listed later in this IRM Work Plan.

The Volunteer will coordinate the work of other contractors and subcontractors involved in aspects of remedial activities, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal. The RE will be responsible for appropriate communication with NYSDEC and NYSDOH.

The RE will review pre-remedial plans submitted by contractors for compliance with this IRM Work Plan and will certify compliance in the IRM Completion Report.

6.2 Pre-Interim Remedial Measure Preparation

6.2.1 Interim Remedial Measure Schedule

The estimated duration to complete the IRM is approximately two to three months.

6.2.2 Work Hours

The hours for operation of remedial activities will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency. NYSDEC will be notified by the Volunteer of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial activity hours.

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6.2.3 Security

Security will be maintained by utilizing and maintaining the existing six-foot high chain link fence surrounding the property. The fence will be maintained throughout the project and access gates will be kept closed during daily operations and closed and locked at other times.

6.3 Interim Remedial Measure Preparation and Closeout

6.3.1 Mobilization

Mobilization will include the delivery of remedial equipment and materials to the subject property. Remedial workers will receive orientation and training in accordance with the HASP, CAMP, and established policies and procedures to be followed during the implementation of remedial activities. The remediation contractor and associated subcontractors will each receive a copy of the IRM Work Plan, HASP, and CAMP and will be briefed on their contents.

6.3.2 Erosion and Sedimentation Controls

Erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff will be placed to protect the excavation work and adjacent areas during excavation activities. Storm water control measures, such as straw hay bales or silt fence, may be utilized during excavation activities to prevent storm water runoff from impacting excavation areas and neighboring properties.

6.3.3 Stabilized Construction Entrance(s)

During remediation, continuity will be achieved between the truck wash and the stone-based egress path by placing the truck wash system right before the egress path of the subject property. Egress points for truck and equipment transport will be kept clean of dirt and other materials during remediation, so that trucks will be decontaminated prior to departure from the subject property.

6.3.4 Utility Marker and Easements Layout

The Volunteer and its contractors are solely responsible for the identification of utilities that might be affected by work under the IRM Work Plan and implementation of required, appropriate, or necessary health and safety measures during performance of work under this IRM Work Plan. The Volunteer and its contractors are solely responsible for safe execution of invasive and other work performed under this IRM Work Plan. The Volunteer and its contractors must obtain any Federal, State or local permits or approvals pertinent to such work that may be required to perform work under this IRM Work Plan. Approval of this IRM Work Plan by NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the subject property has been investigated by the Volunteer and its contractors. It has been determined that no risk or impediment to the planned work under this IRM Work Plan is posed by utilities or easements on the subject property.

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6.3.5 *Equipment and Material Staging*

Equipment and materials staging areas will be designated during the remediation activities, in coordination with the Remediation Manager to facilitate remediation work and prevent cross-contamination.

6.3.6 *Decontamination Area*

A temporary decontamination area lined with polyethylene sheeting will be constructed for steam-cleaning or washing excavation and drilling equipment, when appropriate. The location of the decontamination area will be coordinated with the Remediation Manager. At a minimum, the decontamination pad will have a 30-mil low-permeability liner, be bermed and sloped to a collection sump to contain and collect fluids, and have side walls to mitigate, to the extent practicable, errant overspray, especially when decontaminating large equipment.

6.3.7 *Fencing*

Security will be maintained by utilizing and maintaining the existing six-foot high chain link fence surrounding the property. The fence will be maintained throughout the project and access gates will be kept closed during daily operations and closed and locked at other times.

6.3.8 *Traffic Control*

Drivers of trucks leaving the subject property with soil/fill will be instructed to proceed without stopping in the vicinity of the subject property to prevent neighborhood impacts.

6.3.9 *Demobilization*

Following the completion of remedial activities at the subject property, equipment and remedial structures will be decontaminated and dismantled and removed from the subject property. Sediment and erosion control measures and solid wastes generated during remedial activities (i.e., polyethylene sheeting) will be properly disposed of.

6.4 **Reporting**

Daily and monthly reports will be included in the IRM Completion Report.

6.4.1 *Daily Reports*

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the subject property;
- References to alpha-numeric map for remedial activities;
- A summary of complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions; and
- An explanation of notable conditions.

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Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the IRM Work Plan or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the IRM Work Plan will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the subject property that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and complaints received from the public.

A map that shows a predefined alpha-numeric grid for use in identifying locations described in reports shall be submitted to NYSDEC following completion of the in-situ soil delineation and waste characterization discussed in Section 5.3.

The NYSDEC assigned project number will appear on reports.

6.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the month of the reporting period and will include:

- Activities relative to the subject property during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

6.4.3 Other Reporting

Photographs will be taken of remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate remedial program elements and will be of acceptable quality. Representative photos of the subject property prior to any remedial actions will be provided. Representative photos will be provided of each contaminant source, source area and structures before, during and after remediation. Photos will be included in the daily reports as needed, and a comprehensive collection of photos will be included in the IRM Completion Report.

Job record keeping for remedial work will be appropriately documented. These records will be maintained at the subject property during the project and be available for inspection by NYSDEC and NYSDOH staff.

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6.4.4 *Complaint Management*

Complaints from the public regarding nuisance or other conditions will be reported directly to the NYSDEC project manager and included in the daily reports.

6.5 Soil/Materials Management Plan

This section presents the approach to managing, disposing, and reusing soil, fill, and debris excavated from the subject property. This plan is based on the current knowledge of conditions and will be augmented with additional data collected during remediation, as needed. Environmental scientists and/or engineers under direct supervision of the RE will monitor and document the handling and transporting of material removed from the subject property to a proper disposal facility as a regulated waste or as an unregulated waste, as applicable. Environmental scientists and/or engineers under direct supervision of the RE will assist the remedial contractor in identifying impacted materials during excavation, determining materials suitable for direct load out versus temporary stockpiling, selection of samples for waste characterization, and determining the proper disposal facility.

Stockpiling of impacted soil is not anticipated; however, if stockpiles become necessary, separate stockpile areas will be constructed as needed for the various materials to be excavated or generated, with the intent to most efficiently manage and characterize the materials and to avoid co-mingling impacted materials with non-impacted soil.

6.5.1 *Soil Screening Methods*

Visual, olfactory and photoionization detector (PID) soil screening and assessment will be performed by environmental scientists and/or engineers under direct supervision of the RE during IRM excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include excavation and invasive work performed during the remedy prior to issuance of the Certificate of Completion.

Screening will be performed by environmental scientists and/or engineers under direct supervision of the RE. Resumes will be provided for personnel responsible for field screening (i.e. those representing the RE) of invasive work for unknown contaminant sources during remediation.

6.5.2 *Stockpile Methods*

Stockpiling of impacted soils is not anticipated during the IRM. If the necessity for stockpiling impacted soils arises, the following procedures will be followed.

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

Stockpiles will be kept covered when not actively in use with appropriately anchored tarps. Stockpiles will be routinely inspected, and damaged tarp covers will be promptly replaced.

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

Water will be available at suitable supply and pressure for use in dust control.

6.5.3 Materials Excavation and Load Out

Environmental scientists and/or engineers under direct supervision of the RE will oversee invasive work and the excavation and load-out of excavated material.

The Volunteer and its contractors are solely responsible for safe execution of invasive and other work performed under this Plan.

The presence of utilities and easements on the subject property has been investigated by the Volunteer and its contractors. It has been determined that no risk or impediment to the planned work under this IRM Work Plan is posed by utilities or easements on the subject property.

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

Vehicles leaving the subject property will not be overloaded. The Remedial Contractor's representative will make reasonable efforts to ensure that vehicles are not loaded beyond their NYSDOT weight rating and that material is secured beneath the truck bed cover.

A truck wash will be operated at the subject property. The Remedial Contractor will be responsible for ensuring that outbound trucks will be washed at the truck wash before leaving the subject property until the remedial action is complete.

Locations where vehicles enter or exit the subject property shall be inspected daily for evidence of sediment tracking.

The Remedial Contractor will be responsible for ensuring that egress points for truck and equipment transport from the subject property will be clean of dirt and other materials derived from the subject property during remediation. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to materials derived on the subject property.

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

Mechanical processing of historical fill and contaminated soil on the subject property is prohibited, unless approved by the NYSDEC.

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6.5.4 *Materials Transport*

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

Truck transport routes are as follows:

- Exit the property and head south toward Madison Avenue Bridge for 0.3 miles;
- Turn right onto Madison Avenue Bridge for 0.3 Miles;
- Turn right onto 5th Avenue for 226 feet; and
- Turn right onto Harlem River Drive ramp for 0.2 miles and merge onto Harlem River Drive north.

Trucks loaded with materials will exit the vicinity of the property using only these approved truck routes, unless traffic, road work, or other conditions necessitate alternate routing. Truck operators are responsible for traffic signs and detours.

Proposed in-bound and out-bound truck routes to the subject property are described above. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive areas; (b) use of city mapped truck routes; (c) prohibiting queuing of trucks, to the extent feasible, entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

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

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

Queuing of trucks will be performed on the subject property to the extent feasible in order to minimize disturbance to the neighboring properties.

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

Trucks will be washed prior to leaving the subject property. Truck wash waters will be collected and disposed of in an appropriate manner.

6.5.5 *Materials Disposal*

The disposal locations are to be determined. Disposal location established at a later date will be reported to the NYSDEC Project Manager.

The total disposal volume will be dependent on the final excavation depths necessary.

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Soil/fill/solid waste excavated and removed from the subject property will be treated as contaminated and regulated material and will be disposed in accordance with Federal, State (including 6NYCRR Part 360) and local regulations. If disposal of soil/fill from this property is proposed for unregulated disposal (i.e. clean soil removed for remediation purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated management of materials from this property is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the RE for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the subject property conforms with applicable laws: (1) a letter from the RE or BCP Volunteer, or designee to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation project in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of chemical data for the material being transported (including Characterization data); and (2) a letter from receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the IRM Completion Report.

Non-hazardous historic fill and contaminated soils will be handled, at minimum, as a Municipal Solid Waste per 6 NYCRR Part 360-1.2

Historical fill and contaminated soils from the subject property are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the subject property are considered by the Division of Materials Management (DMM) in NYSDEC to be C&D materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C&D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DMM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C&D facility that provides a detailed explanation that the material is derived from a DER remediation project, that the soil material is contaminated and that it must not be redirected to Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of chemical data for the material being transported.

The IRM Completion Report will include an accounting of the destination of material removed from the subject property during this remedial action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation

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associated with disposal of material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the IRM Completion Report.

Bill of Lading system or equivalent will be used for movement of non-hazardous wastes and contaminated soils. This information will be reported in the IRM Completion Report.

Hazardous wastes derived from remedial activities will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed and will be in full compliance with applicable Federal, State and local regulations.

Waste characterization will be performed for disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and quality assurance / quality control (QA/QC) will be reported in the IRM Completion Report. Data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

6.5.6 Materials Reuse

Materials reuse is not anticipated. In the event that materials will be reused, NYSDEC will be notified in advance and provided with details regarding the material's origin, volumes and sampling data. Such material will not be reused without approval from the NYSDEC project manager.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing is prohibited for reuse.

Contaminated material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the IRM Completion Report.

6.6 Remedial Performance Evaluation (Post-Excavation Sampling)

Following removal of impacted soils from the subject property as a part of the IRM, confirmatory soil samples are not anticipated to be collected from the excavation area due to the anticipated future deeper excavation and larger remedial action. However, in the case that confirmatory soil samples are collected, they will be collected in accordance with NYSDEC DER-10. Results will be compared to NYSDEC RRUSCOs.

6.6.1 End-Point Sampling Frequency

As specified in DER-10, verification sampling will consist of collecting endpoint soil samples from within each excavation area. DER-10 specifies a sampling frequency of one bottom sample from the excavation for every 900 square feet of bottom, and one sidewall sample for every 30 linear feet of sidewall.

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Endpoint soil samples will be submitted to a NYSDOH ELAP certified laboratory and analyzed for:

- VOCs by USEPA Method 8260;
- SVOCs by USEPA Method 8270;
- Pesticides/PCBs by USEPA Method 8081/8082;
- Trivalent & Hexavalent Chromium by USEPA Method 7196;
- Total Cyanide by USEPA Method 9012;
- Metals by USEPA Method 6010/7471; and
- Silvex by USEPA Method 8151.

6.6.2 Methodology

If deemed necessary, excavation soil endpoint samples will be collected when the limits of the IRM excavation have been reached. Endpoint samples will be collected utilizing a properly decontaminated stainless-steel hand auger and/or dedicated polyethylene scoop.

Samples collected for volatile organic analysis will be collected utilizing tera-core sampling devices. The remaining sample volume will be transferred to a stainless-steel bowl and homogenized. Once homogenized, samples will be transferred to laboratory supplied glassware, packed in a cooler with ice and shipped under proper chain-of-custody procedures to a NYSDOH ELAP certified laboratory for analysis in accordance with NYSDEC Analytical Services Protocol (ASP) Category B Data Deliverable packages and electronic data deliverables (EDDs) (in EQuIS format) will be furnished by the laboratory.

6.6.3 Reporting of Results

Data collected during the IRM will be tabulated and reviewed. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain items specified in the USEPA SW-846 appropriate for the analyses to be performed and be reported in standard format. Data will also be submitted to NYSDEC's Environmental Information Management System in the standardized electronic data deliverable format.

6.7 Backfill from Approved Sources

The importation of backfill is not proposed as a part of this IRM. However, if backfill does end up needing to be imported, it would be done via the following guidelines.

Materials proposed for import onto the subject property will be approved by the RE and will be in compliance with provisions in this IRM Work Plan prior to receipt at the subject property.

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

- Clean soil from construction projects at non-industrial properties in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;

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- Clean RCA from facilities permitted or registered by the regulations of NYSDEC;
- Materials where the NYSDEC has issued a beneficial use determination (BUD), pursuant to 6 NYCRR Part 360; and
- Gravel, rock or stone consisting of virgin material from a permitted mine or quarry.

6.7.1 Source Screening, Testing, and Import

The imported uncontaminated, soil will be from an approved source/facility and will be evaluated by the RE to ensure:

1. That a segregated stockpile is properly maintained at the source and will not be comingled with other material prior to importing the clean soil material at the subject property;
2. That the material does not include solid waste, including construction and demolition material, as it's prohibited;
3. That screening for evidence of contamination by visual, olfactory and PID soil screening practices prior to testing at the source as well as upon importing to the subject property is completed; and,
4. That soil samples will be collected from the segregated stockpile at the source at a frequency specified in Table 5.4(e)10 of DER-10 or at an alternate frequency approved by the NYSDEC Project Manager and analyzed for the following Full List parameters:
    a. VOCs by USEPA Method 8260C
    b. SVOCs by USEPA Method 8270D
    c. Metals by USEPA Method 6010C/7471B
    d. Pesticides & PCBs by USEPA Method 8081B/8082A
    e. Trivalent & Hexavalent Chromium by USEPA Method 7196A
    f. Total Cyanide by USEPA Method 9012B
    g. Silvex by USEPA Method 8151A
    h. Per- and polyfluoroalkyl substance (PFAS) by USEPA Method 537 Modified
    i. 1,4-Dioxane by USEPA Method 8270-SIM

Upon receipt of the segregated stockpile analytical results collected at the source, a Request to Import/Reuse Fill or Soil form will be submitted to the NYSDEC Project Manager for review/approval prior to importing. The report will include the following:

1. Summary of number of samples collected and analyzed, tabulated data and comparison:
    a. Lower of RRUSCOs or Protection of Groundwater Soil Cleanup Objectives (POGWSCOs)
    b. For 1,4-Dioxane, soil exceeding 0.1 ppm must be rejected per DER-10: Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil, Subdivision 5.4(e).
    c. If perfluorooctanoic acid (PFOA) or perfluorooctanesulfonic acid (PFOS) is detected in any sample at or above 1 microgram per kilogram (µg/kg), then soil should be tested by synthetic precipitation leaching procedure (SPLP) and the leachate analyzed for PFAS. If the SPLP result exceeds 10 parts per trillion (ppt) for either PFOA or PFAS (individually) then the source of backfill should be rejected, unless an exemption is provided by DER

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2. Analytical data sheets and chain of custody documentation;
3. Summary of number of tons (number cubic of yards);
4. Photographs from the segregated stockpile at the source with sample point locations identified;
5. An affidavit from the source/facility on company letterhead stating that the segregated stockpile for number of tons (number of cubic yards) has been properly maintained at the source and complies with the requirements listed above; and,
6. A copy of source/facility NYSDEC permit, if applicable.

The materials may be placed following approval of backfill by the NYSDEC.

Upon importing the approved soil, the following documentation will be presented in the IRM Completion Report:

1. Truck transportation slips from the source to the subject property;
2. Confirmation of number of tons (number cubic of yards) of approved clean soil material imported to the subject property;
3. Plan depicting areas where the approved clean soil has been placed; and,
4. Photographs documenting the importing and grading of the approved clean soil across the subject property.

6.8 Stormwater Pollution Prevention

Storm water pollution prevention measures detailed below will be implemented during IRM activities.

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the subject property and available for inspection by NYSDEC. 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 shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the IRM Work Plan shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters

Silt fencing or hay bales will be installed around the entire perimeter of the remedial area.

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6.9 Contingency Plan

If USTs or other previously unidentified contaminant sources are found during the IRM excavation, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (metals; VOCs, SVOCs, pesticides, herbicides and PCBs). Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

6.10 Deviations from the Interim Remedial Measure Work Plan

In the event that remedial activities require deviation from the IRM Work Plan due to unforeseen conditions, a detailed description of the conditions and required deviations from the IRM Work Plan will be submitted to the NYSDEC project manager. The description will include the reasons that dictate deviation from the IRM Work Plan, changes/editions to the IRM Work Plan, and how the proposed remedy is affected.

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7.0 HEALTH AND SAFETY

7.1 Health and Safety Plan

A project-specific HASP for environmental work is included as **Appendix B**. Contractors or sub-contractors working at the subject property may adopt this HASP or provide their own HASP for review and approval by NYSDEC prior to conducting work. If contractors provide their own HASP, it must meet the minimum requirements of the HASP included in **Appendix B**. The HASP is consistent with the requirements of NYSDEC DER–10, Occupational Safety and Health Administration (OSHA) (29 CFR 1910 and 1926), Federal, State and local authorities. The HASP will be followed during any ground intrusive activities that may encounter contaminated soil at the subject property.

7.2 Worker Training and Monitoring

The investigations performed to date have not identified the presence of hazardous wastes at the subject property. In the event, hazardous substances are identified during implementation of the IRM Work Plan, the United States Department of Labor's "hazardous waste operations and emergency response" standard shall be followed. This includes requirements for workers training and monitoring.

- Workers participating in cleanup of hazardous materials are required to be trained in 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing hazardous material in contaminated areas.

7.3 Community Air Monitoring Plan

Real-time air monitoring for volatile organic vapors and particulate levels at the perimeter of the exclusion zone or work area will be performed in accordance with the CAMP included as **Appendix C.** Air monitoring locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and downwind monitoring station. Continuous monitoring will be performed for ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil excavation and handling. CAMP monitoring shall continue until native soils and/or fill material are capped by a minimum of 12-inches of clean cover material.

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

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7.4 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors. Specific odor control methods which may be used on a routine basis may include:

- Limiting the area of open excavations.
- Limiting the size of soil stockpiles.
- Shrouding open excavations with tarps and other covers.
- Use of foams to cover exposed odorous soils.
- Other industry standard odor control methods.

If nuisance odors are identified at the property boundary, or if odor complaints are received, work generating such odors will be halted and the source of odors will be identified and corrected. Work will not resume in the area in question until nuisance odors have been abated. NYSDEC and NYSDOH will be notified of odor events and of any other complaints about the project. Implementation of odor controls, including the halt of work, is the responsibility of the Remedial Contractor, and any measures that are implemented will be discussed in the IRM Completion Report.

Necessary means will be employed to prevent nuisances. These measures may include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

7.5 Dust Control Plan

A dust suppression plan that addresses dust management during intrusive work may include one or more of the items listed below:

- Dust suppression will be achieved using a dedicated water truck, or other water source for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Gravel may be used on roadways, as appropriate, to provide a clean and dust-free road surface.
- Roads will be limited in total area to minimize the area required for water truck sprinkling.

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8.0 INTERIM REMEDIAL MEASURE COMPLETION REPORT

An IRM Completion Report will be submitted to NYSDEC following implementation of the IRM defined in this IRM Work Plan.

The IRM Completion Report will incorporate the details and findings of the IRM activities performed as outlined in this work plan. The report will identify disposal information, soil disposal volumes, and manifests, site restoration details and results of CAMP monitoring.

Electronic copies of the IRM Completion Report will be submitted to the NYSDEC. Analytical results of the investigation will be submitted in the electronic data delivery EDD format through the Departments environmental information management system (EIMS).

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FIGURES

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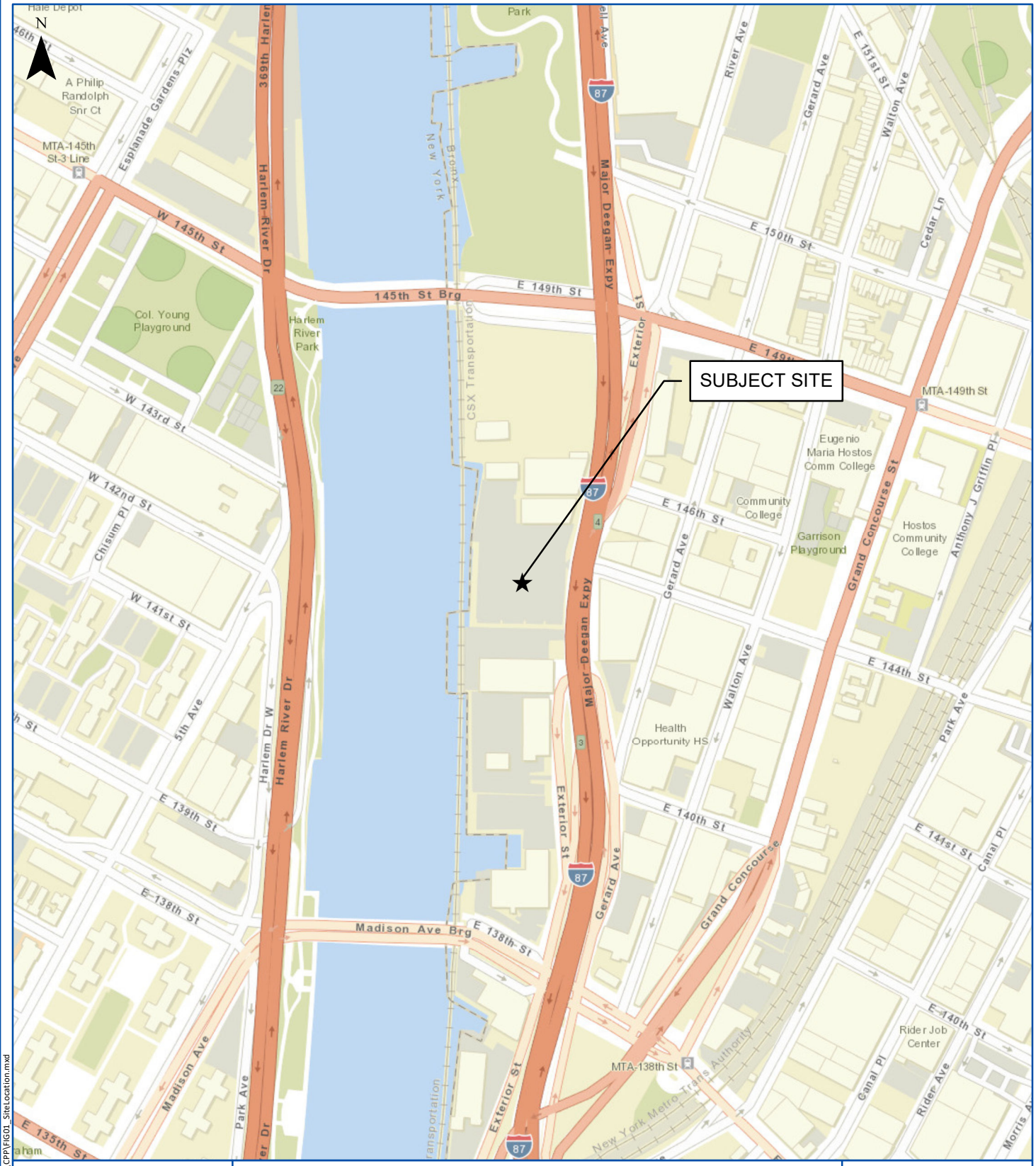

SITE LOCATION

399 Exterior Street
Bronx, NY

0 250 500 750 1,000 Feet

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Project:	1802.A
Date:	11/3/2020
Designed by:	DE
Drawn by:	TS
Approved by:	DE
Figure No:	1

Document Path: W:\Projects\E-L\LST\1802.A\maps\CPP\FIG01_SiteLocation.mxd

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DRAWING PREPARED FOR:

399 Exterior Street LLC
3150 Brunswick Pike, Suite 310
Lawrenceville, New Jersey 08648

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	LST1802.A	Designed by:	DE
Date:	5/6/2020	Drawn by:	TS
Scale:	AS SHOWN	Approved by:	DE

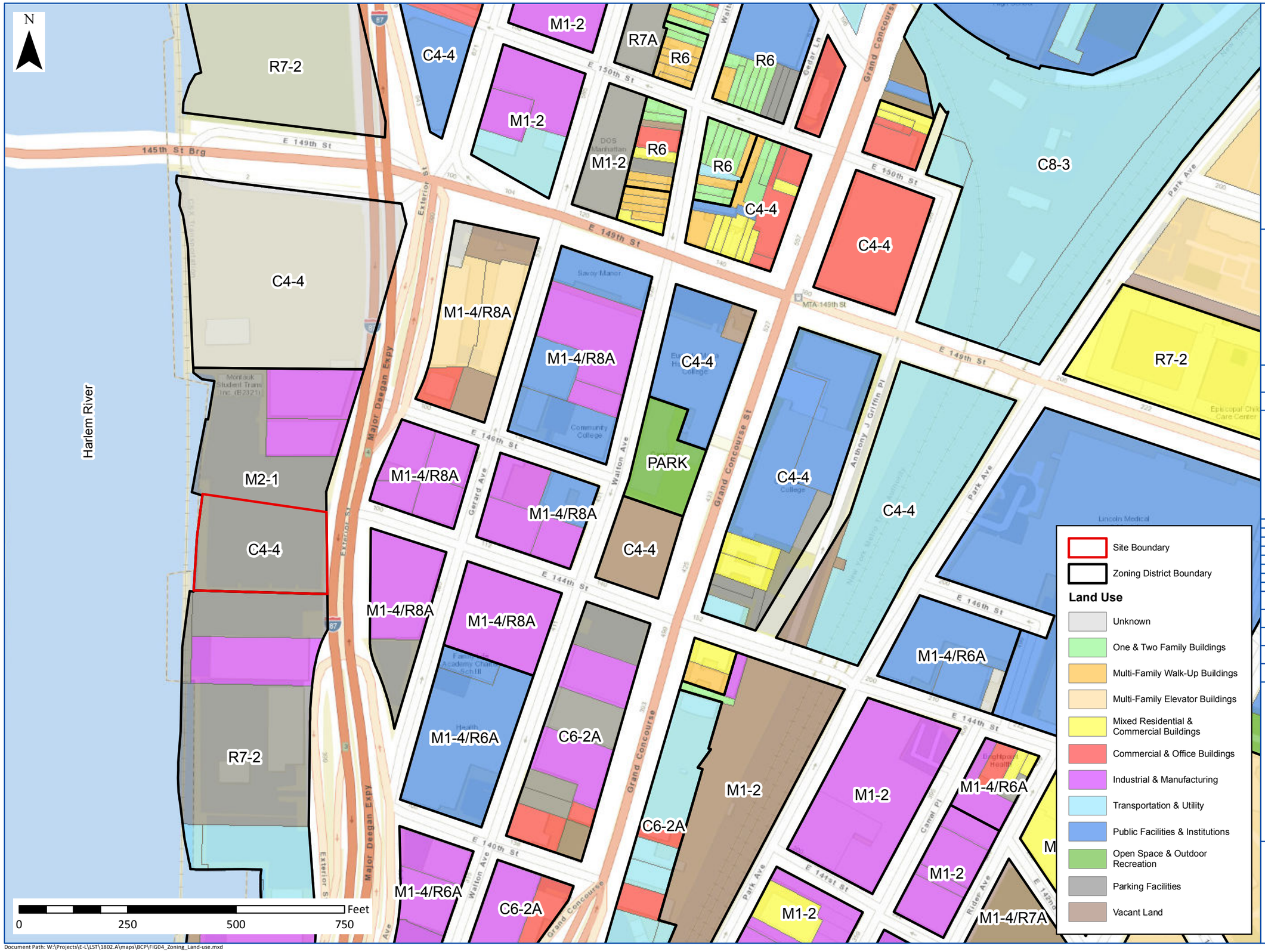
Subject Property Plan

399 Exterior Street
Bronx, NY

FIGURE NO:

2

Document Path: W:\Projects\E-L\LST\1802.A\maps\BCP\FIG02_SitePlan.mxd



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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

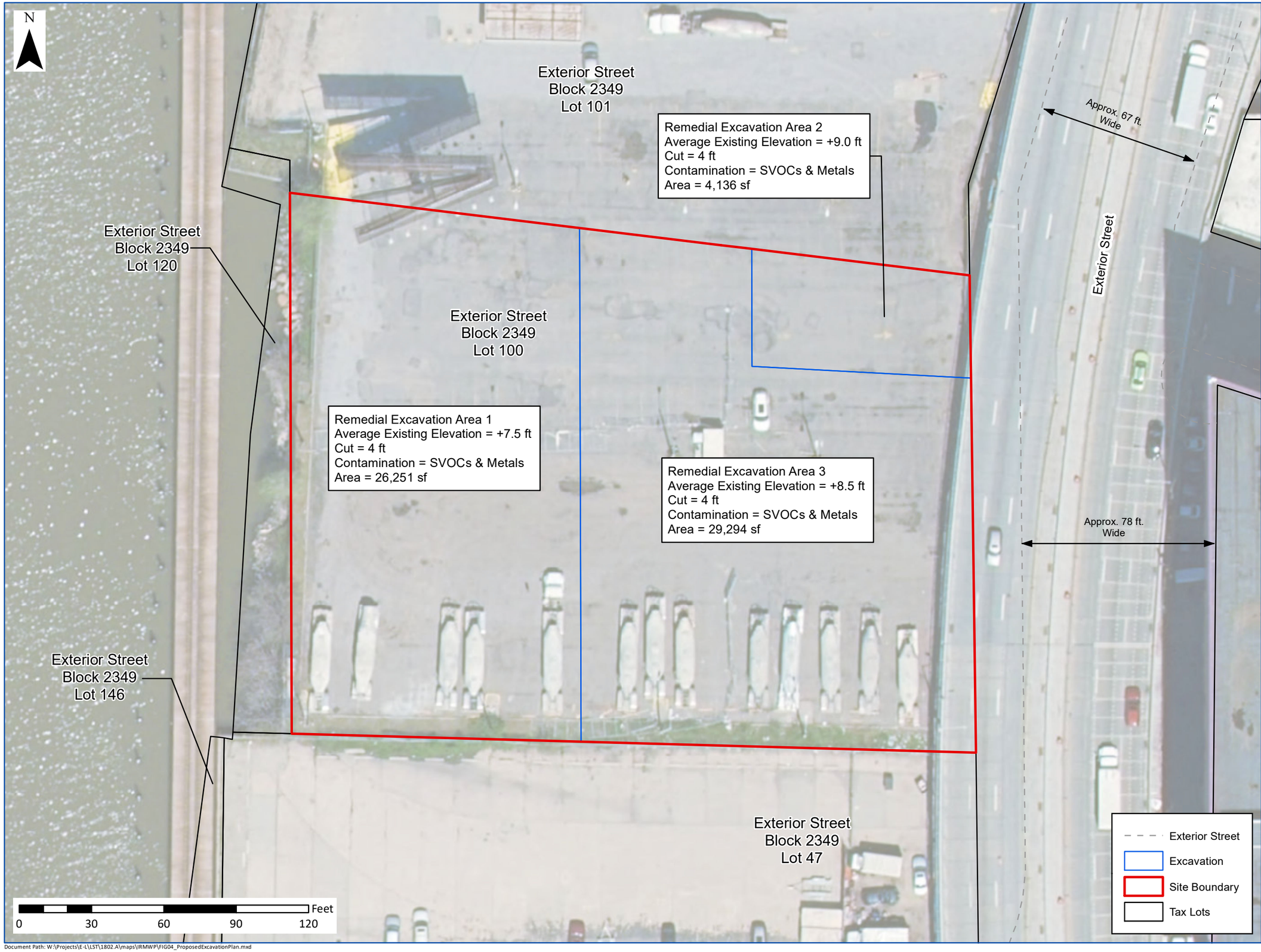
Project:	LST1802.A	Designed by:	DE
Date:	5/6/2020	Drawn by:	TS
Scale:	AS SHOWN	Approved by:	DE

Surrounding Land Use

399 Exterior Street
Bronx, NY

FIGURE NO:

3



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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	LST1802.A	Designed by:	DE
Date:	11/4/2020	Drawn by:	TS
Scale:	AS SHOWN	Approved by:	DE

Proposed IRM Excavation Plan

399 Exterior Street
Bronx, NY

FIGURE NO:

4

APPENDIX A
METES AND BOUNDS

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METES & BOUNDS

Tax Lot 100R

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

BEGINNING at a point on the westerly side of Exterior Street, being distant 685.67 feet from the corner formed by the intersection of the westerly side of Exterior Street and the southerly side of East 149th Street as measured along the westerly side of Exterior Street;

RUNNING THENCE southerly along the westerly side of Exterior Street, 189.38 feet;

THENCE south 62 degrees 12 minutes 30.3 seconds west, 277.22 feet;

THENCE north 29 degrees 10 minutes 01 seconds west, 230.23 feet;

THENCE on an interior angle of 80 degrees 16 minutes 45.1 seconds , 281.36 feet to the westerly side of Exterior Street, to the point or place of BEGINNING.

Said Exterior Street being the service road for the Major Deegan Expressway.

.

APPENDIX B
HEALTH AND SAFETY PLAN

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399 EXTERIOR STREET SITE
399 EXTERIOR STREET
BRONX, NEW YORK 10451
NYSDEC BCP ID: C203139

HEALTH AND SAFETY PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 1233-702

PREPARED FOR:

399 Exterior Street LLC
3150 Brunswick Pike, Suite 310
Lawrenceville, New Jersey 08648

PREPARED BY:

P.W. Grosser Consulting, Inc.
One Penn Plaza, 36th Floor
New York, NY 10119
Phone: 212-786-7420

PWGC Project Number: LST1802A

JANUARY 2021

HEALTH AND SAFETY PLAN
399 EXTERIOR STREET
BRONX, NEW YORK 10451

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FIGURES

APPENDICES

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ACRONYM	DEFINITION
APR	Air Purifying Respirator
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
FER	Final Engineering Report
HASP	Health and Safety Plan
IDLH	Immediately Dangerous to Life and Health
NIOSH	National Institute for Occupational Safety and Health
NYCRR	New York Codes, Rules, and Regulations
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PID	Photo-ionization Detector
PPE	Personal Protective Equipment
ppm	parts per million
PWGC	P.W. Grosser Consulting, Inc.
RRUSCO	Restricted-Residential Use Soil Cleanup Objective
SCBA	Self-Contained Breathing Apparatus
sf	square-foot
SMP	Site Management Plan
SOE	Support of Excavation
SVOC	Semi-volatile Organic Compound
UST	Underground Storage Tank
VOC	Volatile Organic Compound

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STATEMENT OF COMMITMENT

Remedial employees may be exposed to chemical contaminants of concern identified within the soil/fill during the planned remedial activities to be performed on the 399 Exterior Street, Bronx, New York project. P.W. Grosser Consulting, Inc. (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, use of appropriate personal protective equipment (PPE), and the following activity specific safety protocols contained in this Health and Safety Plan (HASP). PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP describes emergency response procedures for actual and potential chemical hazards. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees as it relates to general construction practices.

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1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by PWGC at the request of 399 Exterior Street LLC for the proposed remedial activities to be performed at the 399 Exterior Street, Bronx, New York to protect personnel, visitors, and the public from exposure to hazardous materials or wastes. In accordance with the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this HASP, including the attachments, addresses safety and health hazards relating to each phase of remedial operations and is based on the best information available. The HASP may be revised by PWGC at the request of 399 Exterior Street LLC upon receipt of new information regarding conditions at the subject property. Changes will be documented by written amendments.

1.1 Site Safety Plan Acceptance, Acknowledgement and Amendments

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

Conditions encountered during remediation may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in **Appendix B**.

1.2 Daily Safety Meetings

Each day before work begins; the site safety officer will hold safety (tailgate or tool box) meetings to ensure that personnel understand the conditions and operating procedures and to address safety questions and concerns. Meeting minutes and attendance will be recorded. Project staff will discuss and remedy health and safety issues at these meetings.

1.3 Key Personnel – Roles and Responsibilities

The following key personnel are planned for this project:

- Project Manager – Mr. Michael Gaul or alternate
- Site Safety Officer – Mr. Rich Lagatolla or alternate

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

The site safety officer is responsible for the following:

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1. Educating personnel about information in this HASP and other safety requirements to be observed during remedial operations, including, but not limited to, designation of work zones and levels of protection and emergency procedures dealing with fire and first aid.
2. Coordinating remedial safety decisions with the project manager.
3. Monitoring the condition and status of known hazards specified in this HASP.
4. Maintaining the work zone entry/exit log and subject property entry/exit log.
5. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook onsite).

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

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2.0 SITE BACKGROUND AND SCOPE OF WORK

The subject property is located at 399 Exterior Street in the Mott Haven section of the Bronx, New York and is identified as Block 2349 and Lot 100R on the New York City Tax Map. The subject property is approximately 1.32 acres and is bounded by commercial properties to the north and south, Exterior Street to the east, and the Harlem River to the west. The subject property contains an asphalt paved parking lot. The subject property is currently unoccupied.

The proposed interim remedial measure will consist of the following:

1. Demolition of existing surface improvements on the subject property.
2. Performance of a waste characterization / delineation soil sampling program.
3. Installation of support of excavation (SOE) to support interim remedial measure excavation.
4. Excavation of soil/fill exceeding Track 2 Restricted-Residential Use Soil Cleanup Objectives (RRUSCOs) to a depth of 4-5 feet below grade to facilitate installation of SOE and site remediation.
5. Implementation of a Community Air Monitoring Plan (CAMP) during earth disturbing work.
6. Screening for indications of contamination (by visual means, odor, and monitoring with photo-ionization detector (PID)) of excavated soil during any intrusive work.
7. Appropriate handling, transportation and disposal of contaminated materials removed from the subject property in accordance with Federal, State and local rules and regulations for handling, transport, and disposal.
8. Responsibilities associated with the IRM, including permitting requirements and pretreatment requirements, will be addressed in accordance with applicable Federal, State, and local rules and regulations.
9. Submission of a IRM Completion Report.

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3.0 CHEMICAL HAZARDS

Soil analytical results detected concentrations of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals in exceedance of 6 New York Codes, Rules and Regulations (NYCRR) Part 375 RRUSCOs in several of the boring locations. The majority of contaminants were located in the shallow intervals where historic fill was observed and at the water table interface. No polychlorinated biphenyls (PCBs) or Pesticides were detected at concentrations in excess of the RRUSCOs.

SVOCs:
Soil concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene exceeded RRUSCOs.

Metals:
Soil concentrations of barium, copper, lead and mercury exceeded RRUSCOs.

Appendix C includes information sheets for the known and suspected chemicals that may be encountered at the subject property.

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4.0 PERSONAL PROTECTIVE EQUIPMENT

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

4.1 Level D

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

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

4.2 Level C

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

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

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

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4.3 Level B

Level B PPE shall be donned when the contaminants have not been identified and/or the concentrations of unknown measured total organic vapors in the breathing zone exceed 5 ppm (using a portable PID, or equivalent). Level B PPE shall be donned if the Immediately Dangerous to Life and Health (IDLH) of a known contaminant is exceeded. If a contaminant is identified or is expected to be encountered for which NIOSH and/or OSHA recommend the use of a positive pressure self-contained breathing apparatus (SCBA) when that contaminant is present, Level B PPE shall be donned even though the total organic vapors in the breathing zone may not exceed 5 ppm. Level B shall be donned for confined space entry, and when the atmosphere is oxygen deficient (oxygen less than 19.5%) or potentially oxygen deficient. If Level B PPE is required for a task, at least three people shall be donned in Level B at any one time during that task. PPE shall only be donned at the direction of the site safety officer. Level B PPE consists of:

- supplied air SCBA or air line system with five minute egress system;
- chemical resistant coveralls;
- steel-toe work boots;
- chemical resistant over boots or disposable boot covers;
- disposable inner gloves;
- disposable outer gloves;
- hard hat; and,
- ankles/wrists taped.

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

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5.0 CONTINGENCY PLAN / EMERGENCY RESPONSE PLAN

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

Emergency telephone numbers and a map to the hospital (**Figure 1**) will be posted in the command post. Personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment. These will be outlined in the site specific HASP.

5.1 Emergence Equipment Onsite

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

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

5.2 Emergency Telephone Numbers

General Emergencies	911
New York City Police	911
Lincoln Medical Center	1-718-579-5000
NYSDEC Spills Division	1-800-457-7362
NYSDEC Hazardous Waste Division	1-718-482-4996
NYCDEP	1-212-639-9675
NYC Department of Health	1-212-788-4711
NYC Fire Department	911
National Response Center	1-800-424-8802
Poison Control	1-212-764-7667

A copy of this page shall be posted in the office.

5.3 Medical Emergencies

A person who becomes ill or injured, first aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

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

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5.4 Fire or Explosion

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

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

5.5 Evacuation Routes

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

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

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

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FIGURE

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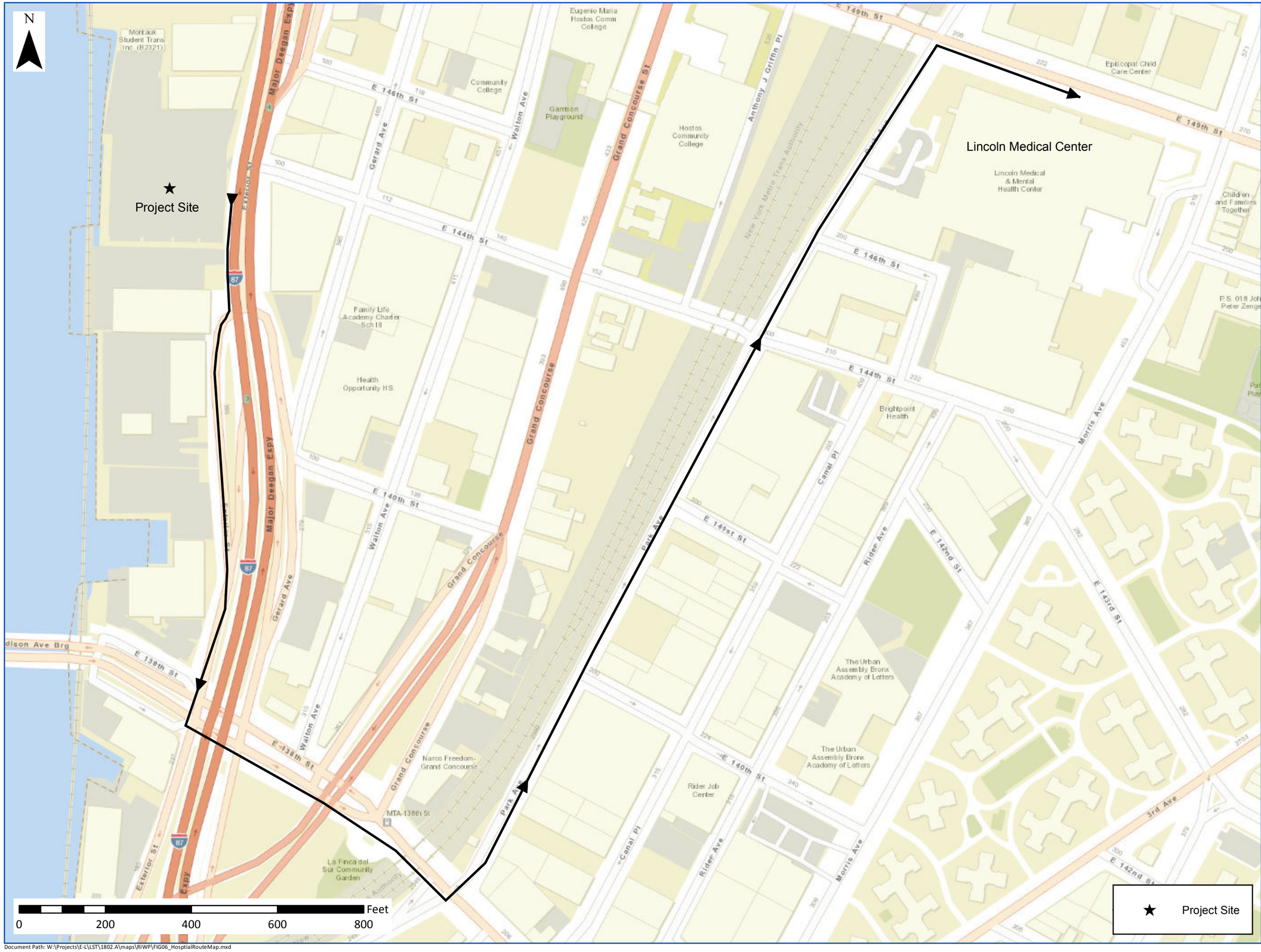

Document Path: W:\Projects\E-L\LST\1802.A\maps\RIWP\FIG06_HosptialRouteMap.mxd

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CLIENT DRIVEN SOLUTIONS
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630 Johnson Ave., Suite 7
Bohemia, NY 11716
Ph: 631-589-6353 • Fax: 631-589-8705
pwgc.info@pwgrosser.com

DRAWING PREPARED FOR:

399 Exterior Street LLC
3150 Brunswick Pike, Suite 310
Lawrenceville, New Jersey 08648

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	LST1802.A	Designed by:	DE
Date:	5/6/2020	Drawn by:	TS
Scale:	AS SHOWN	Approved by:	DE

HOSPITAL ROUTE

399 Exterior Street to
Lincoln Medical Center
234 E 149th St
The Bronx, NY

FIGURE NO:

1

APPENDIX A
SITE SAFETY PLAN ACCEPTANCE AND ACKNOWLEDGMENT FORM

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SITE SAFETY PLAN ACKNOWLEDGEMENT FORM

I have been informed and understand the procedures set forth in the health and safety plan and amendments:

Printed Name	Signature	Representing	Date

APPENDIX B
SITE SAFETY AMENDMENT FORM

P.W. GROSSER CONSULTING, INC.
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SITE SAFETY PLAN AMENDMENT FORM

SITE SAFETY PLAN AMENDMENT # _____: _____

SITE NAME: _____

REASON FOR AMENDMENT: _____

_____

_____

ALTERNATIVE PROCEDURES: _____

_____

_____

REQUIRED CHANGES IN PPE: _____

_____

_____

_____ _____

PROJECT SUPERINTENDENT DATE

_____ _____

HEALTH & SAFETY CONSULTANT DATE

_____ _____

SITE SAFETY OFFICER DATE

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APPENDIX C
CHEMICAL HAZARDS

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MERCURY

0056
April 2004

CAS No: 7439-97-6
RTECS No: OV4550000
UN No: 2809
EC No: 080-001-00-0

Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.

EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
Inhalation	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
Skin	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
Eyes		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

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

EMERGENCY RESPONSE	STORAGE
Transport Emergency Card: TEC (R)-80GC9-II+III	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Well closed.

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Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission

SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.

Chemical dangers
Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.

Occupational exposure limits
TLV: 0.025 mg/m^3 as TWA; (skin); A4; BEI issued; (ACGIH 2004).
MAK: 0.1 mg/m^3; Sh; Peak limitation category: II(8); Carcinogen category: 3B; (DFG 2003).

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!

Inhalation risk
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20/C.

Effects of short-term exposure
The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated.

Effects of long-term or repeated exposure
The substance may have effects on the central nervous system and kidneys, resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. May cause inflammation and discoloration of the gums. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

PHYSICAL PROPERTIES

Boiling point: 357/C
Melting point: -39/C
Relative density (water = 1): 13.5
Solubility in water: none
Vapour pressure, Pa at 20/C: 0.26
Relative vapour density (air = 1): 6.93
Relative density of the vapour/air-mixture at 20/C (air = 1): 1.009

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.

NOTES

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

ADDITIONAL INFORMATION

LEAD

0052
October 2002

CAS No: 7439-92-1
RTECS No: OF7525000

Lead metal
Plumbum
(powder)
Pb
Atomic mass: 207.2

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	**See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.**	**PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.	

EMERGENCY RESPONSE	SAFE STORAGE
	Separated from food and feedstuffs and incompatible materials. See Chemical Dangers.

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IMPORTANT DATA

Physical State; Appearance
BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.

Physical dangers
Dust explosion possible if in powder or granular form, mixed with air.

Chemical dangers
On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.

Occupational exposure limits
TLV: 0.05 mg/m^3 as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004).
MAK: Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004).
EU OEL: as TWA 0.15 mg/m^3; (EU 2002).

Routes of exposure
The substance can be absorbed into the body by inhalation and by ingestion.

Inhalation risk
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

Effects of long-term or repeated exposure
The substance may have effects on the blood, bone marrow, central nervous system, peripheral nervous system and kidneys, resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 1740/C
Melting point: 327.5/C
Density: 11.34 g/cm^3
Solubility in water: none

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
Do NOT take working clothes home.
Card has been partly updated in April 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

INDENO(1,2,3-cd)PYRENE

0730

March 1999

CAS No: 193-39-5
RTECS No: NK9300000

o-Phenylenepyrene
2,3-Phenylenepyrene
$C_{22}H_{12}$
Molecular mass: 276.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

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IMPORTANT DATA

Physical State; Appearance
YELLOW CRYSTALS

Chemical dangers
Upon heating, toxic fumes are formed.

Occupational exposure limits
TLV not established.
MAK: Carcinogen category: 2; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 536/C
Melting point: 164/C

Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.58

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in fish.

NOTES

Indeno(1,2,3-cd)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing Indeno(1,2,3-c,d)pyrene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

DIBENZO(a,h)ANTHRACENE

0431

October 1995

CAS No: 53-70-3
RTECS No: HN2625000
EC No: 601-041-00-2

1,2:5,6-Dibenzanthracene
$C_{22}H_{14}$
Molecular mass: 278.4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness.	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	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Well closed.

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IMPORTANT DATA

Physical State; Appearance
COLOURLESS CRYSTALLINE POWDER.

Occupational exposure limits
TLV not established.

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
The substance may have effects on the skin, resulting in photosensitization. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 524/C
Melting point: 267/C
Relative density (water = 1): 1.28

Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.5

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in seafood.

NOTES

This 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.
DBA is a commonly used name.
This substance is one of many polycyclic aromatic hydrocarbons (PAH).
Card has been partly updated in October 2005. See section EU classification.

ADDITIONAL INFORMATION

COPPER

0240
September 1993

CAS No: 7440-50-8
RTECS No: GL5325000
UN No:
EC No:

Cu
Atomic mass: 63.5

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
EXPLOSION			
EXPOSURE		**PREVENT DISPERSION OF DUST!**	
Inhalation	Cough. Headache. Shortness of breath. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder. Then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).	Symbol R: S:

EMERGENCY RESPONSE	STORAGE
	Separated from: see Chemical Dangers.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.

Chemical Dangers
Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard.

Occupational Exposure Limits
TLV: ppm; 0.2 mg/m^3 fume (ACGIH 1992-1993).
TLV (as Cu, dusts & mists): ppm; 1 mg/m3 (ACGIH 1992-1993).

Routes of Exposure
The substance can be absorbed into the body by inhalation and by ingestion.

Inhalation Risk
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

Effects of Short-term Exposure
Inhalation of fume may cause metal fever (see Notes).

Effects of Long-term or Repeated Exposure
Repeated or prolonged contact may cause skin sensitization.

PHYSICAL PROPERTIES

Boiling point: 2595°C
Melting point: 1083°C
Relative density (water = 1): 8.9
Solubility in water: none

ENVIRONMENTAL DATA

NOTES

The symptoms of metal fume fever do not become manifest until several hours.

ADDITIONAL INFORMATION

Safety (MSDS) data for chrysene

General

Synonyms: 1,2-benzophenanthrene, benzo(a)phenanthrene, 1,2-benzphenanthrene, coal tar pitch, benz(a)phenanthrene, 1,2,5,6-dibenzonaphthalene
Molecular formula: $C_{18}H_{12}$
CAS No: 218-01-9
EC No: 205-923-4

Physical data

Appearance: crystalline powder
Melting point: 253 C
Boiling point: 448 C
Vapour density:
Vapour pressure:
Density (g cm^{-3}): 1.27
Flash point:
Explosion limits:
Autoignition temperature:
Water solubility: insoluble

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Toxic. Confirmed animal carcinogen, possible human carcinogen. Harmful if

swallowed, inhaled or absorbed through the skin.

Toxicity data
(The meaning of any abbreviations which appear in this section is given here.)
IPR-MUS LD50 >320 mg kg^{-1}

Risk phrases
(The meaning of any risk phrases which appear in this section is given here.)
R20 R21 R22 R45 R46.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
UN No 2811. Packing group I. Hazard class 6.1. CDG UK Transport category 1. EMS No 6.1-04.

Personal protection

Safety glasses, good ventilation, gloves. Handle as a carcinogen. A COSHH assessment is required.

Safety phrases
(The meaning of any safety phrases which appear in this section is given here.)
S3 S7 S9 S36 S37 S39 S45.

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

BENZO(k)FLUORANTHENE

0721
March 1999

CAS No: 207-08-9
RTECS No: DF6350000
EC No: 601-036-00-5

Dibenzo(b,jk)fluorene
8,9-Benzofluoranthene
11,12-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission

IMPORTANT DATA

Physical State; Appearance
YELLOW CRYSTALS

Chemical dangers
Upon heating, toxic fumes are formed.

Occupational exposure limits
TLV not established.
MAK: Carcinogen category: 2; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 480/C
Melting point: 217/C

Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.84

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish.

NOTES

Benzo(k)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(k)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

BENZO(b)FLUORANTHENE

0720
March 1999

CAS No: 205-99-2
RTECS No: CU1400000
EC No: 601-034-00-4

Benz(e)acephenanthrylene
2,3-Benzofluoroanthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS CRYSTALS

Chemical dangers
Upon heating, toxic fumes are formed.

Occupational exposure limits
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK: Carcinogen category: 2; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans. May cause genetic damage in humans.

PHYSICAL PROPERTIES

Boiling point: 481/C
Melting point: 168/C
Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.12

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality.

NOTES

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

BENZO(a)PYRENE

0104
October 2005

CAS No: 50-32-8
RTECS No: DJ3675000
EC No: 601-032-00-3

Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
$C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	**See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.**	**AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	T Symbol N Symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Separated from strong oxidants.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
PALE-YELLOW CRYSTALS

Chemical dangers
Reacts with strong oxidants causing fire and explosion hazard.

Occupational exposure limits
TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005).
MAK: Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

Effects of long-term or repeated exposure
This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 496/C
Melting point: 178.1/C
Density: 1.4 g/cm^3

Solubility in water: none (<0.1 g/100 ml)
Vapour pressure : negligible
Octanol/water partition coefficient as log Pow: 6.04

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.

NOTES

Do NOT take working clothes home.
Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

BENZ(a)ANTHRACENE

0385
October 1995

CAS No: 56-55-3
RTECS No: CV9275000
EC No: 601-033-00-9

1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
$C_{18}H_{12}$
Molecular mass: 228.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		**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	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: complete protective clothing including self-contained breathing apparatus.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Well closed.

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International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission

IMPORTANT DATA

Physical State; Appearance
COLOURLESS TO YELLOW - BROWN FLUORESCENT FLAKES OR POWDER.

Physical dangers
Dust explosion possible if in powder or granular form, mixed with air.

Occupational exposure limits
TLV: A2 (suspected human carcinogen); (ACGIH 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Sublimation point: 435/C
Melting point: 162/C
Relative density (water = 1): 1.274
Solubility in water: none
Vapour pressure, Pa at 20/C: 292
Octanol/water partition coefficient as log Pow: 5.61

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur 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.
Card has been partly updated in October 2005. See sections Occupational Exposure Limits, EU classification.

ADDITIONAL INFORMATION

BARIUM

1052
October 1999

CAS No: 7440-39-3
RTECS No: CQ8370000
UN No: 1400

Ba
Atomic mass: 137.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Flammable. Many reactions may cause fire or explosion.	NO open flames, NO sparks, and NO smoking. NO contact with water.	Special powder, dry sand, NO hydrous agents, NO water.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		**PREVENT DISPERSION OF DUST! STRICT HYGIENE!**	
Inhalation	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
Eyes	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT wash away into sewer.	UN Hazard Class: 4.3 UN Pack Group: II

EMERGENCY RESPONSE	STORAGE
Transport Emergency Card: TEC (R)-43G12	Separated from halogenated solvents, strong oxidants, acids. Dry. Keep under inert gas, oil or oxygen-free liquid.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission

SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
YELLOWISH TO WHITE LUSTROUS SOLID IN VARIOUS FORMS.

Physical dangers
Dust explosion possible if in powder or granular form, mixed with air.

Chemical dangers
The substance may spontaneously ignite on contact with air (if in powder form). The substance is a strong reducing agent and reacts violently with oxidants and acids. Reacts violently with halogenated solvents. Reacts with water, forming flammable/explosive gas (hydrogen - see ICSC 0001), causing fire and explosion hazard.

Occupational exposure limits
TLV: 0.5 mg/m^3 (as TWA) (ACGIH 1999).

Routes of exposure
The substance can be absorbed into the body by ingestion.

Effects of short-term exposure
The substance irritates the eyes, the skin and the respiratory tract.

PHYSICAL PROPERTIES

Boiling point: 1640°C
Melting point: 725°C
Density: 3.6 g/cm^3
Solubility in water: reaction

ENVIRONMENTAL DATA

NOTES

Reacts violently with fire extinguishing agents such as water, bicarbonate, powder, foam, and carbon dioxide.
Rinse contaminated clothes (fire hazard) with plenty of water.

ADDITIONAL INFORMATION

APPENDIX D
FIELD ACCIDENT REPORT

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PWGC
CLIENT DRIVEN SOLUTIONS

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME: _____ PROJECT. NO.: _____

Date of Accident: _____ Time: _____ Report By: _____

Type of Accident (Check One):

( ) Vehicular ( ) Personal ( ) Property

Name of Injured: _____ DOB or Age _____

How Long Employed: _____

Names of Witnesses: _____

Description of Accident: _____

_____

_____

Action Taken: _____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

_____

_____

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claims through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

_____

_____

_____

APPENDIX C
COMMUNITY AIR MONITORING PLAN

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399 EXTERIOR STREET SITE
399 EXTERIOR STREET
BRONX, NEW YORK 10451
NYSDEC BCP ID: C203139

COMMUNITY AIR MONITORING PLAN

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 1233-702

PREPARED FOR:

399 Exterior Street LLC
3150 Brunswick Pike, Suite 310
Lawrenceville, New Jersey 08648

PREPARED BY:

P.W. Grosser Consulting, Inc.
One Penn Plaza, 36th Floor
New York, NY 10119
Phone: 212-786-7420

PWGC Project Number: LST1802A

JANUARY 2021

COMMUNITY AIR MONITORING PLAN
399 EXTERIOR STREET
BRONX, NEW YORK 10451

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ACRONYM	DEFINITION
µg/m^3	micrograms per cubic meter
APR	Air Purifying Respirator
BZ	Breathing Zone
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
HSM	Health and Safety Manager
Mph	miles per hour
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PID	Photo-ionization Detector
ppm	parts per million
PWGC	P.W. Grosser Consulting, Inc.
SCBA	Self-Contained Breathing Apparatus
SHSO	Site Health and Safety Officer
SVOC	Semi-volatile Organic Compound
TAGM	Technical and Administrative Guidance Manual
VOC	Volatile Organic Compound

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1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) provides measures for protection for onsite workers and the downwind community (i.e., offsite receptors including residences, businesses, and onsite workers not directly involved) from potential airborne contaminant releases resulting from remedial activities at the 399 Exterior Street, Bronx, New York project site.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial activities did not spread contamination offsite through the air.

The primary concerns for this site are semi-volatile organic compounds (SVOCs), metals and dust particulates.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- 29 Code of Federal Regulations (CFR) 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of protection for workers.
- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan: This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination offsite through the air.
- New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

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2.0 AIR MONITORING

The following sections contain information describing the types, frequency and location of real-time monitoring.

2.1 Real-Time Monitoring

This section addresses the real-time monitoring that will be conducted within the work area, and along the site perimeter, during intrusive activities such as excavation, manipulation of soil piles, soil sampling, etc.

2.1.1 Work Area

The following instruments will be used for work area monitoring:

- Photoionization Detector (PID)
- Dust Monitor (capable of providing 15-minute averages)

Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas.

2.1.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before excavation activities begin. These points will be monitored periodically in series during the site work.

Fugitive respirable dust will be monitored using a Thermo Electron Corporation Model pDR-1000AN/1200 aerosol monitor or equivalent. Air will be monitored for volatile organic vapors with a portable Photovac MicroTip PID, or equivalent. Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas. Air monitoring data is documented in a site logbook by the designated site safety officer. P.W. Grosser Consulting. Inc. (PWGC's) site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan.

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Table 1-1
Frequency and Location of Air Monitoring

ACTIVITY	AIR MONITORING INSTRUMENT	FREQUENCY AND LOCATION
Sampling & Excavation	PID, Dust Monitor (capable of providing 15-minute averages)	Continuous in Breathing Zone (BZ) during intrusive activities or if odors become apparent, screening in the BZ every 60 minutes during non-intrusive activities Continuous during ground intrusive activities by equipment that can provide 15-minute running average concentrations

Table 1-2
Real-Time Air Monitoring Action Levels

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
PID	BZ	0-25 parts per million (ppm), non-transient	None	Exposure below established exposure limits
PID	BZ	25-100 ppm, non-transient	Don Air Purifying Respirator (APR)	Based on potential exposure to VOCs
PID	BZ	>100 ppm, non-transient	Don Self-Contained Breathing Apparatus (SCBA), Institute vapor/odor suppression measures, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas.
PID	Work Area Perimeter	< 5 ppm	None	Exposure below established exposure limits.
PID	Work Area Perimeter	> 5 ppm	Stop work and implement vapor release response plan until readings return to acceptable levels, Notify Health Safety Manager (HSM).	Increased exposure to site contaminants, potential for vapor release to public areas

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AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
Aerosol Monitor (capable of providing 15-minute averages)	Work Area Perimeter	>100 but < 150 micrograms per cubic meter (µg/m^3) for 15 minutes	Institute dust suppression measures, Notify HSM.	Work to continue if particulate concentrations remain below 150 µg/m^3
Aerosol Monitor (capable of providing 15-minute averages)	Work Area Perimeter	>150 µg/m^3	Don SCBA, Institute dust suppression measures, Notify HSM.	Stop work and implement dust suppression techniques until readings return to acceptable levels, Notify HSM.

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3.0 VAPOR EMISSION RESPONSE PLAN

This section is excerpted from the NYSDOH guidance for CAMP - Ground Intrusive Activities.

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. Vapor suppression measures can also be taken at this time. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down. When work shutdown occurs, downwind air monitoring as directed by the Site Health & Safety Officer (SHSO) will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission Response Plan Section.

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4.0 MAJOR VAPOR EMISSION RESPONSE PLAN

If organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source (see Section 5.0) are unsuccessful and if organic vapor levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

However, the Major Vapor Emission Response Plan shall be immediately placed in effect if organic vapor levels are greater than 10 ppm above background.

Upon activation, the following activities will be undertaken:

1. Emergency Response Contacts as listed in the Health & Safety Plan will go into effect.
2. The local police authorities will immediately be contacted by the SHSO and advised of the situation.
3. Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the SHSO.

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5.0 VAPOR SUPPRESSION TECHNIQUES

Vapor suppression techniques must be employed when action levels warrant the use of these techniques.

The techniques to be implemented for control of VOCs from stockpiled soil or from the open excavation will include one or more of the following:

- cover with plastic;
- cover with “clean soil”;
- vapor suppressant foam; or,
- limit working hours to favorable wind and temperature conditions.

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6.0 DUST CONTROL TECHNIQUES

Reasonable dust-suppression techniques must be employed during work that may generate dust, such as excavation, grading, and placement of clean fill. The following techniques were shown to be effective for controlling the generation and migration of dust during remedial activities:

- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Hauling materials in properly covered containers; or,
- Restricting vehicle speeds to 10 miles per hour (mph).

Using atomizing sprays will prevent overly wet conditions, conserve water, and offer an effective means of suppressing fugitive dust. It is imperative that utilizing water for suppressing dust will not create surface runoff.

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7.0 DATA QUALITY ASSURANCE

7.1 Calibration

Instrument calibration shall be documented in the designated field logbook. Instruments shall be calibrated before each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

7.2 Operations

Instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained onsite by the SHSO for reference.

7.3 Data Review

The SHSO will interpret all monitoring data based on Table 1-2 and his/her professional judgment. The SHSO shall review the data with the HSM to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the HSM.

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8.0 RECORDS AND REPORTING

Readings will be recorded and available for review by personnel from the NYSDEC. Should any of the action levels be exceeded, the NYSDEC Division of Air Resources must be notified in writing within five (5) working days.

The notification shall include a description of the control measures implemented to prevent further exceedances.

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