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REMEDIAL INVESTIGATION WORK PLAN

101 East 150th Street
(a.k.a, 586 River Avenue)
Bronx, New York
Block 2354, Lot 1

May 2022
File No. 41.0162951.10

PREPARED FOR:
586 River Ave., LLC
c/o Success Academy Charter Schools
95 Pine Street, 6th Floor
New York, NY 10005

GOLDBERG-ZOINO ASSOCIATES OF NEW YORK P.C.
D/B/A GZA GEOENVIRONMENTAL OF NEW YORK
104 West 29th Street, 10th Floor | New York, NY 10001
212-594-8140

30 Offices Nationwide
www.gza.com

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May 4, 2022
File No. 41.0162951.10

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7015

Re: Remedial Investigation Work Plan
101 East 150th Street
Bronx, New York 10451
Block 2354 Lot 1

Dear Sir/Madame,

On behalf of the 586 River Ave, LLC (Requestor/ Owner), Goldberg-Zoino Associates of New York P.C. d/b/a GZA GeoEnvironmental of New York (GZA) is pleased to submit this Remedial Investigation Work Plan (RIWP) for the above referenced property (Site).

If you have any questions, please contact Stephen M. Kline at (212) 594-8140.

Very truly yours,

GZA GEOENVIRONMENTAL OF NEW YORK

Reinbill P. Maniquez, CHMM
Senior Project Manager

Stephen M. Kline, P.E.
QEP/ Vice President

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CERTIFICATION

I, Stephen M. Kline, P.E., certify that that I am a Qualified Environmental Professional (QEP) as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan (RIWP) for 101 East 150th Street, Bronx, New York, Block 2354, Lot 1, was prepared in accordance with applicable statutes and regulations and in substantial conformance with the DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

Stephen M. Kline, P.E.

QEP Name

QEP Signature

May 4, 2022

Date

1.0 INTRODUCTION

This Remedial Investigation Work Plan (RIWP) for the property identified as 101 East 150th Street (a.k.a., 586 River Avenue), Bronx, New York (Site) was prepared by Goldberg Zoino Associates of New York, P.C. d/b/a GZA GeoEnvironmental of New York (GZA) on behalf of 586 River Ave., LLC (Requestor /Owner). The Requestor intends to enter into the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), Brownfield Cleanup Program (BCP) per Title 6 of the New York State Official Compilation of Codes, Rules, and Regulation (NYCRR) Part 375-3.4.

The Site is located in the Lower Concourse neighborhood of Bronx, New York and is comprised of a rectangular-shaped parcel identified as Block 2354, Lot 1 on the New York City (NYC) Department of Finance (DOF) Tax Map.

1.1 PROJECT OBJECTIVE

The previous investigations performed at the Site provided a preliminary understanding of the nature and extent of contamination, specifically chlorinated solvents and petroleum-related volatile organic compounds (VOCs). The objective of this RIWP is to collect sufficient quality and quantity of data to supplement the previous investigations, address the data gaps, and aid in the delineation of impacted areas that will need to be addressed during the remedial activities that will allow for the beneficial redevelopment of the property under the BCP.

1.2 SCOPE OF WORK

The RIWP describes the project objectives, details the Site information and location, relevant historical background, previous site investigations, and field methodologies that will be employed during the subsurface investigation. This RIWP was prepared by GZA for the Site in general accordance with the NYSDEC, DER *Technical Guidance for Site Investigation and Remediation (DER-10)*, dated May 2010. Appended to this RIWP are plans that detail the site-specific protocols to be followed during the investigation work, which include:

- Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP)
- Health and Safety Plan (HASP)
- Community Air Monitoring Plan (CAMP)

2.0 SITE INFORMATION

The following section summarizes information provided by the Requestor such as survey plans, previous assessment and investigation reports related to the Site. These documents should be consulted for additional information and details not presented here. Previous documents include:

- *Topographical Survey Plan, Alphonse Pesce Jr., October 20, 2003, updated May 10, 2012*
- *Phase I Environmental Site Assessment, AEI Consultants, April 4, 2018*
- *Phase I Environmental Site Assessment, Brinkerhoff Environmental Services Inc., June 12,2020*
- *Phase I Environmental Site Assessment, GZA GeoEnvironmental of New York, November 2021*
- *Phase II Environmental Site Investigation Report, GZA GeoEnvironmental of New York, November 2021*
- *Amended Geotechnical Engineering Report, GZA GeoEnvironmental of New York, April 15, 2022*

Previous plans and reports were transmitted to the NYSDEC as an attachment to the BCP Application Package provided under separate cover.

2.1 SITE LOCATION, DESCRIPTION, AND USE

The Site is identified 101 East 150th Street is located in the Lower Concourse neighborhood of Bronx, New York in an area zoned for residential (R7A, R6), light manufacturing (M1-2) and commercial (C2-4 and C4-4) use. The Site is comprised of one tax lot (Bronx Block 2354, Lot 1) and is 99,109 square feet (approximately 2.27 acres) in area. The Site is bound to the north by a NYC-owned surface parking lot (151 Street Lot South), to the east by Gerard Avenue, to the south by East 150th Street, and to the west by River Avenue. A topographic map showing the location of the Site is provided as **Figure 1**.

The Site is improved by a 30,345-square foot, two-story commercial building with a full cellar and an asphalt-paved parking lot. **Figure 2** shows a Site Plan depicting the Site features.

2.2 SITE AND AREA HISTORY

Records from 1891 through the early-1900s, show the Site as athletic fields. By the late-1900s, the Site was used a as lumber storage yard. By early 1930s until 1950, the Site was used as an athletic field / recreational facility with a club house. The Site building was constructed in approximately 1952. The property was first used by a shoe factory (National Shoes) as office and warehouse (from ca 1952 to 1981) and an electronic parts manufacturer (Welbilt Electronic Die Corp/Wedtech) (from ca 1984 to ca 1990s). By 2001, the property was foreclosed, and ownership was transferred to Marty and Dorothy Silverman Foundation, and eventually donated to the St. Luke's – Roosevelt Hospital Center. The property was then sold to Gerard Avenue LLC (American Self Storage). By 2003, the New York City (NYC) Department of Buildings (DOB) granted a change of use of the property's cellar and ground floor from electronic part manufacturing to commercial self-storage use; and the change of use of second floor of the building from office spaces to classrooms and instructional spaces. In 2019, the property was sold to 580 Gerard LLC, which continued the commercial self-storage (Treasure Island) and school (Bronx Children's Psychiatric / New York City Children's Center) operations at the property.

The NYC Department of Finance (DOF) website lists the following ownership records and deed transfers:

Previous Owner	Contact	Address	Date of Ownership or Operation
580 Gerard LLC	Jorge Madruga of MADDD Equities	15 Verbena Avenue Suite 200, Floral Park, NY	08/14/2019 to 12/29/2021
Gerard Avenue LLC	John Del Monaco	950 Route 36, Hazlet, NJ	09/04/2002 to 07/26/2019
St. Luke's Roosevelt Hospital	Robert Nulds	Amsterdam Avenue and 114th St. New York, NY	01/3/1991 to 08/7/2002
Marty and Dorothy Silverman Foundation	Lorin Silverman	110 East 59th Street, New York, NY	09/24/1990 to 01/03/1991
Five Oceans Realty Corp.	David Reback,Esq.	2322 Arthur Avenue, Bronx, NY	09/16/1987 to 08/28/1990
Welbilt Electronics / Wedtech Corp.	Bernard G. Ehrlich, Esq.	1049 Washington Avenue, Bronx, NY	03/10/1980 to 08/26/1987
National Shoes Inc.	Sherman N. Baker	150 Central Park South, New York , NY	Unknown to 03/10/1980

Records from as early as 1891 show the surrounding areas to the north, south, and east of the Site as vacant. The area to the west is shown with several 1-story buildings including a dwelling and a stable. By the late 1900s, the area to the north were developed 2-story dwelling with sheds, to the west were 1- to 3-story buildings used as a lumber yard, factories, and coal storage. While the areas to the east and south of the Site were vacant. By the early 1930s until mid-2000s, the area to the west of the Site were developed with rows of canopies which were later converted to one large building then into three large building identified as the Bronx Terminal Market. By early 1950s until late 2000, the property east and upgradient of the Site (580 Gerard Avenue) was developed with three contiguous 1-story buildings labeled as "US Post Office Vehicle Maintenance Facility," "plumbing supplies," and an auto repair shop. On January 8, 2021, 580 Gerard Avenue was entered into the BCP under Site No. C203142.

2.3 PROPOSED REDEVELOPMENT PLAN

The Site is located in the Lower Concourse neighborhood of Bronx Community District (CD) 4 in an area zoned for light manufacturing (M1-2) and commercial (C2-4 and C4-4) use. The Requestor intends to redevelop the Site into a six-story school building. The Proposed development would not alter the Project Site's existing M1-2 zoning designation. The Site is undergoing an Environmental Assessment under the City Environmental Quality Review (CEQR) in connection with an application for a Special Permit from the BSA pursuant to the zoning resolution (ZR) § 73-19. The redevelopment would not create a land use nor a structure that would be incompatible with the existing zoning designations within the surrounding secondary study area. The Project Site is located less than 400-feet from a C4-4 zoning district (located directly across River Avenue to the west of the Site) and R7A/C2-4 districts (located directly across Gerard Avenue to the east of the Site) in which UG 3 schools are permitted as-of-right (i.e., without a special permit)

The Requestor intends to redevelop the Site by removing the existing building and constructing a new 304,711 gross square foot, six-story school building with a cellar. The proposed development plan will incorporate engineering controls in the form of a vapor barrier and a sub-slab depressurization system (SSDS). The cellar will contain a gym for indoor soccer, a theater, auditorium, dance studios, storage, and mechanical spaces. The ground floor will contain a lobby with vestibules, multipurpose rooms, offices, support rooms, classrooms, lecture halls and a basketball gym. The second floor will contain classrooms, a cafeteria, conference rooms and multi-purpose rooms. The third and fourth floors will contain science laboratories, additional classrooms, multi-purpose rooms and work spaces. The fifth floor will contain another cafeteria, and classrooms, a dance and art studio as well as two outdoor terrace spaces. The sixth floor will contain the infirmary / nurses' suite, classrooms and storage areas. A copy of the proposed redevelopment plan is included in **Appendix A**.

In addition, the proposed redevelopment would entail construction excavation for the new building. The Requestor intends to remediate the Site during the redevelopment under the NYSDEC BCP. Assuming the Requestor's application to join the BCP is accepted, the process will involve: (i) submission of this draft Remedial Investigation Work Plan to NYSDEC; (ii) a public comment period on the draft Remedial Investigation Work Plan; (iii) a BCP Agreement between the Requestor and NYSDEC; (iv) NYSDEC's approval of a final Remedial Investigation Work Plan; (v) submission of a draft Citizen Participation Plan and draft Remedial Investigation Report and draft Remedial Work Plan to NYSDEC; (vi) a public comment period on the draft Remedial Investigation Report and draft Remedial Work Plan; (vii) NYSDEC's issuance of a remedy selection decision in a Record of Decision; (viii) performance of the Remedial Work (which is expected to occur concurrently with the construction of the Proposed Project (a new school building); (ix) submission of a Remedial Action Report to NYSDEC; and (x) NYSDEC's issuance of a Certificate of Completion.

3.0 ENVIRONMENTAL AND PHYSIOGRAPHIC SETTING

The following subsections provide information regarding the general physiographic, hydrologic, and soil conditions around the Site.

3.1 REGIONAL PHYSIOGRAPHY

As shown on **Figure 1**, the U.S. Geological Survey topographic map 2019 U.S Geologic Survey (USGS) Central Park, NY Quadrangle 7.5-Minute Series Map, the eastern portion of the Site is at an elevation between 15 and 20 feet above mean sea level (amsl) based on North American Vertical Datum of 1988 (NAVD88). The surface topography slopes downward towards the Harlem River located approximately 750 feet west of the Site.

3.2 GEOLOGIC, HYDROGEOLOGIC, AND HYDROLOGIC CONDITIONS

According to the 1992 USGS publication Bedrock and Engineering Geologic Maps of Bronx County and Parts of New York and Queens Counties (Baskerville 1992), Bronx County is underlain by high grade metamorphic bedrock consisting of a sequence of Cambrian and Ordovician gneiss, schistose-gneiss, and marble. The bedrock beneath the Site is expected to be the Inwood Marble, (white calcite-dolomite) interlayered with units of Walloomsac and Manhattan Schists. Bedrock was observed between 50 feet and almost 100 feet below ground surface with an average depth of approximately 70 feet.

The eastern portion of the Site along the Gerard Avenue is at an elevation (EL) corresponding to EL +23 to EL +27 feet NAVD88. The topography along River Avenue is lower and ranges between EL +15 and EL +21 feet. The Parking area is cut down from the adjacent street elevations ranges between EL +8 and EL +12 feet.

Regionally the topography slopes westward down to approximately EL +8 feet. The nearest water body is the Harlem River located 750 feet west of the Site.

The Geotechnical Engineering Report by GZA, dated April 15, 2022 (see **Section 4.5**), identified fill material, consisting of fine to coarse sand containing up to 35 percent gravel, up to 35 percent silt or clayey silt, and varying amounts of brick, glass, or concrete fragments (Fill) was encountered below the surface cover at each boring across the entire Site. The bottom of the Fill layer ranged between EL +0.5 and EL +9 feet across the Site.

During the geotechnical study, groundwater levels in an observation well were measured between 8.9 and 9.1 feet below the parking area grade, which corresponds to approximately EL +2.8 and EL +3.0 feet. The anticipated groundwater flow direction is to the west, towards the Harlem River.

4.0 PREVIOUS SITE INVESTIGATIONS

The following subsections document the previous site investigations were reviewed as part of this Phase II ESI.

4.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT –APRIL 4, 2018

The 2018 Phase I Environmental Site Assessment (ESA) identified the property as 595 Gerard Avenue and was performed by AEI Consultants (AEI). The 2018 Phase I Environmental Site Assessment (ESA) found two Recognized Environmental Conditions (RECs) related to the Site. The first REC is the historical use of the Site, from approximately 1981 to 2003, as a metal fabrication facility. These facilities typically store and use new and used lubricants, solvents, and other hazardous substances, as well as producing a significant amount of waste, including

heavy metal wastes. The second REC is the current and historical use of several adjacent, potentially up gradient Sites as vehicle maintenance and fueling stations for fleet vehicles and sites containing numerous gasoline underground storage tanks (USTs). The adjacent sites were listed in multiple regulatory databases as release sites. The Phase I ESA did not find Controlled Recognized Environmental Conditions (CRECs), or Historical Recognized Environmental Conditions (HRECs) related to the Site. AEI noted that, due to the age of the building, the potential for asbestos containing material (ACM) and lead based paint (LBP) were identified as concerns.

A certificate of occupancy dated 1951 references the current two-story warehouse structure and approval from the NYC Fire Department (FDNY) for heating oil use at the Site. One AST containing #2 fuel oil and totaling approximately 10,000 gallons in capacity was observed in association with the boiler and is in the southeastern portion of the property. The AST is in a double-walled masonry vault, without access. AEI reported no olfactory evidence or visual evidence of staining or spills from the AST.

4.2 PHASE I ENVIRONMENTAL SITE ASSESSMENT –JUNE 12, 2020

The 2020 Phase I ESA identifies the property as 580 River Avenue and was performed by Brinkerhoff Environmental Services, Inc. (Brinkerhoff). The 2020 Phase I ESA identified the five RECs in conjunction with the Site:

- The lack of documentation regarding prior heating sources of former on-Site buildings, dating back to 1891. There is a potential for USTs to exist at the Site.
- Two gasoline tanks were present in the northwestern portion of the south-adjoining property building from at least 1951 through 1989. No information was located regarding the installation, operation, or removal of these gasoline tanks. No releases related to these tanks were documented.
- Auto repair facilities have been present on the southeast-adjoining property since at least 1924, and gasoline tanks have been documents on the same property from at least 1951 through 2007. NYSDEC spill Nos. 9910856, 1203859, and 1204620 are associated with this property, and were all granted “case closed” status. However, the handling, storage, and/or disposal of materials and substances used during the former and current operations at the property are unknown, so the potential exists for impact to the subsurface soil, soil vapor, and groundwater.
- The handling, storage, and/or disposal of materials and substances used during the historic and current operations at the subject Site are unknown. Therefore, the potential exists for impacts to subsurface soil, soil vapor, and groundwater.
- A stormwater drain is present in the parking lot on the northern exterior of the warehouse building. As the time of Brinkerhoff’s site reconnaissance, a dumpster and general garbage was observed above the drain. Staining was observed on the asphalt surface in the vicinity of the dumpster. Therefore, the potential exists for impact to subsurface soil, soil vapor, and groundwater at the Site.

Brinkerhoff found no CREC or HRECs related to the Site. The potential for ACM or LBP within the warehouse was reported as a concern. The Phase I also identified the potential for urban historic fill to exist beneath the Site.

4.3 PHASE I ENVIRONMENTAL SITE ASSESSMENT – NOVEMBER 2021

GZA prepared a Phase I ESA in conformance with ASTM E-1527-13 and identified two RECs in connection with the Site. One REC is the historical use of the Site as a shoe manufacturer in the 1950s until 1980 and by an electrical

products manufacturing and warehouse company in the 1980s until the 1990s. The other REC is the 580 Gerard Avenue property, adjacent to the east and upgradient of the Site, has had a history of auto repair use and known as US Post Office Vehicle Maintenance Facility since the 1950s. The 580 Gerard Avenue property is listed under the BCP Site No. C203142. File review of BCP report document contamination of the soil, groundwater, and soil vapor at 580 Gerard Avenue. The following four Business Environmental Risks (BERs) were identified for the Site:

- If the future use of the Site changes, care should be exercised during excavation for the potential to encounter historic urban fill material.
- An inactive 10,000-gallon fuel oil above ground storage tank (AST) is located in the basement at the southeastern portion of the warehouse. The AST is encased in a room with a small access panel. The property used natural gas and the AST is no longer in use. The AST should be decommissioned in conformance with applicable federal, state, and local regulations.
- The potential for ACM and LBP exists within the Site building due to its age.
- If dewatering is required for construction, groundwater sampling and testing in conformance with federal, state, and/or local sewer discharge permit/approval requirements may be required.

No CRECs or HRECs were identified for the Site. Minor staining was observed near the dumpster area and the parking area, which GZA recognized as a de minimis condition.

4.4 PHASE II ENVIRONMENTAL SITE INVESTIGATION – NOVEMBER 2021

In October and November 2021, GZA conducted an initial and supplemental Phase II Environmental Site Investigation (ESI) in conformance with ASTM 1903-19 and submitted the results as one report in November 2021. In total, the investigation included a geophysical survey, advancement of 24 soil borings, collection and laboratory analysis of 26 soil samples, conversion of eight soil borings to temporary monitoring wells, collection and laboratory analysis of eight groundwater sampling sets, installation and sampling of 10 soil vapor probes, collections and laboratory analysis of two outdoor air samples, three indoor air samples, and one ambient air sample from within the on-Site catch basin. Sample locations and exceedances of respective guidance values are shown on **Figures 3, 4, and 5**. Soil sampling results were compared to NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCO), NYSDEC Part 375 Protection of Groundwater SCOs, and NYSDEC Part 375 Residential Use Soil Cleanup Objectives (RUSCO). The following summarized the findings of the Phase II ESI:

- Anomalies resembling potential subsurface utilities (such as electric, water, gas, and sewer) were identified during the geophysical survey. A fill port and a vent pipe associated with the 10,000-gallon AST, were identified along the southeast corner building exterior. However, no subsurface anomalies consistent with USTs were identified during the geophysical survey.
- GZA observed fill at varying depths from 3 to 5 feet below ground surface (bgs) and a layer of native sand underlaying the fill stratum which extended to at the maximum depth of the soil borings at 15 feet bgs.
- Non-stabilized groundwater was encountered at depths ranging from 4.6 feet below the basement slab to 9.8 feet below the parking area ground surface.
- Soil - Several petroleum hydrocarbon VOCs were encountered in excess of their respective RUSCOs at the deeper strata (i.e., below the 9 feet bgs or water table) at samples located at the eastern boundary

towards the middle of the parking area. Chlorinated VOCs were encountered in excess of their respective RSCOs at the shallow sample (i.e., 3 feet bgs) collected near the southwestern portion of the parking area.

- Several semi-volatile organic compounds (SVOCs) were detected in excess of their respective RUSCOs in two shallow samples collected in the parking area. These SVOCs are typical constituents of urban fill in observed in New York City.

- Some metals were detected in excess of UUSCOs. However, most samples show metal concentrations below the RUSCOs. The exceptions are chromium observed in shallow soil samples collected from the parking area, and lead observed in shallow samples from the parking area. These metals concentrations are typical constituents of urban fill in observed in New York City.

- Pesticides, and PCBs were either not detected or detected at concentrations below their respective UUSCOs, RUSCOs, or PGWSCOs.

- Groundwater – Several petroleum hydrocarbon VOCs and SVOCs were detected at concentrations in excess of NYSDEC Technical Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS) at samples from wells located at the eastern boundary (TMW-6 and TMW-16) and towards the middle of the parking area.

- Metals, pesticides, and PCBs were either not detected or detected at concentrations below their respective TOGS 1.1.1. AWQS.

- Soil Vapor and Ambient Air –Multiple petroleum hydrocarbon compounds were reported in the soil gas samples at concentrations exceeding their respective New York State Department of Health (NYSDOH) Fuel Oil 2003 Upper Fence Limit and/or EPA Data 2001 90th Percentile Value. However, only some were detected in the indoor air samples. None of the ambient air samples show petroleum hydrocarbon compounds.

- Multiple chlorinated soil gas were reported at concentrations that exceeded their respective NYSDOH Air Guidance Values (AGVs) for indoor air. The highest concentration was at samples collected near the eastern boundary and the middle of the parking area.

- None of the chlorinated VOCs were detected in either the indoor, outdoor air, or ambient air samples at concentrations that exceeded NYSDOH AGVs.

4.5 GEOTECHNICAL ENGINEERING REPORT - APRIL 15, 2022

In support of the redevelopment plan for the Site, GZA performed a Geotechnical Exploration program. The Geotechnical scope include the following:

- Review of site subsurface data provided to us from previous explorations
- Performance of 16 borings at the Site
- Performance of 12 cone penetration soundings at the Site
- Evaluation and analysis of the subsurface conditions
- Preparation of the geotechnical engineering report.

General descriptions of the soil strata encountered in the borings are summarized below in order of their occurrence with depth.

- Surface Cover – Surface cover consisting of paved asphalt measuring approximately 3 to 12 inches in thickness was encountered at the ground surface within the parking area borings. Concrete with a measured thickness of approximately 6 inches was encountered at the ground surface within the sidewalk borings.

- FILL – Fill, consisting of fine to coarse sand containing up to 35 percent gravel, up to 35 percent silt or clayey silt, and varying amounts of brick, glass, or concrete fragments was encountered below the surface cover in each boring. The fill extended approximately between elevations 0.5 and 9.0 feet. At LBb-1 location a very hard surface was reportedly encountered at about elevation 5.0 feet, and boring was offset to continue the boring.

- UPPER SAND – A sand stratum was encountered in each boring extended to elevations between -8.1 and -23.5 feet. The sand consists of loose to dense, fine to coarse sand containing up to 50 percent gravel and up to 35 percent silt.

- SILT/CLAY – A silt and clay stratum was encountered within all but one boring. The material extended approximately between EL -18.1 and -56.5 feet. This silt/clay stratum was described as various shades of gray and brown, and contained up to 35 percent of fine to medium sand. Within boring GZ-12, boulders were encountered and cored through within this stratum between EL -41.9 and -51.9 feet.

- LOWER SAND – A lower sand stratum was encountered below the silt/clay layer. The lower sand stratum extended approximately to elevations between EL -33.8 and EL -59.7 feet. This lower sand stratum was described as various shades of brown or gray, and contained up to 50 percent gravel, up to 50 percent silt, clayey silt, or silty clay.

- DECOMPOSED ROCK – Decomposed rock was encountered about EL -23.5 to EL -63.0 feet and extended to bedrock or termination depths of borings at about EL -29.5 to EL -93.5 feet in some locations. This stratum was described as various shades of white, gray, brown, or blue, and consisting of fine to coarse sand, clayey silt, or silt, with up to 50 percent silt or clayey silt, or gravel. Mica fragments were observed within the samples.

- BEDROCK – Bedrock was encountered below the decomposed rock at EL -76.4 and EL -29.4 feet. In two borings the bedrock was observed to consists of hard, freshly weathered, slightly fractured, fine to medium-grained Schist, with closely spaced, horizontal to sub-horizontal, smooth joints/fractures. The bedrock elevations vary significantly and erratically across the Site.

Groundwater measurements in the observation well at LBc-2(OW) between January 28 and April 11, 2022, were between 8.9 and 9.1 feet below the ground surface, corresponding to ranging between EL 2.8 and EL 3.0.

4.6 SUMMARY OF PREVIOUS INVESTIGATIONS AND CONSTITUENTS OF CONCERN

Previous uses of the Site indicate a potential on-Site source for primary contaminants of concern. The Site building was used for shoe manufacturing and electronic component manufacturing from the late-1950s through approximately 1990. This manufacturing, which includes the cleaning of electronic components, historically used

chlorinated solvents similar to those observed during the Phase II Environmental Site Investigation performed in 2021.

The current parking area has remained undeveloped by a building, but historically there was a storage shed. The parking area was used for trucking and distribution of warehoused goods overtime. The types of petroleum contamination observed in the groundwater and chlorinated solvents observed in the soil vapor samples are common in automobile repair and maintenance since they have been historically used as equipment degreasers and parts cleaners. The parking area has been used as a parking facility, and it is possible some vehicle maintenance was performed in the parking area.

In addition, a layer of non-native, historic, urban fill has been observed throughout the Site.

Records from as early as 1891 show the surrounding areas to the north, south, and east of the Site as vacant. The area to the west is shown with several 1-story buildings including a dwelling and a stable. By the late 1900s, the area to the north were developed 2-story dwelling with sheds, to the west were 1- to 3-story buildings used as a lumber yard, toy and refrigerator factory with coal storage. While the areas to the east and south of the Site were vacant. By the early 1930s until mid-2000s, the area to the west of the Site were developed with rows of canopies which were later converted to one large building then into three large building identified as the Bronx Terminal Market. By early 1950s until late 2000, the property east and upgradient of the Site (580 Gerard Avenue) was developed with three contiguous 1-story buildings labeled as "US Post Office Vehicle Maintenance Facility", "plumbing supplies", and an auto repair shop. On January 8, 2021, 580 Gerard Avenue located upgradient and adjacent to the Site to the east entered into the BCP under Site No. C203142.

One 10,000-gallon fuel oil AST is located in the cellar of the Site building and is registered under the NYSDEC Petroleum Bulk Storage (PBS) Facility ID No. 2-609485. The AST was formerly used to supply No. 2 fuel oil to the boiler in the warehouse. The AST is no longer in use, as the building has converted to natural gas heating.

Based on the previous investigations, the primary contaminants of concern are petroleum-related VOCs, chlorinated VOC, SVOCs, and metals. The soil, groundwater, and soil gas analytical results that exceed their respective guidance values are shown on **Figures 3, 4, and 5,** respectively.

Historic urban fill material dating back to the late-1800s was observed across the entire Site. Petroleum hydrocarbon VOCs were encountered in excess of their respective Residential Soil Cleanup Objectives (RSCOs) at the deeper strata (i.e., below the 9 feet bgs or water table) at samples located at the eastern boundary and towards the middle of the parking area. Chlorinated VOCs were encountered in excess of their RSCOs at the shallow sample (i.e., 3 feet bgs) collected near the southwestern portion of the parking area. In addition, elevated subsurface petroleum contamination was observed in the vicinity of the water table at GZ-5, GZ-6, GZ-16, and GZ-24 as shown on **Figure 3**.

Several petroleum hydrocarbon VOCs and SVOCs were detected at concentrations in excess of the NYSDEC Technical Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS) at samples from wells located at the eastern boundary and towards the middle of the parking area. Please refer to **Figure 4**.

Multiple chlorinated VOCs were observed at elevated concentrations with their respective NYSDOH Air Guideline Values (AGVs) in soil gas. As shown on **Figure 5**, the exceedance occurred in the northern and southern areas of the Site, and in 9 of the 10 soil vapor sampling locations (SV-1, SV-2, SV-3, SV-4, SV-5, SV-6, SV-13, SV-15, and SV-16). However, there were no exceedances of the NYSDOH AGVs in the indoor air or outdoor ambient air vapor samples. The highest concentration was at samples collected near the middle of the parking area.

5.0 REMEDIAL INVESTIGATION

The proposed Remedial Investigation (RI) field program will focus on collecting additional soil, groundwater, and soil gas data to delineate and characterize of known chlorinated solvent and petroleum contamination, and historic fill materials underlying the property. The scope of the RI will include the collection of sufficient Site investigation data so that, together with the historical data, the entire Site will be sufficiently characterized to support the development of the Site-wide Remedial Action Work Plan (RAWP).

To accomplish this, the scope of work for the RI will include the following:

- The advancement of soil borings, collection of soil samples, installation of permanent groundwater monitoring wells, collection of groundwater samples from new monitoring wells, installation of soil vapor points, and sampling of new soil vapor points;
- The collection of soil, groundwater, and soil vapor sufficient to define the nature and extent of impacted media and current Site conditions and offsite groundwater and/or soil vapor migration potential;
- The collection of a synoptic round of groundwater level measurements and the collection of additional land survey data as needed for developing a groundwater elevation contour map; and
- The performance of a qualitative human health exposure assessment (QHHEA) to identify existing and potential exposure pathways and evaluate contaminant fate and transport.

The proposed scope of work includes:

<u>Soil</u>

- Advancement of 28 soil borings to a maximum depth of 30 feet bgs.
- Collection and laboratory analyses of 74 soil samples.

<u>Groundwater</u>

- Advancement of six soil borings down to a maximum depth of 30 feet bgs that will be converted to permanent flush-mounted monitoring wells.
- Gauging and development of the eight new permanent monitoring wells and 1 existing monitoring well.
- Collection and laboratory analyses of nine groundwater samples.

<u>Soil Gas</u>

- Advancement of four sub-slab soil vapor points down to 2 feet below the existing building cellar slab.
- Advancement of six soil vapor probes down to 5 feet bgs.
- Collection and laboratory analyses of 10 soil vapor samples.

<u>Outdoor Air/ Indoor Air</u>

- Collection and laboratory analyses of one outdoor ambient air and one indoor air sample.

All investigation activity will be conducted in accordance with the applicable requirements of the DER-10. All data will be produced in accordance with NYSDOH Analytical Services Protocol (ASP) Category B deliverables and will be reviewed and validated by an independent data validator. The data validator will prepare a Data Usability Summary Report (DUSR) before data is incorporated into the RIR for the Site. All data will be submitted to NYSDEC in electronic format, in accordance with DER-10.

The sample summary and rationale are provided in **Table 1**. The proposed sample locations are shown on **Figure 6**. The following sections describe the methods, rationale, and proposed sampling schedule for the soil

investigation activities summarized above. Sampling will be performed in accordance with the QAPP/FSP presented in **Appendix B**.

5.1 SOIL INVESTIGATION

As shown on **Figure 6**, GZA proposes to advance 28 soil borings across the property. The borings will be performed under field observation of a GZA engineer or geologist. Soil samples will be obtained with a 5-foot steel MacroCore™ sampler using disposable acetate liners. The MacroCore™ sampler will be advanced through the subsurface to collect representative soil samples down to a minimum of 15 feet bgs to maximum 30 feet bgs. If refusal is encountered in a soil boring due to subsurface obstructions (e.g., boulders, construction, and fill debris) above the target depth, the drillers will attempt up to two off-set locations for each boring location. An example soil boring log is included in **Appendix C**.

We will collect soil samples continuously from grade to the target depth and observe/document the soil samples for staining and soil characteristics. We will screen the soil samples for total organic vapors with a hand-held, photoionization detector (PID) and record lithological descriptions of the soil and field screening results on the soil boring logs. GZA's visual inspection will also document for evidence of contamination including staining and/or odors.

The GZA field representative will retain selected samples for laboratory analyses from the soil samples that indicate the comparatively highest impacts based on visual, olfactory, and PID screening results, and/or based on our evaluation of relevant Site features and conditions. GZA will collect between two (2) to three (3) soil samples set per boring totaling 74 soil sample sets. Discrete samples will be collected with an EnCore® sampler (or similar) in compliance with EPA Method 5035 from the 6-inch interval with the highest visual, olfactory and PID evidence of environmental impacts. The other sample will be collected across a two-foot interval that includes the VOC discrete sample interval. The soil samples will be analyzed as follows based on sampling approach:

- **Focused– 25 samples will be analyzed for the following:**
  - Target Compound List (TCL) VOC by Environmental Protection Agency (EPA) Method 8260 (discrete) with Tentatively Identified Compounds (TICs);
  - TCL SVOC by EPA Method 8270 with TICs; and
  - Target Analyte List (TAL) Metals by EPA Method 6010C / 7471B including hexavalent chromium and total cyanide.

- **Full Suite – 41 samples will be analyzed for the following:**
  - TCL VOCs by EPA Method 8260 (discrete) with TICs;
  - TCL SVOC by EPA Method 8270 with TICs;
  - TAL Metals by EPA Method 6010C / 7471B including hexavalent chromium and total cyanide;
  - Pesticides by EPA Method 8081 / Herbicides by EPA Method 8151; and
  - Polychlorinated biphenyls (PCBs) by EPA Method 8082A.

- **Full Suite + Emerging Contaminants (EC) – 8 samples will be analyzed for the following:**
  - TCL VOCs by EPA Method 8260 (discrete) with TICs;
  - TCL SVOC by EPA Method 8270 with TICs, including 1,4 Dioxane;
  - TAL Metals by EPA Method 6010C / 7471B, including hexavalent chromium and total cyanide;
  - TAL Pesticides by EPA Method 8081/ Herbicides by EPA Method 8151;
  - PCBs by EPA Method 8082A; and
  - Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537.1.

Each sample set will be labeled, sealed, and placed in a cooler for shipment under standard chain-of-custody protocol to a NYSDOH Environmental Laboratory Approval Program (ELAP)-laboratory.

5.2 GROUNDWATER INVESTIGATION

As shown on **Figure 6**, six soil borings will be converted into new permanent monitoring wells (designated MW-01 through MW-06). In addition, GZA proposes to sample the one existing permanent monitoring well (LBc-02[OW]) during the RI. Two of the monitoring wells (i.e., one upgradient and one downgradient) are proposed to be installed on the sidewalk to allow for long-term groundwater monitoring during and after construction. The permanent monitoring wells will be comprised of two-inch diameter PVC that will be installed to a maximum depth of approximately 30 feet bgs (i.e., at least 7 feet into the water table). Each well will consist of a 2-inch diameter PVC riser and at least 10 feet long of 0.02-inch slotted 2-inch diameter PVC screen with the screened interval designed to span across the water table to detect petroleum sheens or light non-aqueous phase liquids (LNAPL). A 2-foot bentonite plug will be placed above the filter pack. The remaining annular space will be filled with bentonite. The wells will be completed with a flush-mount manhole and locking cap. An example of a monitoring well construction log is provided in **Appendix C**.

Groundwater samples will be collected from the up to three temporary well points by peristaltic pump and with dedicated low-density polyethylene (LDPE) tubing. Prior to sample collection, a minimum of three well screen volumes will be purged from each well point with the pump intake placed at the approximate midpoint of the screened interval. At the ground surface, the water will pass through a sealed flow through cell containing probes which will measure the water temperature, pH, specific conductivity, turbidity, oxidation-reduction potential (ORP), and dissolved oxygen (DO). One groundwater sample will be collected after the water quality parameters have stabilized. Stabilization is defined by three successive readings that are within ± 0.1 for pH, ± 3% for conductivity, ± 10 mv for ORP, and ± 10% for turbidity and DO. GZA will field filter all groundwater samples (e.g., metals analyses) if the turbidity measurement is greater than 50 NTU following the purging of three to 10 well screen volumes. An example well purge log is provided in **Appendix C**.

The groundwater samples will be analyzed for the following parameters based on a targeted approach:

- **Full Suite – Seven (7) samples will be analyzed for the following:**
  - TCL VOCs by EPA Method 8260;
  - TCL SVOC by EPA Method 8270;
  - Total and dissolved TAL Metals by EPA Method 6010C / 6020 / 7471B;
  - Cyanide by EPA method 9010/9012;
  - Mercury by EPA method 7471; and
  - Pesticides by EPA Method 8081/ PCBs by EPA Method 8082A and Herbicides by EPA method 8151.
- **Full Suite + EC – Four (4) samples will be analyzed for the following:**
  - TCL VOCs by EPA Method 8260 with TICs;
  - TCL SVOC by EPA Method 8270 with TICs including 1-4 Dioxane;
  - Total and dissolved TAL Metals by EPA Method 6010C / 7471B, including cyanide by EPA method 9010/9012, mercury by EPA Method 7471;
  - Pesticides by EPA Method 8081/ PCBs by EPA Method 8082A / Herbicides by EPA method 8151; and
  - PFAS by EPA Method 537.1

One trip blank sample will accompany the groundwater sample (at a frequency of one per day of sampling with a sample submitted to the laboratory for TCL VOC analysis) and will be analyzed for TCL VOCs.

5.3 SOIL GAS, OUTDOOR AIR, AND INDOOR AIR SAMPLING

As shown on **Figure 6**, GZA proposes to install six soil vapor probes (designated SV-17, SV-18, SV-19, SV-24, SV-25, and SV-28) down to approximately 5 feet bgs near selected soil borings completed at the Site. GZA's drilling subcontractor will also install four sub-slab soil vapor (designated SSV- 10 to SSV 114) points located with the existing building footprint.

GZA will collect each of the soil vapor samples using methods consistent with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Soil vapor samples will be collected using a stainless-steel probe, consisting of a drive point and internal perforated sampling port with a retractable tip, connected to Teflon™ sampling tubing. GZA proposes to collect soil vapor samples in 6-liter Summa® canisters equipped with 2-hour flow regulators. The soil vapor samples will be submitted to a NYSDOH ELAP-accredited laboratory. The soil vapor samples will be submitted for Target Compound List (TCL) VOCs analysis via EPA Method TO-15. The analytical results will be compared to 8-hour exposure standards and NYSDOH-specified guidance values. Following soil vapor sample collection, the soil vapor sampling point materials will be removed from the ground. An example soil vapor sampling log is included in **Appendix C**.

GZA will also collect one outdoor ambient air and one indoor ambient air sample to evaluate the potential for vapor intrusion into the existing building. GZA will collect ambient samples in 6-liter Summa® canisters equipped with 2-hour flow regulators. The ambient air samples will be submitted to a NYSDOH ELAP-accredited laboratory for TCL VOC analysis via EPA Method TO-15.

5.4 QUALITY ASSURANCE /QUALITY CONTROL

As part of the field investigation, GZA will also collect Quality Assurance/Quality Control (QA/QC) samples in accordance with the QAPP, presented in **Appendix B**, to confirm the usability of the data. QA/QC samples include equipment rinsate/field blanks, trip blanks, sample duplicates and matrix spike/matrix spike duplicates (MS/MSDs).

When applicable, the sample result summary tables will list the laboratory method detection limit (MDL) at which a compound was non-detectable. The laboratory results will be reported to the sample-specific practical quantitation limit (PQL), equal to the sample-specific MDL, supported by the instrument calibrations. The reliability of laboratory data is supported by compliance with sample holding times and laboratory MDLs below cleanup criteria. Accuracy and precision of the laboratory analytical methods will be maintained by the use of calibration and calibration verification procedures, laboratory control samples, and surrogate, matrix, and analytical spikes.

5.5 DATA MANAGEMENT AND VALIDATION

GZA will coordinate with the laboratory to prepare the laboratory analytical reports in accordance with NYSDEC ASP Category B data deliverables, which include:

- Sample Delivery Group Narrative;
- Contract Lab Sample Information sheets;
- NYSDEC Data Package Summary Forms;
- Chain-of-custody forms; and,
- Test analyses results (including TICs for analysis of VOCs and SVOCs).

Plus, related QA/QC information and documentation consisting of:

- Calibration standards;
- Surrogate recoveries;
- Blank results;
- Spike recoveries
- Duplicate results;
- Confirmation (lab check/QC) samples;
- Internal standard area and retention time summary;
- Chromatograms;
- Raw data files; and
- Other specific information as described in the most current NYSDEC ASP

GZA will coordinate with the laboratory to prepare the results in Electronic Data Deliverables (EDDs) format compatible with EQuIS that can be uploaded into an EQuIS database for storage and development of tables or output to other data analysis tools and GIS as needed. GZA will have a data validate evaluate the data package for inclusion into a DUSR that will subsequently be prepared to document the usability of the data. Additional details regarding QA/QC and data management and validation are included in **Appendix B – QAPP/FSP**.

5.6 CHAIN OF CUSTODY AND SHIPPING

A chain-of-custody form will trace the path of sample containers from the Site to the laboratory. The project manager will notify the laboratory of upcoming field sampling events and the subsequent transfer of samples. This notification will include information concerning the number and type of samples, and the anticipated date of arrival. Insulated sample shipping containers (typically coolers) will be provided by the laboratory for shipping samples. All sample bottles within each shipping container will be individually labeled with an adhesive identification label provided by the laboratory. Project personnel receiving the sample containers from the laboratory will check each cooler for the condition and integrity of the bottles prior to field work.

The field sampler will indicate the sample designation/location number in the space provided on the chain-of-custody form for each sample. The chain of custody forms will be signed and placed in a sealed plastic Ziploc bag in the cooler. If sent via third party carrier, the shipping container will be closed for transport with nylon strapping, or a similar shipping tape, and a paper custody seals will be affixed to the lid. The seals must be broken to open the cooler and will indicate tampering if the seals are broken before receipt at the laboratory. A label may be affixed identifying the cooler as containing "Environmental Samples" and the cooler will be shipped via courier or by an overnight delivery service to the laboratory. When the laboratory receives the coolers, the custody seals will be checked, and lab personnel will sign the chain-of-custody form.

The following typical Chain-Of-Custody procedures will be implemented by GZA during the soil sampling:

A. The samples are under custody of the GZA field personnel, if:
   1. they are in his/her possession,
   2. they are in view after being in possession,
   3. they are locked up or sealed securely to prevent tampering, or
   4. they are in a designated secure area.

B. The original of the chain-of-custody form must accompany the samples at all times after collection, until receipt at the analytical laboratory. A copy of the chain-of-custody form will be kept by the sampling collector until it is filed in the project file.

C. When the possession of samples is transferred, the individuals relinquishing and receiving the samples will sign, date, and note the time on the Chain-Of-Custody form.

D. When samples are shipped, the GZA personnel, or designated representative, will note the courier's name, and air bill number, if applicable, on the Chain-Of-Custody form. Prior to shipping, coolers will be secured with signed custody seals so the laboratory may confirm coolers were not opened during shipping.

The chain-of-custody form will contain information to distinguish each sample from any other sample. This information will include:

A. The project name and address for which sampling is being conducted;
B. The name(s) and signature(s) of sampler(s);
C. The matrix being sampled (groundwater, soil, etc.);
D. The sampling date and time;
E. The specific sampling location in sufficient detail to allow re-sampling at the same location;
F. The number of containers and the volume of sample collected, and
G. The analytical method to be performed.

5.7 STORAGE AND DISPOSAL OF INVESTIGATION-DERIVED WASTE

Investigation derived waste (IDW) generated during the RI will be containerized and properly characterized and disposed of. Containers, which are USDOT approved storage containers (55-gallon drums) or a small bulk roll-off container, will be properly labeled and grouped by environmental matrix (soil, water, PPE/plastic, etc.). All drums or roll-offs will be staged in a central location on-Site prior to off-Site disposal.

If drums are used, they will be tracked as they are filled and given unique identification codes based on the following:

- A prefix indicating the drum's contents: i.e., S – Soil, W – Water, P – PPE/Plastic, and C&D – Construction Debris.
- Following the prefix and a hyphen will be the origin of the drum's contents. For example, drum SB-1, SB-2, SB-3 is a generated drum filled with soil from soil boring locations SB-1, SB-2 and SB-3; drum MW-1 is water generated from monitoring well MW-1.
- As drums are generated, their identification code, date of generation, contents, source (i.e., drill cuttings from location x, purge water from well y), and date sampled will be entered on a tracking table.

The drums (or roll-off container) will be centrally stored on-Site. Subsequently, the waste soils and/or water will be characterized with laboratory analyses for proper disposal.

6.0 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

A QHHEA will be performed following the collection of all RI data. The Exposure Assessment (EA) will be performed in accordance with Section 3.3(c)4 of DER-10 and the NYSDOH guidance for performing a qualitative EA (DER-10; Appendix 3B). The QHHEA will characterize the exposure setting, identify potentially complete exposure pathways, and qualitatively evaluate potential fate and transport of constituents from one medium to another (i.e., soil-to-air or soil-to-groundwater).

An exposure pathway is considered complete when the following five conditions are met:

1. Source identified (i.e., metals in paint on exterior building surfaces);
2. Release and transport mechanism from source to environmental media (i.e., into the subsurface or volatilization to the air of an overlying building);
3. Point of human exposure (i.e., an occupied building or surface soil);
4. A route of exposure (ingestion, dermal contact, or inhalation), and
5. A receptor population (i.e., on-site workers).

Once potentially complete exposure pathways are identified, the QHHEA will characterize Site conditions to determine whether the Site poses an existing or potential future hazard to the potentially exposed population. The evaluation will include a qualitative discussion of potential fate and transport mechanisms at the Site. The results of the QHHEA will be included as part of the RIR.

According to Section 3.10 of DER-10, and the Fish and Wildlife Resources Impact Analysis Decision Key in DER-10 Appendix 3C, a Fish and Wildlife exposure assessment will be performed (if needed) based on the results of the RI.

7.0 HEALTH AND SAFETY

The work outlined above will be completed under a GZA site-specific Health and Safety Plan (HASP)**,** attached as **Appendix D**, in accordance with OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations. A photoionization detector (PID) will be used to monitor the breathing zone of workers performing investigative activities in areas where there is a potential for the presence of organic vapors (i.e., groundwater and soil vapor sampling). A dust meter will also be used to screen for dust in the breathing zone that has the potential presence of metal contamination. GZA anticipates the work will be completed in Modified Level D personal protective equipment (PPE); however, workers will be prepared to elevate to more protective PPE based on the conditions encountered during field activities.

7.1 PROJECT KICKOFF AND UTILITY CLEARANCE

A project kick-off meeting will be held prior to initiating field work to orient field team members and subcontractors with the Site background, scope of work, potential hazards, health and safety requirements, emergency contingencies and other field procedures.

Prior to performing any subsurface work, a utility clearance survey will be performed in accordance with New York State Dig-Safe protocol. Sample locations will be screened using surface geophysical techniques such as electromagnetic (EM), ground penetrating radar (GPR) and/or radiofrequency (RF) techniques.

7.2 COMMUNITY AIR MONITORING PLAN (CAMP)

Real-time air monitoring for VOCs and particulate levels at the perimeter of the exclusion zone or work area will be performed in accordance with the CAMP (see **Appendix E**).

Continuous air monitoring will be required during ground intrusive activities and other activities where equipment is disturbing the ground surface. Ground intrusive activities include, but are not limited to, soil/fill excavation and

handling, test pitting or trenching, grading of existing Site soils and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required 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 would generally 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.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the Site perimeter on a continuous basis during earthwork activities unless otherwise specified in the CAMP. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. Wind direction will be evaluated using an on-site meteorological tower (RM Young sensors) that measures wind speed, direction, dry-bulb temperature and relative humidity. A central computer system will receive information from the meteorological system and compute a two-minute average wind speed and direction value. The VOC monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

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

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down until the source of the problem is identified and corrective action is taken to reduce organic vapor levels.

4. Fifteen-minute readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored at the Site perimeter and in work zones on a continuous basis during earthwork. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped

with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. Visible dust from the work area will trigger the initiation of dust suppression procedures. Dust suppression equipment will be on Site, functional and available at the work zone prior to commencing work.

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

8.0 REPORTING

Upon completion of the field activities, an RIR/RAWP will be prepared to document the findings of the investigations performed at the Site and the proposed remedy. The RIR/RAWP will be consistent with the specifications presented in the DER-10 document and will include:

- An executive summary;
- A site description and history;
- Summary information regarding previous investigations and remedial work performed at the Site;
- Descriptions of field activities performed;
- A summary of pertinent field observations, field measurements, and laboratory analytical data summarized in tabular format - analytical results will be compared to appropriate NYSDEC guidance and standards;
- Plan view and cross-section figures presenting laboratory analytical data and field observations of surface and subsurface soil and groundwater impacts. A minimum of two profiles will be developed, one perpendicular to and one parallel with groundwater flow direction at the Site;
- A qualitative human health risk assessment which assesses the sources of impact, on and off-site human and ecological receptors, and exposure pathways;
- A data usability review and DUSRs for the laboratory data collected during the RI;
- An integration of field observations and measurements with laboratory analytical data to evaluate the nature and extent of impacts and to develop a site conceptual model of potential contaminant migration;
- A Remedial Alternatives Analysis;
- A set of conclusions for the investigation; and

- Recommendations

Data collected during the RI will be submitted in the Department's Environmental Information Management System (EIMS) format for Electronic Data Delivery (EDD).

9.0 PROJECT SCHEDULE AND PROJECT PERSONNEL

Our anticipated schedule to perform the investigation activities described in this work plan is summarized below:

Description	Anticipate RI Schedule
Submission of RIWP to NYSDEC	1st week of May 2022
Approval and commencement of Field Investigation	3rd Week of June 2022
Complete RIR/RAWP and submit to NYSDEC	4th Week of August 2022

We note that the proposed schedule may be adjusted if unforeseen delays occur due to inclement weather, DOT permit approval, drill rig availability or other conditions that are beyond GZA's control.

The following GZA project personnel are proposed to be involved as part of the remedial investigation activities. Qualifications of personnel are provided in **Appendix F**. Drilling and laboratory subcontractors have not yet been retained.

Personnel	Role	Contact Information
Stephen M. Kline	Qualified Environmental Professional	347-242-7109
Reinbill P. Maniquez	Senior Project Manager	347-443-1059
Jackson Bogach	Assistant Project Manager	332-215-6349
Mark Frey	Field Geologist	347-213-8324

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REMEDIAL INVESTIGATION WORK PLAN

101 East 150th Street
(a.k.a, 586 River Avenue)
Bronx, New York
Block 2354, Lot 1

May 2022
File No. 41.0162951.10

PREPARED FOR:
586 River Ave., LLC
c/o Success Academy Charter Schools
95 Pine Street, 6th Floor
New York, NY 10005

GOLDBERG-ZOINO ASSOCIATES OF NEW YORK P.C.
D/B/A GZA GEOENVIRONMENTAL OF NEW YORK
104 West 29th Street, 10th Floor | New York, NY 10001
212-594-8140

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May 4, 2022
File No. 41.0162951.10

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7015

Re: Remedial Investigation Work Plan
101 East 150th Street
Bronx, New York 10451
Block 2354 Lot 1

Dear Sir/Madame,

On behalf of the 586 River Ave, LLC (Requestor/ Owner), Goldberg-Zoino Associates of New York P.C. d/b/a GZA GeoEnvironmental of New York (GZA) is pleased to submit this Remedial Investigation Work Plan (RIWP) for the above referenced property (Site).

If you have any questions, please contact Stephen M. Kline at (212) 594-8140.

Very truly yours,

GZA GEOENVIRONMENTAL OF NEW YORK

Reinbill P. Maniquez, CHMM
Senior Project Manager

Stephen M. Kline, P.E.
QEP/ Vice President

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CERTIFICATION

I, Stephen M. Kline, P.E., certify that that I am a Qualified Environmental Professional (QEP) as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan (RIWP) for 101 East 150th Street, Bronx, New York, Block 2354, Lot 1, was prepared in accordance with applicable statutes and regulations and in substantial conformance with the DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

Stephen M. Kline, P.E.

QEP Name

QEP Signature

May 4, 2022

Date

1.0 INTRODUCTION

This Remedial Investigation Work Plan (RIWP) for the property identified as 101 East 150th Street (a.k.a., 586 River Avenue), Bronx, New York (Site) was prepared by Goldberg Zoino Associates of New York, P.C. d/b/a GZA GeoEnvironmental of New York (GZA) on behalf of 586 River Ave., LLC (Requestor /Owner). The Requestor intends to enter into the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), Brownfield Cleanup Program (BCP) per Title 6 of the New York State Official Compilation of Codes, Rules, and Regulation (NYCRR) Part 375-3.4.

The Site is located in the Lower Concourse neighborhood of Bronx, New York and is comprised of a rectangular-shaped parcel identified as Block 2354, Lot 1 on the New York City (NYC) Department of Finance (DOF) Tax Map.

1.1 PROJECT OBJECTIVE

The previous investigations performed at the Site provided a preliminary understanding of the nature and extent of contamination, specifically chlorinated solvents and petroleum-related volatile organic compounds (VOCs). The objective of this RIWP is to collect sufficient quality and quantity of data to supplement the previous investigations, address the data gaps, and aid in the delineation of impacted areas that will need to be addressed during the remedial activities that will allow for the beneficial redevelopment of the property under the BCP.

1.2 SCOPE OF WORK

The RIWP describes the project objectives, details the Site information and location, relevant historical background, previous site investigations, and field methodologies that will be employed during the subsurface investigation. This RIWP was prepared by GZA for the Site in general accordance with the NYSDEC, DER *Technical Guidance for Site Investigation and Remediation (DER-10)*, dated May 2010. Appended to this RIWP are plans that detail the site-specific protocols to be followed during the investigation work, which include:

- Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP)
- Health and Safety Plan (HASP)
- Community Air Monitoring Plan (CAMP)

2.0 SITE INFORMATION

The following section summarizes information provided by the Requestor such as survey plans, previous assessment and investigation reports related to the Site. These documents should be consulted for additional information and details not presented here. Previous documents include:

- *Topographical Survey Plan, Alphonse Pesce Jr., October 20, 2003, updated May 10, 2012*
- *Phase I Environmental Site Assessment, AEI Consultants, April 4, 2018*
- *Phase I Environmental Site Assessment, Brinkerhoff Environmental Services Inc., June 12,2020*
- *Phase I Environmental Site Assessment, GZA GeoEnvironmental of New York, November 2021*
- *Phase II Environmental Site Investigation Report, GZA GeoEnvironmental of New York, November 2021*
- *Amended Geotechnical Engineering Report, GZA GeoEnvironmental of New York, April 15, 2022*

Previous plans and reports were transmitted to the NYSDEC as an attachment to the BCP Application Package provided under separate cover.

2.1 SITE LOCATION, DESCRIPTION, AND USE

The Site is identified 101 East 150th Street is located in the Lower Concourse neighborhood of Bronx, New York in an area zoned for residential (R7A, R6), light manufacturing (M1-2) and commercial (C2-4 and C4-4) use. The Site is comprised of one tax lot (Bronx Block 2354, Lot 1) and is 99,109 square feet (approximately 2.27 acres) in area. The Site is bound to the north by a NYC-owned surface parking lot (151 Street Lot South), to the east by Gerard Avenue, to the south by East 150th Street, and to the west by River Avenue. A topographic map showing the location of the Site is provided as **Figure 1**.

The Site is improved by a 30,345-square foot, two-story commercial building with a full cellar and an asphalt-paved parking lot. **Figure 2** shows a Site Plan depicting the Site features.

2.2 SITE AND AREA HISTORY

Records from 1891 through the early-1900s, show the Site as athletic fields. By the late-1900s, the Site was used a as lumber storage yard. By early 1930s until 1950, the Site was used as an athletic field / recreational facility with a club house. The Site building was constructed in approximately 1952. The property was first used by a shoe factory (National Shoes) as office and warehouse (from ca 1952 to 1981) and an electronic parts manufacturer (Welbilt Electronic Die Corp/Wedtech) (from ca 1984 to ca 1990s). By 2001, the property was foreclosed, and ownership was transferred to Marty and Dorothy Silverman Foundation, and eventually donated to the St. Luke's – Roosevelt Hospital Center. The property was then sold to Gerard Avenue LLC (American Self Storage). By 2003, the New York City (NYC) Department of Buildings (DOB) granted a change of use of the property's cellar and ground floor from electronic part manufacturing to commercial self-storage use; and the change of use of second floor of the building from office spaces to classrooms and instructional spaces. In 2019, the property was sold to 580 Gerard LLC, which continued the commercial self-storage (Treasure Island) and school (Bronx Children's Psychiatric / New York City Children's Center) operations at the property.

The NYC Department of Finance (DOF) website lists the following ownership records and deed transfers:

Previous Owner	Contact	Address	Date of Ownership or Operation
580 Gerard LLC	Jorge Madruga of MADDD Equities	15 Verbena Avenue Suite 200, Floral Park, NY	08/14/2019 to 12/29/2021
Gerard Avenue LLC	John Del Monaco	950 Route 36, Hazlet, NJ	09/04/2002 to 07/26/2019
St. Luke's Roosevelt Hospital	Robert Nulds	Amsterdam Avenue and 114th St. New York, NY	01/3/1991 to 08/7/2002
Marty and Dorothy Silverman Foundation	Lorin Silverman	110 East 59th Street, New York, NY	09/24/1990 to 01/03/1991
Five Oceans Realty Corp.	David Reback,Esq.	2322 Arthur Avenue, Bronx, NY	09/16/1987 to 08/28/1990
Welbilt Electronics / Wedtech Corp.	Bernard G. Ehrlich, Esq.	1049 Washington Avenue, Bronx, NY	03/10/1980 to 08/26/1987
National Shoes Inc.	Sherman N. Baker	150 Central Park South, New York , NY	Unknown to 03/10/1980

Records from as early as 1891 show the surrounding areas to the north, south, and east of the Site as vacant. The area to the west is shown with several 1-story buildings including a dwelling and a stable. By the late 1900s, the area to the north were developed 2-story dwelling with sheds, to the west were 1- to 3-story buildings used as a lumber yard, factories, and coal storage. While the areas to the east and south of the Site were vacant. By the early 1930s until mid-2000s, the area to the west of the Site were developed with rows of canopies which were later converted to one large building then into three large building identified as the Bronx Terminal Market. By early 1950s until late 2000, the property east and upgradient of the Site (580 Gerard Avenue) was developed with three contiguous 1-story buildings labeled as "US Post Office Vehicle Maintenance Facility," "plumbing supplies," and an auto repair shop. On January 8, 2021, 580 Gerard Avenue was entered into the BCP under Site No. C203142.

2.3 PROPOSED REDEVELOPMENT PLAN

The Site is located in the Lower Concourse neighborhood of Bronx Community District (CD) 4 in an area zoned for light manufacturing (M1-2) and commercial (C2-4 and C4-4) use. The Requestor intends to redevelop the Site into a six-story school building. The Proposed development would not alter the Project Site's existing M1-2 zoning designation. The Site is undergoing an Environmental Assessment under the City Environmental Quality Review (CEQR) in connection with an application for a Special Permit from the BSA pursuant to the zoning resolution (ZR) § 73-19. The redevelopment would not create a land use nor a structure that would be incompatible with the existing zoning designations within the surrounding secondary study area. The Project Site is located less than 400-feet from a C4-4 zoning district (located directly across River Avenue to the west of the Site) and R7A/C2-4 districts (located directly across Gerard Avenue to the east of the Site) in which UG 3 schools are permitted as-of-right (i.e., without a special permit)

The Requestor intends to redevelop the Site by removing the existing building and constructing a new 304,711 gross square foot, six-story school building with a cellar. The proposed development plan will incorporate engineering controls in the form of a vapor barrier and a sub-slab depressurization system (SSDS). The cellar will contain a gym for indoor soccer, a theater, auditorium, dance studios, storage, and mechanical spaces. The ground floor will contain a lobby with vestibules, multipurpose rooms, offices, support rooms, classrooms, lecture halls and a basketball gym. The second floor will contain classrooms, a cafeteria, conference rooms and multi-purpose rooms. The third and fourth floors will contain science laboratories, additional classrooms, multi-purpose rooms and work spaces. The fifth floor will contain another cafeteria, and classrooms, a dance and art studio as well as two outdoor terrace spaces. The sixth floor will contain the infirmary / nurses' suite, classrooms and storage areas. A copy of the proposed redevelopment plan is included in **Appendix A**.

In addition, the proposed redevelopment would entail construction excavation for the new building. The Requestor intends to remediate the Site during the redevelopment under the NYSDEC BCP. Assuming the Requestor's application to join the BCP is accepted, the process will involve: (i) submission of this draft Remedial Investigation Work Plan to NYSDEC; (ii) a public comment period on the draft Remedial Investigation Work Plan; (iii) a BCP Agreement between the Requestor and NYSDEC; (iv) NYSDEC's approval of a final Remedial Investigation Work Plan; (v) submission of a draft Citizen Participation Plan and draft Remedial Investigation Report and draft Remedial Work Plan to NYSDEC; (vi) a public comment period on the draft Remedial Investigation Report and draft Remedial Work Plan; (vii) NYSDEC's issuance of a remedy selection decision in a Record of Decision; (viii) performance of the Remedial Work (which is expected to occur concurrently with the demolition activities on-site and construction of the Proposed Project (a new school building); (ix) submission of a Remedial Action Report to NYSDEC; and (x) NYSDEC's issuance of a Certificate of Completion.

3.0 ENVIRONMENTAL AND PHYSIOGRAPHIC SETTING

The following subsections provide information regarding the general physiographic, hydrologic, and soil conditions around the Site.

3.1 REGIONAL PHYSIOGRAPHY

As shown on **Figure 1**, the U.S. Geological Survey topographic map 2019 U.S Geologic Survey (USGS) Central Park, NY Quadrangle 7.5-Minute Series Map, the eastern portion of the Site is at an elevation between 15 and 20 feet above mean sea level (amsl) based on North American Vertical Datum of 1988 (NAVD88). The surface topography slopes downward towards the Harlem River located approximately 750 feet west of the Site.

3.2 GEOLOGIC, HYDROGEOLOGIC, AND HYDROLOGIC CONDITIONS

According to the 1992 USGS publication Bedrock and Engineering Geologic Maps of Bronx County and Parts of New York and Queens Counties (Baskerville 1992), Bronx County is underlain by high grade metamorphic bedrock consisting of a sequence of Cambrian and Ordovician gneiss, schistose-gneiss, and marble. The bedrock beneath the Site is expected to be the Inwood Marble, (white calcite-dolomite) interlayered with units of Walloomsac and Manhattan Schists. Bedrock was observed between 50 feet and almost 100 feet below ground surface with an average depth of approximately 70 feet.

The eastern portion of the Site along the Gerard Avenue is at an elevation (EL) corresponding to EL +23 to EL +27 feet NAVD88. The topography along River Avenue is lower and ranges between EL +15 and EL +21 feet. The Parking area is cut down from the adjacent street elevations ranges between EL +8 and EL +12 feet.

Regionally the topography slopes westward down to approximately EL +8 feet. The nearest water body is the Harlem River located 750 feet west of the Site.

The Geotechnical Engineering Report by GZA, dated April 15, 2022 (see **Section 4.5**), identified fill material, consisting of fine to coarse sand containing up to 35 percent gravel, up to 35 percent silt or clayey silt, and varying amounts of brick, glass, or concrete fragments (Fill) was encountered below the surface cover at each boring across the entire Site. The bottom of the Fill layer ranged between EL +0.5 and EL +9 feet across the Site.

During the geotechnical study, groundwater levels in an observation well were measured between 8.9 and 9.1 feet below the parking area grade, which corresponds to approximately EL +2.8 and EL +3.0 feet. The anticipated groundwater flow direction is to the west, towards the Harlem River.

4.0 PREVIOUS SITE INVESTIGATIONS

The following subsections document the previous site investigations were reviewed as part of this Phase II ESI.

4.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT –APRIL 4, 2018

The 2018 Phase I Environmental Site Assessment (ESA) identified the property as 595 Gerard Avenue and was performed by AEI Consultants (AEI). The 2018 Phase I Environmental Site Assessment (ESA) found two Recognized Environmental Conditions (RECs) related to the Site. The first REC is the historical use of the Site, from approximately 1981 to 2003, as a metal fabrication facility. These facilities typically store and use new and used lubricants, solvents, and other hazardous substances, as well as producing a significant amount of waste, including

heavy metal wastes. The second REC is the current and historical use of several adjacent, potentially up gradient Sites as vehicle maintenance and fueling stations for fleet vehicles and sites containing numerous gasoline underground storage tanks (USTs). The adjacent sites were listed in multiple regulatory databases as release sites. The Phase I ESA did not find Controlled Recognized Environmental Conditions (CRECs), or Historical Recognized Environmental Conditions (HRECs) related to the Site. AEI noted that, due to the age of the building, the potential for asbestos containing material (ACM) and lead based paint (LBP) were identified as concerns.

A certificate of occupancy dated 1951 references the current two-story warehouse structure and approval from the NYC Fire Department (FDNY) for heating oil use at the Site. One AST containing #2 fuel oil and totaling approximately 10,000 gallons in capacity was observed in association with the boiler and is in the southeastern portion of the property. The AST is in a double-walled masonry vault, without access. AEI reported no olfactory evidence or visual evidence of staining or spills from the AST.

4.2 PHASE I ENVIRONMENTAL SITE ASSESSMENT –JUNE 12, 2020

The 2020 Phase I ESA identifies the property as 580 River Avenue and was performed by Brinkerhoff Environmental Services, Inc. (Brinkerhoff). The 2020 Phase I ESA identified the five RECs in conjunction with the Site:

- The lack of documentation regarding prior heating sources of former on-Site buildings, dating back to 1891. There is a potential for USTs to exist at the Site.

- Two gasoline tanks were present in the northwestern portion of the south-adjoining property building from at least 1951 through 1989. No information was located regarding the installation, operation, or removal of these gasoline tanks. No releases related to these tanks were documented.

- Auto repair facilities have been present on the southeast-adjoining property since at least 1924, and gasoline tanks have been documents on the same property from at least 1951 through 2007. NYSDEC spill Nos. 9910856, 1203859, and 1204620 are associated with this property, and were all granted “case closed” status. However, the handling, storage, and/or disposal of materials and substances used during the former and current operations at the property are unknown, so the potential exists for impact to the subsurface soil, soil vapor, and groundwater.

- The handling, storage, and/or disposal of materials and substances used during the historic and current operations at the subject Site are unknown. Therefore, the potential exists for impacts to subsurface soil, soil vapor, and groundwater.

- A stormwater drain is present in the parking lot on the northern exterior of the warehouse building. As the time of Brinkerhoff’s site reconnaissance, a dumpster and general garbage was observed above the drain. Staining was observed on the asphalt surface in the vicinity of the dumpster. Therefore, the potential exists for impact to subsurface soil, soil vapor, and groundwater at the Site.

Brinkerhoff found no CREC or HRECs related to the Site. The potential for ACM or LBP within the warehouse was reported as a concern. The Phase I also identified the potential for urban historic fill to exist beneath the Site.

4.3 PHASE I ENVIRONMENTAL SITE ASSESSMENT – NOVEMBER 2021

GZA prepared a Phase I ESA in conformance with ASTM E-1527-13 and identified two RECs in connection with the Site. One REC is the historical use of the Site as a shoe manufacturer in the 1950s until 1980 and by an electrical

products manufacturing and warehouse company in the 1980s until the 1990s. The other REC is the 580 Gerard Avenue property, adjacent to the east and upgradient of the Site, has had a history of auto repair use and known as US Post Office Vehicle Maintenance Facility since the 1950s. The 580 Gerard Avenue property is listed under the BCP Site No. C203142. File review of BCP report document contamination of the soil, groundwater, and soil vapor at 580 Gerard Avenue. The following four Business Environmental Risks (BERs) were identified for the Site:

- If the future use of the Site changes, care should be exercised during excavation for the potential to encounter historic urban fill material.
- An inactive 10,000-gallon fuel oil above ground storage tank (AST) is located in the basement at the southeastern portion of the warehouse. The AST is encased in a room with a small access panel. The property used natural gas and the AST is no longer in use. The AST should be decommissioned in conformance with applicable federal, state, and local regulations.
- The potential for ACM and LBP exists within the Site building due to its age.
- If dewatering is required for construction, groundwater sampling and testing in conformance with federal, state, and/or local sewer discharge permit/approval requirements may be required.

No CRECs or HRECs were identified for the Site. Minor staining was observed near the dumpster area and the parking area, which GZA recognized as a de minimis condition.

4.4 PHASE II ENVIRONMENTAL SITE INVESTIGATION – NOVEMBER 2021

In October and November 2021, GZA conducted an initial and supplemental Phase II Environmental Site Investigation (ESI) in conformance with ASTM 1903-19 and submitted the results as one report in November 2021. In total, the investigation included a geophysical survey, advancement of 24 soil borings, collection and laboratory analysis of 26 soil samples, conversion of eight soil borings to temporary monitoring wells, collection and laboratory analysis of eight groundwater sampling sets, installation and sampling of 10 soil vapor probes, collections and laboratory analysis of two outdoor air samples, three indoor air samples, and one ambient air sample from within the on-Site catch basin. Sample locations and exceedances of respective guidance values are shown on **Figures 3, 4, and 5**. Soil sampling results were compared to NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCO), NYSDEC Part 375 Protection of Groundwater SCOs, and NYSDEC Part 375 Residential Use Soil Cleanup Objectives (RUSCO). The following summarized the findings of the Phase II ESI:

- Anomalies resembling potential subsurface utilities (such as electric, water, gas, and sewer) were identified during the geophysical survey. A fill port and a vent pipe associated with the 10,000-gallon AST, were identified along the southeast corner building exterior. However, no subsurface anomalies consistent with USTs were identified during the geophysical survey.
- GZA observed fill at varying depths from 3 to 5 feet below ground surface (bgs) and a layer of native sand underlaying the fill stratum which extended to at the maximum depth of the soil borings at 15 feet bgs.
- Non-stabilized groundwater was encountered at depths ranging from 4.6 feet below the basement slab to 9.8 feet below the parking area ground surface.
- Soil - Several petroleum hydrocarbon VOCs were encountered in excess of their respective RUSCOs at the deeper strata (i.e., below the 9 feet bgs or water table) at samples located at the eastern boundary

towards the middle of the parking area. Chlorinated VOCs were encountered in excess of their respective RSCOs at the shallow sample (i.e., 3 feet bgs) collected near the southwestern portion of the parking area.

- Several semi-volatile organic compounds (SVOCs) were detected in excess of their respective RUSCOs in two shallow samples collected in the parking area. These SVOCs are typical constituents of urban fill in observed in New York City.

- Some metals were detected in excess of UUSCOs. However, most samples show metal concentrations below the RUSCOs. The exceptions are chromium observed in shallow soil samples collected from the parking area, and lead observed in shallow samples from the parking area. These metals concentrations are typical constituents of urban fill in observed in New York City.

- Pesticides, and PCBs were either not detected or detected at concentrations below their respective UUSCOs, RUSCOs, or PGWSCOs.

- Groundwater – Several petroleum hydrocarbon VOCs and SVOCs were detected at concentrations in excess of NYSDEC Technical Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS) at samples from wells located at the eastern boundary (TMW-6 and TMW-16) and towards the middle of the parking area.

- Metals, pesticides, and PCBs were either not detected or detected at concentrations below their respective TOGS 1.1.1. AWQS.

- Soil Vapor and Ambient Air –Multiple petroleum hydrocarbon compounds were reported in the soil gas samples at concentrations exceeding their respective New York State Department of Health (NYSDOH) Fuel Oil 2003 Upper Fence Limit and/or EPA Data 2001 90th Percentile Value. However, only some were detected in the indoor air samples. None of the ambient air samples show petroleum hydrocarbon compounds.

- Multiple chlorinated soil gas were reported at concentrations that exceeded their respective NYSDOH Air Guidance Values (AGVs) for indoor air. The highest concentration was at samples collected near the eastern boundary and the middle of the parking area.

- None of the chlorinated VOCs were detected in either the indoor, outdoor air, or ambient air samples at concentrations that exceeded NYSDOH AGVs.

4.5 GEOTECHNICAL ENGINEERING REPORT - APRIL 15, 2022

In support of the redevelopment plan for the Site, GZA performed a Geotechnical Exploration program. The Geotechnical scope include the following:

- Review of site subsurface data provided to us from previous explorations
- Performance of 16 borings at the Site
- Performance of 12 cone penetration soundings at the Site
- Evaluation and analysis of the subsurface conditions
- Preparation of the geotechnical engineering report.

General descriptions of the soil strata encountered in the borings are summarized below in order of their occurrence with depth.

- Surface Cover – Surface cover consisting of paved asphalt measuring approximately 3 to 12 inches in thickness was encountered at the ground surface within the parking area borings. Concrete with a measured thickness of approximately 6 inches was encountered at the ground surface within the sidewalk borings.

- FILL – Fill, consisting of fine to coarse sand containing up to 35 percent gravel, up to 35 percent silt or clayey silt, and varying amounts of brick, glass, or concrete fragments was encountered below the surface cover in each boring. The fill extended approximately between elevations 0.5 and 9.0 feet. At LBb-1 location a very hard surface was reportedly encountered at about elevation 5.0 feet, and boring was offset to continue the boring.

- UPPER SAND – A sand stratum was encountered in each boring extended to elevations between -8.1 and -23.5 feet. The sand consists of loose to dense, fine to coarse sand containing up to 50 percent gravel and up to 35 percent silt.

- SILT/CLAY – A silt and clay stratum was encountered within all but one boring. The material extended approximately between EL -18.1 and -56.5 feet. This silt/clay stratum was described as various shades of gray and brown, and contained up to 35 percent of fine to medium sand. Within boring GZ-12, boulders were encountered and cored through within this stratum between EL -41.9 and -51.9 feet.

- LOWER SAND – A lower sand stratum was encountered below the silt/clay layer. The lower sand stratum extended approximately to elevations between EL -33.8 and EL -59.7 feet. This lower sand stratum was described as various shades of brown or gray, and contained up to 50 percent gravel, up to 50 percent silt, clayey silt, or silty clay.

- DECOMPOSED ROCK – Decomposed rock was encountered about EL -23.5 to EL -63.0 feet and extended to bedrock or termination depths of borings at about EL -29.5 to EL -93.5 feet in some locations. This stratum was described as various shades of white, gray, brown, or blue, and consisting of fine to coarse sand, clayey silt, or silt, with up to 50 percent silt or clayey silt, or gravel. Mica fragments were observed within the samples.

- BEDROCK – Bedrock was encountered below the decomposed rock at EL -76.4 and EL -29.4 feet. In two borings the bedrock was observed to consists of hard, freshly weathered, slightly fractured, fine to medium-grained Schist, with closely spaced, horizontal to sub-horizontal, smooth joints/fractures. The bedrock elevations vary significantly and erratically across the Site.

Groundwater measurements in the observation well at LBc-2(OW) between January 28 and April 11, 2022, were between 8.9 and 9.1 feet below the ground surface, corresponding to ranging between EL 2.8 and EL 3.0.

4.6 SUMMARY OF PREVIOUS INVESTIGATIONS AND CONSTITUENTS OF CONCERN

Previous uses of the Site indicate a potential on-Site source for primary contaminants of concern. The Site building was used for shoe manufacturing and electronic component manufacturing from the late-1950s through approximately 1990. This manufacturing, which includes the cleaning of electronic components, historically used

chlorinated solvents similar to those observed during the Phase II Environmental Site Investigation performed in 2021.

The current parking area has remained undeveloped by a building, but historically there was a storage shed. The parking area was used for trucking and distribution of warehoused goods overtime. The types of petroleum contamination observed in the groundwater and chlorinated solvents observed in the soil vapor samples are common in automobile repair and maintenance since they have been historically used as equipment degreasers and parts cleaners. The parking area has been used as a parking facility, and it is possible some vehicle maintenance was performed in the parking area.

In addition, a layer of non-native, historic, urban fill has been observed throughout the Site.

Records from as early as 1891 show the surrounding areas to the north, south, and east of the Site as vacant. The area to the west is shown with several 1-story buildings including a dwelling and a stable. By the late 1900s, the area to the north were developed 2-story dwelling with sheds, to the west were 1- to 3-story buildings used as a lumber yard, toy and refrigerator factory with coal storage. While the areas to the east and south of the Site were vacant. By the early 1930s until mid-2000s, the area to the west of the Site were developed with rows of canopies which were later converted to one large building then into three large building identified as the Bronx Terminal Market. By early 1950s until late 2000, the property east and upgradient of the Site (580 Gerard Avenue) was developed with three contiguous 1-story buildings labeled as "US Post Office Vehicle Maintenance Facility", "plumbing supplies", and an auto repair shop. On January 8, 2021, 580 Gerard Avenue located upgradient and adjacent to the Site to the east entered into the BCP under Site No. C203142.

One 10,000-gallon fuel oil AST is located in the cellar of the Site building and is registered under the NYSDEC Petroleum Bulk Storage (PBS) Facility ID No. 2-609485. The AST was formerly used to supply No. 2 fuel oil to the boiler in the warehouse. The AST is no longer in use, as the building has converted to natural gas heating.

Based on the previous investigations, the primary contaminants of concern are petroleum-related VOCs, chlorinated VOC, SVOCs, and metals. The soil, groundwater, and soil gas analytical results that exceed their respective guidance values are shown on **Figures 3, 4, and 5,** respectively.

Historic urban fill material dating back to the late-1800s was observed across the entire Site. Petroleum hydrocarbon VOCs were encountered in excess of their respective Residential Soil Cleanup Objectives (RSCOs) at the deeper strata (i.e., below the 9 feet bgs or water table) at samples located at the eastern boundary and towards the middle of the parking area. Chlorinated VOCs were encountered in excess of their RSCOs at the shallow sample (i.e., 3 feet bgs) collected near the southwestern portion of the parking area. In addition, elevated subsurface petroleum contamination was observed in the vicinity of the water table at GZ-5, GZ-6, GZ-16, and GZ-24 as shown on **Figure 3**.

Several petroleum hydrocarbon VOCs and SVOCs were detected at concentrations in excess of the NYSDEC Technical Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS) at samples from wells located at the eastern boundary and towards the middle of the parking area. Please refer to **Figure 4**.

Multiple chlorinated VOCs were observed at elevated concentrations with their respective NYSDOH Air Guideline Values (AGVs) in soil gas. As shown on **Figure 5**, the exceedance occurred in the northern and southern areas of the Site, and in 9 of the 10 soil vapor sampling locations (SV-1, SV-2, SV-3, SV-4, SV-5, SV-6, SV-13, SV-15, and SV-16). However, there were no exceedances of the NYSDOH AGVs in the indoor air or outdoor ambient air vapor samples. The highest concentration was at samples collected near the middle of the parking area.

5.0 REMEDIAL INVESTIGATION

The proposed Remedial Investigation (RI) field program will focus on collecting additional soil, groundwater, and soil gas data to delineate and characterize of known chlorinated solvent and petroleum contamination, and historic fill materials underlying the property. The scope of the RI will include the collection of sufficient Site investigation data so that, together with the historical data, the entire Site will be sufficiently characterized to support the development of the Site-wide Remedial Action Work Plan (RAWP).

To accomplish this, the scope of work for the RI will include the following:

- The advancement of soil borings, collection of soil samples, installation of permanent groundwater monitoring wells, collection of groundwater samples from new monitoring wells, installation of soil vapor points, and sampling of new soil vapor points;
- The collection of soil, groundwater, and soil vapor sufficient to define the nature and extent of impacted media and current Site conditions and offsite groundwater and/or soil vapor migration potential;
- The collection of a synoptic round of groundwater level measurements and the collection of additional land survey data as needed for developing a groundwater elevation contour map; and
- The performance of a qualitative human health exposure assessment (QHHEA) to identify existing and potential exposure pathways and evaluate contaminant fate and transport.

The proposed scope of work includes:

<u>Soil</u>

- Advancement of 28 soil borings to a maximum depth of 30 feet bgs.
- Collection and laboratory analyses of 74 soil samples.

<u>Groundwater</u>

- Advancement of six soil borings down to a maximum depth of 30 feet bgs that will be converted to permanent flush-mounted monitoring wells.
- Gauging and development of the eight new permanent monitoring wells and 1 existing monitoring well.
- Collection and laboratory analyses of nine groundwater samples.

<u>Soil Gas</u>

- Advancement of four sub-slab soil vapor points down to 2 feet below the existing building cellar slab.
- Advancement of six soil vapor probes down to 5 feet bgs.
- Collection and laboratory analyses of 10 soil vapor samples.

<u>Outdoor Air/ Indoor Air</u>

- Collection and laboratory analyses of one outdoor ambient air and one indoor air sample.

All investigation activity will be conducted in accordance with the applicable requirements of the DER-10. All data will be produced in accordance with NYSDOH Analytical Services Protocol (ASP) Category B deliverables and will be reviewed and validated by an independent data validator. The data validator will prepare a Data Usability Summary Report (DUSR) before data is incorporated into the RIR for the Site. All data will be submitted to NYSDEC in electronic format, in accordance with DER-10.

The sample summary and rationale are provided in **Table 1**. The proposed sample locations are shown on **Figure 6**. The following sections describe the methods, rationale, and proposed sampling schedule for the soil

investigation activities summarized above. Sampling will be performed in accordance with the QAPP/FSP presented in **Appendix B**.

5.1 SOIL INVESTIGATION

As shown on **Figure 6**, GZA proposes to advance 28 soil borings across the property. The borings will be performed under field observation of a GZA engineer or geologist. Soil samples will be obtained with a 5-foot steel MacroCore™ sampler using disposable acetate liners. The MacroCore™ sampler will be advanced through the subsurface to collect representative soil samples down to a minimum of 15 feet bgs to maximum 30 feet bgs. If refusal is encountered in a soil boring due to subsurface obstructions (e.g., boulders, construction, and fill debris) above the target depth, the drillers will attempt up to two off-set locations for each boring location. An example soil boring log is included in **Appendix C**.

We will collect soil samples continuously from grade to the target depth and observe/document the soil samples for staining and soil characteristics. We will screen the soil samples for total organic vapors with a hand-held, photoionization detector (PID) and record lithological descriptions of the soil and field screening results on the soil boring logs. GZA's visual inspection will also document for evidence of contamination including staining and/or odors.

The GZA field representative will retain selected samples for laboratory analyses from the soil samples that indicate the comparatively highest impacts based on visual, olfactory, and PID screening results, and/or based on our evaluation of relevant Site features and conditions. GZA will collect between two (2) to three (3) soil samples set per boring totaling 74 soil sample sets. Discrete samples will be collected with an EnCore® sampler (or similar) in compliance with EPA Method 5035 from the 6-inch interval with the highest visual, olfactory and PID evidence of environmental impacts. The other sample will be collected across a two-foot interval that includes the VOC discrete sample interval. The soil samples will be analyzed as follows based on sampling approach:

- **Focused– 25 samples will be analyzed for the following:**
  - Target Compound List (TCL) VOC by Environmental Protection Agency (EPA) Method 8260 (discrete) with Tentatively Identified Compounds (TICs);
  - TCL SVOC by EPA Method 8270 with TICs; and
  - Target Analyte List (TAL) Metals by EPA Method 6010C / 7471B including hexavalent chromium and total cyanide.

- **Full Suite – 41 samples will be analyzed for the following:**
  - TCL VOCs by EPA Method 8260 (discrete) with TICs;
  - TCL SVOC by EPA Method 8270 with TICs;
  - TAL Metals by EPA Method 6010C / 7471B including hexavalent chromium and total cyanide;
  - Pesticides by EPA Method 8081 / Herbicides by EPA Method 8151; and
  - Polychlorinated biphenyls (PCBs) by EPA Method 8082A.

- **Full Suite + Emerging Contaminants (EC) – 8 samples will be analyzed for the following:**
  - TCL VOCs by EPA Method 8260 (discrete) with TICs;
  - TCL SVOC by EPA Method 8270 with TICs, including 1,4 Dioxane;
  - TAL Metals by EPA Method 6010C / 7471B, including hexavalent chromium and total cyanide;
  - TAL Pesticides by EPA Method 8081/ Herbicides by EPA Method 8151;
  - PCBs by EPA Method 8082A; and
  - Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537.1.

Each sample set will be labeled, sealed, and placed in a cooler for shipment under standard chain-of-custody protocol to a NYSDOH Environmental Laboratory Approval Program (ELAP)-laboratory.

5.2 GROUNDWATER INVESTIGATION

As shown on **Figure 6**, six soil borings will be converted into new permanent monitoring wells (designated MW-01 through MW-06). In addition, GZA proposes to sample the one existing permanent monitoring well (LBc-02[OW]) during the RI. Two of the monitoring wells (i.e., one upgradient and one downgradient) are proposed to be installed on the sidewalk to allow for long-term groundwater monitoring during and after construction. The permanent monitoring wells will be comprised of two-inch diameter PVC that will be installed to a maximum depth of approximately 30 feet bgs (i.e., at least 7 feet into the water table). Each well will consist of a 2-inch diameter PVC riser and at least 10 feet long of 0.02-inch slotted 2-inch diameter PVC screen with the screened interval designed to span across the water table to detect petroleum sheens or light non-aqueous phase liquids (LNAPL). A 2-foot bentonite plug will be placed above the filter pack. The remaining annular space will be filled with bentonite. The wells will be completed with a flush-mount manhole and locking cap. An example of a monitoring well construction log is provided in **Appendix C**.

Groundwater samples will be collected from the up to three temporary well points by peristaltic pump and with dedicated low-density polyethylene (LDPE) tubing. Prior to sample collection, a minimum of three well screen volumes will be purged from each well point with the pump intake placed at the approximate midpoint of the screened interval. At the ground surface, the water will pass through a sealed flow through cell containing probes which will measure the water temperature, pH, specific conductivity, turbidity, oxidation-reduction potential (ORP), and dissolved oxygen (DO). One groundwater sample will be collected after the water quality parameters have stabilized. Stabilization is defined by three successive readings that are within ± 0.1 for pH, ± 3% for conductivity, ± 10 mv for ORP, and ± 10% for turbidity and DO. GZA will field filter all groundwater samples (e.g., metals analyses) if the turbidity measurement is greater than 50 NTU following the purging of three to 10 well screen volumes. An example well purge log is provided in **Appendix C**.

The groundwater samples will be analyzed for the following parameters based on a targeted approach:

- **Full Suite – Seven (7) samples will be analyzed for the following:**
  - TCL VOCs by EPA Method 8260;
  - TCL SVOC by EPA Method 8270;
  - Total and dissolved TAL Metals by EPA Method 6010C / 6020 / 7471B;
  - Cyanide by EPA method 9010/9012;
  - Mercury by EPA method 7471; and
  - Pesticides by EPA Method 8081/ PCBs by EPA Method 8082A and Herbicides by EPA method 8151.
- **Full Suite + EC – Four (4) samples will be analyzed for the following:**
  - TCL VOCs by EPA Method 8260 with TICs;
  - TCL SVOC by EPA Method 8270 with TICs including 1-4 Dioxane;
  - Total and dissolved TAL Metals by EPA Method 6010C / 7471B, including cyanide by EPA method 9010/9012, mercury by EPA Method 7471;
  - Pesticides by EPA Method 8081/ PCBs by EPA Method 8082A / Herbicides by EPA method 8151; and
  - PFAS by EPA Method 537.1

One trip blank sample will accompany the groundwater sample (at a frequency of one per day of sampling with a sample submitted to the laboratory for TCL VOC analysis) and will be analyzed for TCL VOCs.

5.3 SOIL GAS, OUTDOOR AIR, AND INDOOR AIR SAMPLING

As shown on **Figure 6**, GZA proposes to install six soil vapor probes (designated SV-17, SV-18, SV-19, SV-24, SV-25, and SV-28) down to approximately 5 feet bgs near selected soil borings completed at the Site. GZA's drilling subcontractor will also install four sub-slab soil vapor (designated SSV- 10 to SSV 114) points located with the existing building footprint.

GZA will collect each of the soil vapor samples using methods consistent with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Soil vapor samples will be collected using a stainless-steel probe, consisting of a drive point and internal perforated sampling port with a retractable tip, connected to Teflon™ sampling tubing. GZA proposes to collect soil vapor samples in 6-liter Summa® canisters equipped with 2-hour flow regulators. The soil vapor samples will be submitted to a NYSDOH ELAP-accredited laboratory. The soil vapor samples will be submitted for Target Compound List (TCL) VOCs analysis via EPA Method TO-15. The analytical results will be compared to 8-hour exposure standards and NYSDOH-specified guidance values. Following soil vapor sample collection, the soil vapor sampling point materials will be removed from the ground. An example soil vapor sampling log is included in **Appendix C**.

GZA will also collect one outdoor ambient air and one indoor ambient air sample to evaluate the potential for vapor intrusion into the existing building. GZA will collect ambient samples in 6-liter Summa® canisters equipped with 2-hour flow regulators. The ambient air samples will be submitted to a NYSDOH ELAP-accredited laboratory for TCL VOC analysis via EPA Method TO-15.

5.4 QUALITY ASSURANCE /QUALITY CONTROL

As part of the field investigation, GZA will also collect Quality Assurance/Quality Control (QA/QC) samples in accordance with the QAPP, presented in **Appendix B**, to confirm the usability of the data. QA/QC samples include equipment rinsate/field blanks, trip blanks, sample duplicates and matrix spike/matrix spike duplicates (MS/MSDs).

When applicable, the sample result summary tables will list the laboratory method detection limit (MDL) at which a compound was non-detectable. The laboratory results will be reported to the sample-specific practical quantitation limit (PQL), equal to the sample-specific MDL, supported by the instrument calibrations. The reliability of laboratory data is supported by compliance with sample holding times and laboratory MDLs below cleanup criteria. Accuracy and precision of the laboratory analytical methods will be maintained by the use of calibration and calibration verification procedures, laboratory control samples, and surrogate, matrix, and analytical spikes.

5.5 DATA MANAGEMENT AND VALIDATION

GZA will coordinate with the laboratory to prepare the laboratory analytical reports in accordance with NYSDEC ASP Category B data deliverables, which include:

- Sample Delivery Group Narrative;
- Contract Lab Sample Information sheets;
- NYSDEC Data Package Summary Forms;
- Chain-of-custody forms; and,
- Test analyses results (including TICs for analysis of VOCs and SVOCs).

Plus, related QA/QC information and documentation consisting of:

- Calibration standards;
- Surrogate recoveries;
- Blank results;
- Spike recoveries
- Duplicate results;
- Confirmation (lab check/QC) samples;
- Internal standard area and retention time summary;
- Chromatograms;
- Raw data files; and
- Other specific information as described in the most current NYSDEC ASP

GZA will coordinate with the laboratory to prepare the results in Electronic Data Deliverables (EDDs) format compatible with EQuIS that can be uploaded into an EQuIS database for storage and development of tables or output to other data analysis tools and GIS as needed. GZA will have a data validate evaluate the data package for inclusion into a DUSR that will subsequently be prepared to document the usability of the data. Additional details regarding QA/QC and data management and validation are included in **Appendix B – QAPP/FSP**.

5.6 CHAIN OF CUSTODY AND SHIPPING

A chain-of-custody form will trace the path of sample containers from the Site to the laboratory. The project manager will notify the laboratory of upcoming field sampling events and the subsequent transfer of samples. This notification will include information concerning the number and type of samples, and the anticipated date of arrival. Insulated sample shipping containers (typically coolers) will be provided by the laboratory for shipping samples. All sample bottles within each shipping container will be individually labeled with an adhesive identification label provided by the laboratory. Project personnel receiving the sample containers from the laboratory will check each cooler for the condition and integrity of the bottles prior to field work.

The field sampler will indicate the sample designation/location number in the space provided on the chain-of-custody form for each sample. The chain of custody forms will be signed and placed in a sealed plastic Ziploc bag in the cooler. If sent via third party carrier, the shipping container will be closed for transport with nylon strapping, or a similar shipping tape, and a paper custody seals will be affixed to the lid. The seals must be broken to open the cooler and will indicate tampering if the seals are broken before receipt at the laboratory. A label may be affixed identifying the cooler as containing "Environmental Samples" and the cooler will be shipped via courier or by an overnight delivery service to the laboratory. When the laboratory receives the coolers, the custody seals will be checked, and lab personnel will sign the chain-of-custody form.

The following typical Chain-Of-Custody procedures will be implemented by GZA during the soil sampling:

A. The samples are under custody of the GZA field personnel, if:
   1. they are in his/her possession,
   2. they are in view after being in possession,
   3. they are locked up or sealed securely to prevent tampering, or
   4. they are in a designated secure area.

B. The original of the chain-of-custody form must accompany the samples at all times after collection, until receipt at the analytical laboratory. A copy of the chain-of-custody form will be kept by the sampling collector until it is filed in the project file.

C. When the possession of samples is transferred, the individuals relinquishing and receiving the samples will sign, date, and note the time on the Chain-Of-Custody form.

D. When samples are shipped, the GZA personnel, or designated representative, will note the courier's name, and air bill number, if applicable, on the Chain-Of-Custody form. Prior to shipping, coolers will be secured with signed custody seals so the laboratory may confirm coolers were not opened during shipping.

The chain-of-custody form will contain information to distinguish each sample from any other sample. This information will include:

A. The project name and address for which sampling is being conducted;
B. The name(s) and signature(s) of sampler(s);
C. The matrix being sampled (groundwater, soil, etc.);
D. The sampling date and time;
E. The specific sampling location in sufficient detail to allow re-sampling at the same location;
F. The number of containers and the volume of sample collected, and
G. The analytical method to be performed.

5.7 STORAGE AND DISPOSAL OF INVESTIGATION-DERIVED WASTE

Investigation derived waste (IDW) generated during the RI will be containerized and properly characterized and disposed of. Containers, which are USDOT approved storage containers (55-gallon drums) or a small bulk roll-off container, will be properly labeled and grouped by environmental matrix (soil, water, PPE/plastic, etc.). All drums or roll-offs will be staged in a central location on-Site prior to off-Site disposal.

If drums are used, they will be tracked as they are filled and given unique identification codes based on the following:

- A prefix indicating the drum's contents: i.e., S – Soil, W – Water, P – PPE/Plastic, and C&D – Construction Debris.
- Following the prefix and a hyphen will be the origin of the drum's contents. For example, drum SB-1, SB-2, SB-3 is a generated drum filled with soil from soil boring locations SB-1, SB-2 and SB-3; drum MW-1 is water generated from monitoring well MW-1.
- As drums are generated, their identification code, date of generation, contents, source (i.e., drill cuttings from location x, purge water from well y), and date sampled will be entered on a tracking table.

The drums (or roll-off container) will be centrally stored on-Site. Subsequently, the waste soils and/or water will be characterized with laboratory analyses for proper disposal.

6.0 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

A QHHEA will be performed following the collection of all RI data. The Exposure Assessment (EA) will be performed in accordance with Section 3.3(c)4 of DER-10 and the NYSDOH guidance for performing a qualitative EA (DER-10; Appendix 3B). The QHHEA will characterize the exposure setting, identify potentially complete exposure pathways, and qualitatively evaluate potential fate and transport of constituents from one medium to another (i.e., soil-to-air or soil-to-groundwater).

An exposure pathway is considered complete when the following five conditions are met:

1. Source identified (i.e., metals in paint on exterior building surfaces);
2. Release and transport mechanism from source to environmental media (i.e., into the subsurface or volatilization to the air of an overlying building);
3. Point of human exposure (i.e., an occupied building or surface soil);
4. A route of exposure (ingestion, dermal contact, or inhalation), and
5. A receptor population (i.e., on-site workers).

Once potentially complete exposure pathways are identified, the QHHEA will characterize Site conditions to determine whether the Site poses an existing or potential future hazard to the potentially exposed population. The evaluation will include a qualitative discussion of potential fate and transport mechanisms at the Site. The results of the QHHEA will be included as part of the RIR.

According to Section 3.10 of DER-10, and the Fish and Wildlife Resources Impact Analysis Decision Key in DER-10 Appendix 3C, a Fish and Wildlife exposure assessment will be performed (if needed) based on the results of the RI.

7.0 HEALTH AND SAFETY

The work outlined above will be completed under a GZA site-specific Health and Safety Plan (HASP)**,** attached as **Appendix D**, in accordance with OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations. A photoionization detector (PID) will be used to monitor the breathing zone of workers performing investigative activities in areas where there is a potential for the presence of organic vapors (i.e., groundwater and soil vapor sampling). A dust meter will also be used to screen for dust in the breathing zone that has the potential presence of metal contamination. GZA anticipates the work will be completed in Modified Level D personal protective equipment (PPE); however, workers will be prepared to elevate to more protective PPE based on the conditions encountered during field activities.

7.1 PROJECT KICKOFF AND UTILITY CLEARANCE

A project kick-off meeting will be held prior to initiating field work to orient field team members and subcontractors with the Site background, scope of work, potential hazards, health and safety requirements, emergency contingencies and other field procedures.

Prior to performing any subsurface work, a utility clearance survey will be performed in accordance with New York State Dig-Safe protocol. Sample locations will be screened using surface geophysical techniques such as electromagnetic (EM), ground penetrating radar (GPR) and/or radiofrequency (RF) techniques.

7.2 COMMUNITY AIR MONITORING PLAN (CAMP)

Real-time air monitoring for VOCs and particulate levels at the perimeter of the exclusion zone or work area will be performed in accordance with the CAMP (see **Appendix E**).

Continuous air monitoring will be required during ground intrusive activities and other activities where equipment is disturbing the ground surface. Ground intrusive activities include, but are not limited to, soil/fill excavation and

handling, test pitting or trenching, grading of existing Site soils and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required 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 would generally 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.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the Site perimeter on a continuous basis during demolition and earthwork activities unless otherwise specified in the CAMP. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. Wind direction will be evaluated using an on-site meteorological tower (RM Young sensors) that measures wind speed, direction, dry-bulb temperature and relative humidity. A central computer system will receive information from the meteorological system and compute a two-minute average wind speed and direction value. The VOC monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

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

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down until the source of the problem is identified and corrective action is taken to reduce organic vapor levels.

4. Fifteen-minute readings will be recorded and be available for State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored at the Site perimeter and in work zones on a continuous basis during demolition and earthwork. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be

equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. Visible dust from the work area will trigger the initiation of dust suppression procedures. Dust suppression equipment will be on Site, functional and available at the work zone prior to commencing work.

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

8.0 REPORTING

Upon completion of the field activities, an RIR/RAWP will be prepared to document the findings of the investigations performed at the Site and the proposed remedy. The RIR/RAWP will be consistent with the specifications presented in the DER-10 document and will include:

- An executive summary;
- A site description and history;
- Summary information regarding previous investigations and remedial work performed at the Site;
- Descriptions of field activities performed;
- A summary of pertinent field observations, field measurements, and laboratory analytical data summarized in tabular format - analytical results will be compared to appropriate NYSDEC guidance and standards;
- Plan view and cross-section figures presenting laboratory analytical data and field observations of surface and subsurface soil and groundwater impacts. A minimum of two profiles will be developed, one perpendicular to and one parallel with groundwater flow direction at the Site;
- A qualitative human health risk assessment which assesses the sources of impact, on and off-site human and ecological receptors, and exposure pathways;
- A data usability review and DUSRs for the laboratory data collected during the RI;
- An integration of field observations and measurements with laboratory analytical data to evaluate the nature and extent of impacts and to develop a site conceptual model of potential contaminant migration;
- A Remedial Alternatives Analysis;
- A set of conclusions for the investigation; and

- Recommendations

Data collected during the RI will be submitted in the Department's Environmental Information Management System (EIMS) format for Electronic Data Delivery (EDD).

9.0 PROJECT SCHEDULE AND PROJECT PERSONNEL

Our anticipated schedule to perform the investigation activities described in this work plan is summarized below:

Description	Anticipate RI Schedule
Submission of RIWP to NYSDEC	1st week of May 2022
Approval and commencement of Field Investigation	3rd Week of June 2022
Complete RIR/RAWP and submit to NYSDEC	4th Week of August 2022

We note that the proposed schedule may be adjusted if unforeseen delays occur due to inclement weather, DOT permit approval, drill rig availability or other conditions that are beyond GZA's control.

The following GZA project personnel are proposed to be involved as part of the remedial investigation activities. Qualifications of personnel are provided in **Appendix F**. Drilling and laboratory subcontractors have not yet been retained.

Personnel	Role	Contact Information
Stephen M. Kline	Qualified Environmental Professional	347-242-7109
Reinbill P. Maniquez	Senior Project Manager	347-443-1059
Jackson Bogach	Assistant Project Manager	332-215-6349
Mark Frey	Field Geologist	347-213-8324

Tables

Table1 - Sample Summary and Rationale

Remedial Investigation Work Plan
101 E. 150th Street
Bronx, New York

Sample Name	Location	Approximate Surface Elevation (NAVD 88)	Sample / Boring Termination Elevation (NAVD 88)	Sample / Boring Termination Depth (feet below ground surface)	Approximate Number of Samples	Rationale for Sampling	Laboratory Analysis
Soil							**Analyses**
SB-01	Approximately 80 feet north of the southeast building corner, on the eastern adjacent sidewalk	+24	-6	30	2	To characterize soil conditions and delineate extent and depths of contamination for groundwater monitoring locations.	SB-01 (0-2') - Full Suite; SB-01 (WT) - Full suite
SB-02	Approximately 65 feet north of the southwest building corner, on the western adjacent sidewalk	+17	-8	25	2		SB-02 (0-2') - Full Suite; SB-02 (WT) - Full suite
SB-03	Approximately 60 feet east and 10 feet north from the northwest existing building corner	+11	-7	18	3		SB-03 (0-2') - Full Suite + Emerging Contaminants; SB-03 (mid) - Focused; SB-03 (WT) - Full suite
SB-04	Approximately 15 feet east and 100 feet north from the northwest existing building corner	+12	-6	18	3		SB-04 (0-2') - Full Suite + Emerging Contaminants; SB-05 (mid) - Focused; SB-04 (WT) - Full suite
SB-05	Approximately 90 feet east and 100 feet north from the northwest existing building corner	+12	-6	18	3		SB-05 (0-2') - Full Suite + Emerging Contaminants; SB-05 (mid) - Focused; SB-05 (WT) - Full suite
SB-06	Approximately 165 feet east and 200 feet north from the northwest existing building corner	+12.5	-5.5	18	3		SB-06 (0-2') - Full Suite + Emerging Contaminants; SB-06 (mid) - Focused; SB-06 (WT) - Full suite
SB-07	Southwest section of existing building	+9	-6	15	2	To characterize soil conditions and delineate extent and depths of contamination below existing building.	SB-07 (0-2') - Focused; SB-07 (WT) - Full Suite
SB-08	Southern middle section of existing building	+9	-6	15	2		SB-08 (0-2') - Focused; SB-08 (WT) - Full Suite
SB-09	Southeast section of existing building	+9	-6	15	2		SB-09 (0-2') - Full suite + Emerging Contaminants; SB-09 (WT) - Full Suite
SB-10	Center of existing building	+9	-6	15	2		SB-10 (0-2') - Focused; SB-10 (WT) - Full Suite
SB-11	Eastern middle section of existing building	+9	-6	15	2		SB-11 (0-2') - Focused; SB-11 (WT) - Full Suite
SB-12	Northwest section of existing building	+9	-6	15	2		SB-12 (0-2') - Focused; SB-12 (WT) - Full Suite
SB-13	Northern middle section of existing building	+9	-6	15	2		SB-13 (0-2') - Full suite + Emerging Contaminants; SB-13 (WT) - Full Suite
SB-14	Northeast section of existing building	+9	-6	15	2		SB-14 (0-2') - Focused; SB-14 (WT) - Full Suite
SB-15	Approximately 130 feet east and 10 feet north from the northwest existing building corner	+8	-7	15	3	To characterize soil conditions and delineate extent and depths of contamination.	SB-15 (0-2') - Full Suite + Emerging Contaminants; SB-15 (mid) - Focused; SB-15 (WT) - Full Suite
SB-16	Approximately 190 feet east and 10 feet north from the northwest existing building corner	+20	-5	25	3		SB-16 (0-2') - Full Suite; SB-16 (mid) - Focused; SB-16 (WT) - Full Suite
SB-17	Approximately 10 feet east and 10 feet north from the northwest existing building corner	+16	-4	20	3		SB-17 (0-2') - Full Suite; SB-17 (mid) - Focused; SB-17 (WT) - Full Suite
SB-18	Approximately 10 feet east and 60 feet north from the northwest existing building corner	+12	-6	18	3		SB-18 (0-2') - Full Suite; SB-18 (mid) - Focused; SB-18 (WT) - Full Suite

Soil Analysis Description

Focused (26): Part 375 TCL VOCs (EPA Method SW 846 8260), Part 375 TCL SVOCs (EPA Method SW 846 8270), TAL metals (EPA MethodsSW 846 6010/6020/7470)

Full Suite (40): Part 375 TCL VOCs (EPA Method SW 846 8260), Part 375 TCL SVOCs (EPA Method SW 846 8270), pesticides/herbicides/PCBs (EPA Methods SW 846 8081/8151/8082), TAL and TCLP metals (EPA Methods SW 846 6010/6020/7470/1311), cyanide (EPA Method SW 846 9010/9012), and mercury (EPA Method SW 846 7471)

Full Suite + Emerging contaminants (8): Part 375 TCL VOCs + TICs, including 1-4 Dioxane (EPA Method SW 846 8260, isotope dilution for 1-4 Dioxane), TCL SVOCs + TICs (EPA Method SW 846 8270), pesticides/herbicides/PCBs (EPA Methods SW 846 8081/8151/8082), TAL metals (EPA Methods SW 846 6010/6020/7470), cyanide (EPA Method SW 846 9010/9012), and mercury (EPA Method SW 846 7471); PFAs (EPA Method SW 846 537.1)

Notes:
mid = Sample collected at greater than 2 feet below ground surface and just above the groundwater interface . The sample name will include the sample depth, [e.g., SB-24 (2-4')]
WT = water table. Sample will be taken at the groundwater interface and include the sample depth, [e.g, SB-10 (6-8')]
TCL = Target Compound List
TAL = Target Analyte List
VOCs + TICs = volatile organic compounds plus tentatively identified compounds
SVOCs + TICs = semi-volatile organic compounds plus tentatively identified compounds
PCBs = polychlorinated biphenyls
PFAs = perfluorinated compounds

Table1 - Sample Summary and Rationale

Remedial Investigation Work Plan
101 E. 150th Street
Bronx, New York

Sample Name	Location	Approximate Surface Elevation (NAVD 88)	Sample / Boring Termination Elevation (NAVD	Sample / Boring Termination Depth (feet below ground	Approximate Number of Samples	Rationale for Sampling	Laboratory Analysis
Soil							**Analyses**
SB-19	Approximately 65 feet east and 60 feet north from the northwest existing building corner	+11.5	-3.5	15	3	To characterize soil conditions and delineate extent and depths of contamination.	SB-19 (0-2') - Full Suite; SB-19 (mid) - Focused; SB-19 (WT) - Full Suite
SB-20	Approximately 90 feet east and 60 feet north from the northwest existing building corner	+11	-4	15	3		SB-20 (0-2') - Focused; SB-20 (mid) - Focused; SB-20 (WT) - Full Suite
SB-21	Approximately 160 feet east and 60 feet north from the northwest existing building corner	+11	-4	15	3		SB-21 (0-2') - Full Suite; SB-21 (mid) - Focused; SB-21 (WT) - Full Suite
SB-22	Approximately 65 feet east and 100 feet north from the northwest existing building corner	+11.5	-3.5	15	3		SB-22 (0-2') - Focused; SB-22 (mid) -Full Suite; SB-22 (WT) - Full Suite
SB-23	Approximately 165 feet east and 100 feet north from the northwest existing building corner	+12	-3	15	3		B-23 (0-2' - Full Suite; SB-23 (mid) - Focused; SB-23 (WT) - Full Suite
SB-24	Approximately 10 feet east and 150 feet north from the northwest existing building corner	+12.5	-2.5	15	3		B-24 (0-2') - Full Suite; SB-24 (mid) - Focused; SB-24 (WT) - Full Suite
SB-25	Approximately 60 feet east and 150 feet north from the northwest existing building corner	+12	-3	15	3		SB-25 (0-2') - Full Suite; SB-25 (mid) - Focused; SB-25 (WT) - Full Suite
SB-26	Approximately 90 feet east and 150 feet north from the northwest existing building corner	+12	-3	15	3		SB-26 (0-2') - Full Suite + Emerging Contaminants; SB-26 (mid) - Focused; SB-26 (WT) - Full Suite
SB-27	Approximately 165 feet east and 150 feet north from the northwest existing building corner	+12	-3	15	3		SB-27 (0-2') - Full suite; SB-27 (mid) - Focused; SB-27 (WT) - Full Suite
SB-28	Approximately 25 feet east and 200 feet north from the northwest existing building corner	+12.5	-2.5	15	3		SB-28 (0-2') - Full suite; SB-28 (mid) - Focused; SB-28 (WT) - Full Suite

Soil Analysis Description

Focused (26): Part 375 TCL VOCs (EPA Method SW 846 8260), Part 375 TCL SVOCs (EPA Method SW 846 8270), TAL metals (EPA MethodsSW 846 6010/6020/7470)

Full Suite (40): Part 375 TCL VOCs (EPA Method SW 846 8260), Part 375 TCL SVOCs (EPA Method SW 846 8270), pesticides/herbicides/PCBs (EPA Methods SW 846 8081/8151/8082), TAL and TCLP metals (EPA Methods SW 846 6010/6020/7470/1311), cyanide (EPA Method SW 846 9010/9012), and mercury (EPA Method SW 846 7471)

Full Suite + Emerging contaminants (8): Part 375 TCL VOCs + TICs, including 1-4 Dioxane (EPA Method SW 846 8260, isotope dilution for 1-4 Dioxane), TCL SVOCs + TICs (EPA Method SW 846 8270), pesticides/herbicides/PCBs (EPA Methods SW 846 8081/8151/8082), TAL metals (EPA Methods SW 846 6010/6020/7470), cyanide (EPA Method SW 846 9010/9012), and mercury (EPA Method SW 846 7471); PFAs (EPA Method SW 846 537.1)

Notes:
mid = Sample collected at greater than 2 feet below ground surface and just above the groundwater interface . The sample name will include the sample depth, [e.g., SB-24 (2-4')]
WT = water table. Sample will be taken at the groundwater interface and include the sample depth, [e.g, SB-10 (6-8')]
TCL = Target Compound List
TAL = Target Analyte List
VOCs + TICs = volatile organic compounds plus tentatively identified compounds
SVOCs + TICs = semi-volatile organic compounds plus tentatively identified compounds
PCBs = polychlorinated biphenyls
PFAs = perfluorinated compounds

Table1 - Sample Summary and Rationale

Remedial Investigation Work Plan
101 E. 150th Street
Bronx, New York

Sample Name	Location	Approximate Surface Elevation (NAVD 88)	Sample / Boring Termination Elevation (NAVD 88)	Sample / Boring Termination Depth (feet below ground surface)	Approximate Number of Samples	Rationale for Sampling	Laboratory Analysis
Sub-Slab Soil Vapor							**Analysis**
SSV-10	Center of Existing Building	+9	+7	2	1	To characterize the sub-slab soil vapor within the existing building and delineate the extent of impacted soil	EPA Method TO-15 for Volatile Organic Compounds (VOCs)
SSV-12	Northwest section of existing building	+9	+7	2	1		
SSV-13	Northern middle section of existing building	+9	+7	2	1		
SSV-14	Northeast section of existing building	+9	+7	2	1		
Soil Vapor							**Analysis**
SV-17	Approximately 10 feet east and 10 feet north from the northwest existing building corner	+16	+11	5	1	To characterize the soil vapor within the existing parking lot area and delineate the extent of impacted soil	EPA Method TO-15 for VOCs
SV-18	Approximately 90 feet east and 100 feet north from the northwest existing building corner	+12	+7	5	1		
SV-19	Approximately 65 feet east and 60 feet north from the northwest existing building corner	+11.5	+6.5	5	1		
SV-24	Approximately 10 feet east and 150 feet north from the northwest existing building corner	+12.5	+7.5	5	1		
SV-25	Approximately 60 feet east and 150 feet north from the northwest existing building corner	+12	+7	5	1		
SV-28	Approximately 25 feet east and 200 feet north from the northwest existing building corner	+12	+7	5	1		
Ambient Air/Indoor Air							**Analysis**
AA-03	Center of parking lot	+12	+15	-3	1	To characterize the concentration of VOCs in ambient air and analyze vapor intrusion of the existing cellar	EPA Method TO-15 for VOCs
IA-04	Center of existing building	+9	+12	-3	1		

Sample Name	Location	Approximate Surface Elevation (NAVD 88)	Sample / Boring Termination Elevation (NAVD 88)	Sample / Boring Termination Depth (feet below ground surface)	Approximate Number of Samples	Rationale for Sampling	Laboratory Analysis
Groundwater - Permanent Wells							**Analyses**
MW-01	Approximately 80 feet north of the southeast building corner, on the eastern adjacent sidewalk	+24	-6	30	1	To characterize the groundwater conditions at the Site	Full Suite
MW-02	Approximately 65 feet north of the southwest building corner, on the western adjacent sidewalk	+17	-8	25	1		Full Suite
MW-03	Approximately 60 feet east and 10 feet north from the northwest existing building corner	+11	-7	18	1		Full Suite + Emerging contaminants
MW-04	Approximately 15 feet east and 100 feet north from the northwest existing building corner	+12	-6	18	1		Full Suite + Emerging contaminants
MW-05	Approximately 90 feet east and 100 feet north from the northwest existing building corner	+12	-6	18	1		Full Suite + Emerging contaminants
MW-06	Approximately 165 feet east and 200 feet north from the northwest existing building corner	+12.5	-5.5	18	1		Full Suite + Emerging contaminants
LBc-2(OW)	Approximately 170 feet east and 125 feet north from the northwest existing building corner	+12	-6	18	1		Full Suite

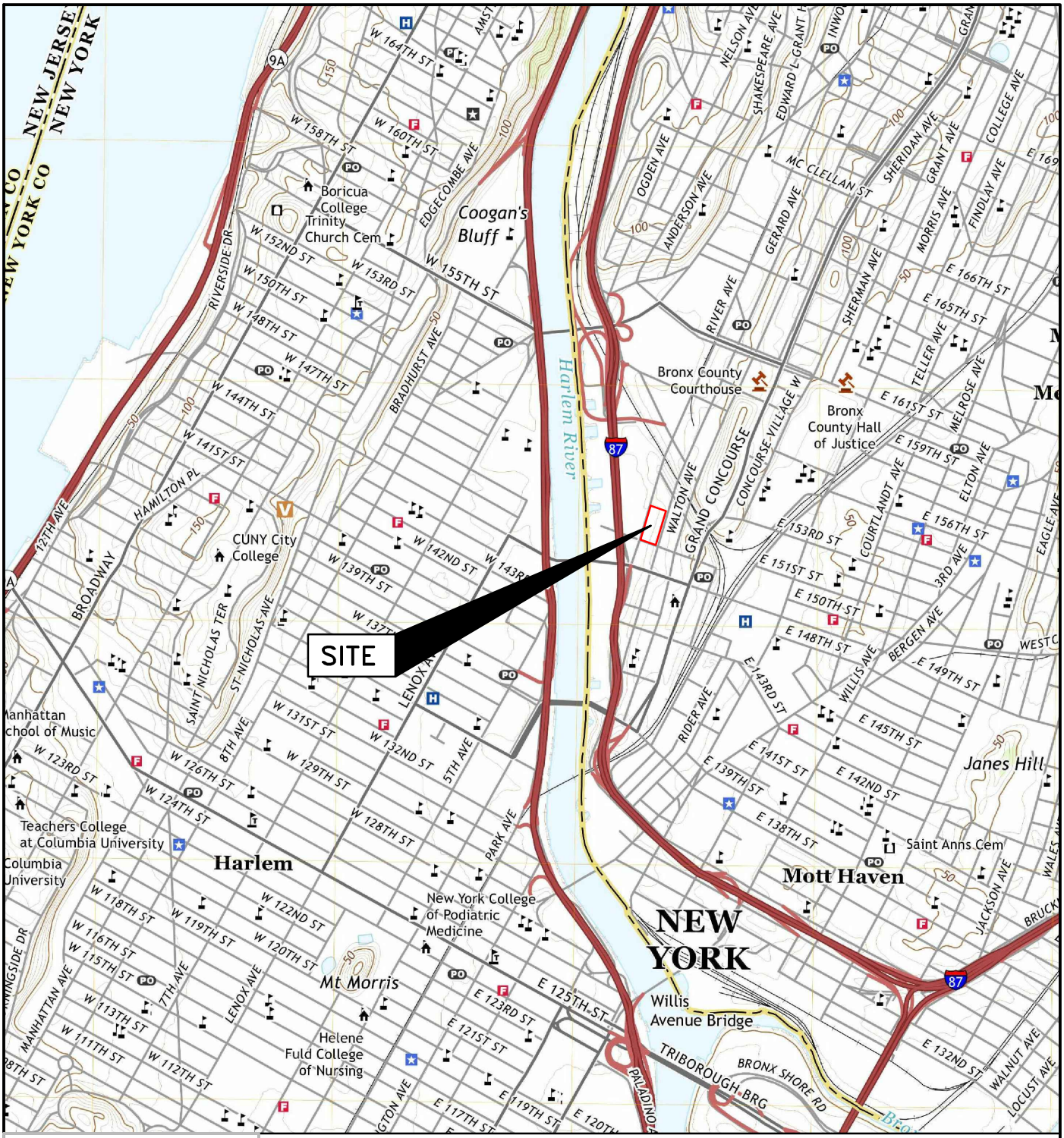
Notes:
Based on the Geotechnical Engineering Report, dated April 15, 2022, the water table is anticipated to be between +2 to +4 feet above mean sea level (amsl) elevation based on North American Vertical Datum of 1988 (NAVD 88)

Groundwater Analysis Description

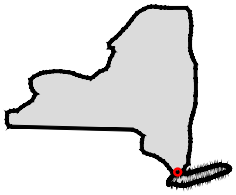
Full Suite (5): TCL VOCs (EPA Method SW 846 8260), TCL SVOCs (EPA Method SW 846 8270), pesticides/herbicides/PCBs (EPA Methods SW 846 8081/8151/8082), total and dissolved TAL metals (EPA Methods SW 846 6010/6020/7470), cyanide (EPA Method SW 846 9010/9012), and mercury (EPA Method SW 846 7471)

Full Suite + Emerging contaminants (2): TCL VOCs + TICs, including 1-4 Dioxane (EPA Method SW 846 8260, isotope dilution for 1-4 Dioxane), TCL SVOCs + TICs (EPA Method SW 846 8270), pesticides/herbicides/PCBs (EPA Methods SW 846 8081/8151/8082), total and dissolved TAL metals (EPA Methods SW 846 6010/6020/7470), cyanide (EPA Method SW 846 9010/9012), and mercury (EPA Method SW 846 7471); PFAs (EPA Method SW 846 537.1)

Figures



NEW YORK



QUADRANGLE LOCATION

SOURCE:

USGS TOPOGRAPHIC MAPS: CENTRAL PARK, NEW YORK, NEW JERSEY (2019). CONTOUR INTERVAL 10FT., NAVD-1988, ORIGINAL SCALE 1:24,000 (1IN.=2,000FT.).

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S

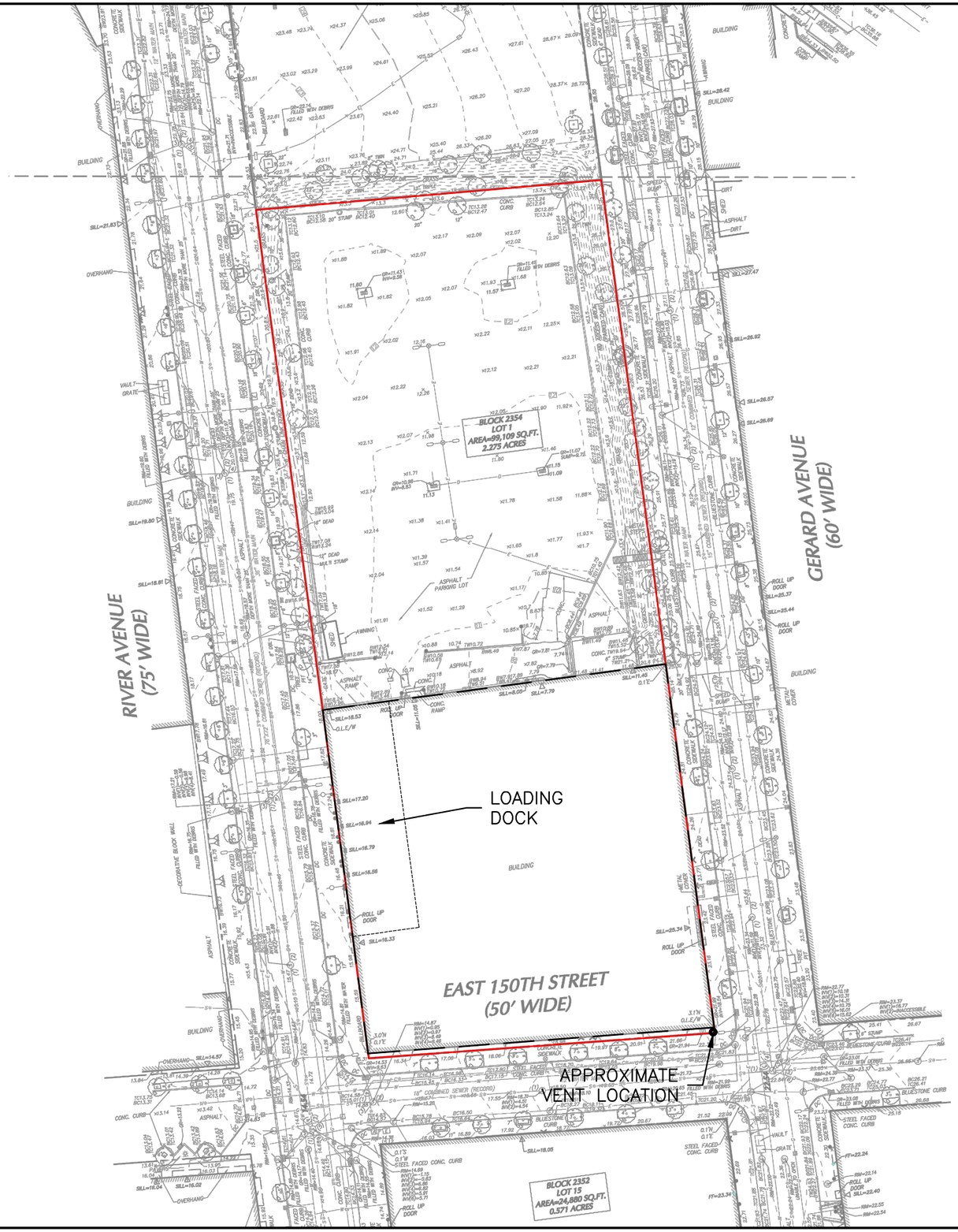
101 EAST 150TH STREET
BRONX, NEW YORK, 10451

PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

PREPARED FOR:
SUCCESS ACADEMY CHARTER SCHOOLS
95 PINE STREET, 6TH FLOOR
NEW YORK, NY 10005

SITE LOCATION MAP

PROJ MGR: RM	REVIEWED BY: SK	CHECKED BY: SK	FIGURE 1
DESIGNED BY: RM	DRAWN BY: JB	SCALE: 1"=2000'	
DATE: MAY 2022	PROJECT NO. 41.0162951.10	REVISION NO. -	SHEET NO.



GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED "TOPOGRAPHIC BOUNDARY AND UTILITY SURVEY – SOUTH BRONX DEVELOPMENT", PREPARED BY "LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C", ORIGINAL SCALE 1"–30', DATED 06–20–2020.
2. THE PURPOSE OF THIS DRAWING IS TO LOCATE, DESCRIBE, AND REPRESENT THE POSITIONS OF EXPLORATION LOCATIONS IN RELATION TO THE SUBJECT SITE. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
3. ALL ELEVATIONS GIVEN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGEND

APPROXIMATE SITE BOUNDARY

APPROXIMATE LIMITS OF EXISTING BUILDING

0 35 70 140

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

101 EAST 150TH STREET
BRONX, NEW YORK, 10451

SITE PLAN

PREPARED BY:
GZA GeoEnvironmental of NY
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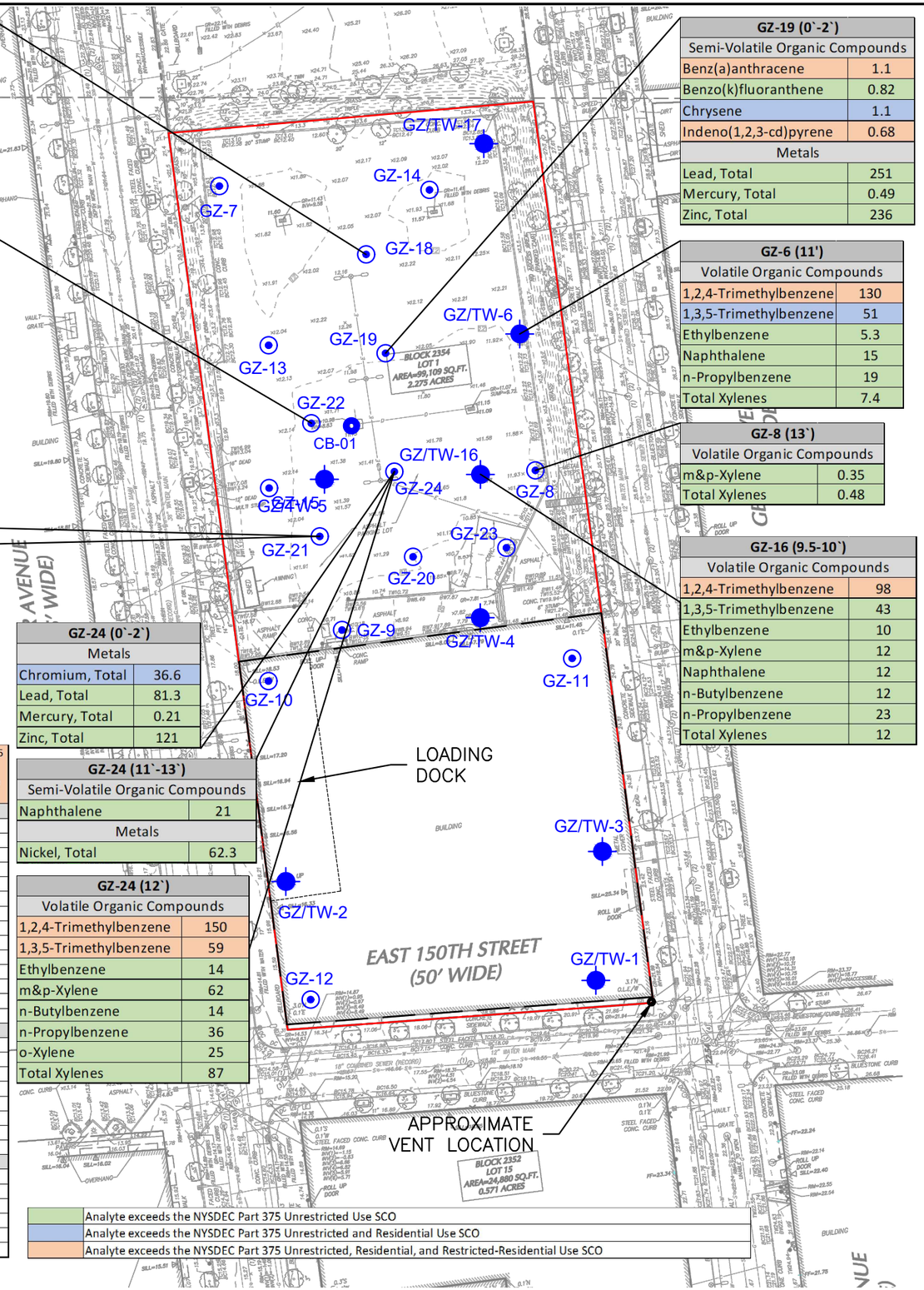
PREPARED FOR:
SUCCESS ACADEMY CHARTER SCHOOLS
95 PINE STREET, 6TH FLOOR
NEW YORK, NY 10005

PROJ MGR: RM	REVIEWED BY: SK	CHECKED BY: SK	FIGURE 2
DESIGNED BY: RM	DRAWN BY: JB	SCALE: 1"=70'	
DATE: MAY 2022	PROJECT NO. 41.0162951.10	REVISION NO. -	SHEET NO.

GZA–J:\Active 162900 to 162999\162951.10 – SA 586 River Avenue BCP Application\Drawings\GZA CAD\41.0162951.10 RIWP.dwg [FIG 2 – 17x11] April 22, 2022 – 4:39pm jackson.bogach



GZ-18 (0-2`)	
Metals	
Chromium, Total	49.5
Lead, Total	149

GZ-22 (0-2`)	
Metals	
Chromium, Total	30.7
Copper, Total	66.2
Lead, Total	1,030
Zinc, Total	201

GZ-21 (2`-4`)	
Semi-Volatile Organic Compounds	
Benz(a)anthracene	**11**
Benzo(a)pyrene	**6.9**
Benzo(b)fluoranthene	**5.9**
Benzo(k)fluoranthene	**3.8**
Chrysene	**13**
Dibenz(a,h)anthracene	**1.2**
Indeno(1,2,3-cd)pyrene	**3.6**
Metals	
Lead, Total	197
Mercury, Total	0.7
Zinc, Total	142

GZ-21 (3`)	
Volatile Organic Compounds	
1,1,1-Trichloroethane	5.6
1,1-Dichloroethane	3.2
cis-1,2-Dichloroethene	32
trans-1,2-Dichloroethene	0.37
Trichloroethene	44

GZ-24 (0`-2`)	
Metals	
Chromium, Total	36.6
Lead, Total	81.3
Mercury, Total	0.21
Zinc, Total	121

GZ-24 (11`-13`)	
Semi-Volatile Organic Compounds	
Naphthalene	21
Metals	
Nickel, Total	62.3

GZ-24 (12`)	
Volatile Organic Compounds	
1,2,4-Trimethylbenzene	150
1,3,5-Trimethylbenzene	59
Ethylbenzene	14
m&p-Xylene	62
n-Butylbenzene	14
n-Propylbenzene	36
o-Xylene	25
Total Xylenes	87

GZ-19 (0`-2`)	
Semi-Volatile Organic Compounds	
Benz(a)anthracene	1.1
Benzo(k)fluoranthene	0.82
Chrysene	1.1
Indeno(1,2,3-cd)pyrene	0.68
Metals	
Lead, Total	251
Mercury, Total	0.49
Zinc, Total	236

GZ-6 (11')	
Volatile Organic Compounds	
1,2,4-Trimethylbenzene	130
1,3,5-Trimethylbenzene	51
Ethylbenzene	5.3
Naphthalene	15
n-Propylbenzene	19
Total Xylenes	7.4

GZ-8 (13`)	
Volatile Organic Compounds	
m&p-Xylene	0.35
Total Xylenes	0.48

GZ-16 (9.5-10`)	
Volatile Organic Compounds	
1,2,4-Trimethylbenzene	98
1,3,5-Trimethylbenzene	43
Ethylbenzene	10
m&p-Xylene	12
Naphthalene	12
n-Butylbenzene	12
n-Propylbenzene	23
Total Xylenes	12

	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Residential Use SCO	NYSDEC Part 375 Restricted-Residential Use SCO
Analyte	Volatile Organic Compounds (mg/kg)		
1,1,1-Trichloroethane	0.68	100	100
1,1-Dichloroethane	0.27	19	26
1,2,4-Trimethylbenzene	3.6	47	52
1,3,5-Trimethylbenzene	8.4	47	52
cis-1,2-Dichloroethene	0.25	59	100
Ethylbenzene	1	30	41
m&p-Xylene	0.26	100	100
Naphthalene	12	100	100
n-Butylbenzene	12	100	100
n-Propylbenzene	3.9	100	100
o-Xylene	0.26	100	100
Total Xylenes	0.26	100	100
trans-1,2-Dichloroethene	0.19	100	100
Trichloroethene	0.47	10	21
Analyte	Semi-Volatile Organic Compounds (mg/kg)		
Benz(a)anthracene	1	1	1
Benzo(a)pyrene	1	1	1
Benzo(b)fluoranthene	1	1	1
Benzo(k)fluoranthene	0.8	1	3.9
Chrysene	1	1	3.9
Dibenz(a,h)anthracene	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5
Naphthalene	12	100	100
Analyte	Metals (mg/kg)		
Chromium, Total	30	36	180
Copper, Total	50	270	270
Lead, Total	63	400	400
Mercury, Total	0.18	0.81	0.81
Nickel, Total	30	140	310
Zinc, Total	109	2200	10000

	Analyte exceeds the NYSDEC Part 375 Unrestricted Use SCO
	Analyte exceeds the NYSDEC Part 375 Unrestricted and Residential Use SCO
	Analyte exceeds the NYSDEC Part 375 Unrestricted, Residential, and Restricted-Residential Use SCO

GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED "TOPOGRAPHIC BOUNDARY AND UTILITY SURVEY – SOUTH BRONX DEVELOPMENT", PREPARED BY "LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C", ORIGINAL SCALE 1"–30', DATED 06–20–2020.
2. SAMPLING DEPTHS ARE SHOWN NEXT TO THE SAMPLE ID ON EACH CALL–OUT BOX. ALL CHEMICAL CONCENTRATIONS ARE SHOWN IN MILLIGRAMS PER KILOGRAM.
3. THE PURPOSE OF THIS DRAWING IS TO LOCATE, DESCRIBE, AND REPRESENT THE POSITIONS OF EXPLORATION LOCATIONS IN RELATION TO THE SUBJECT SITE. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. ALL ELEVATIONS GIVEN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE LIMITS OF EXISTING BUILDING
- GZ/TW-# — APPROXIMATE SOIL BORING LOCATION (ALSO CONVERTED TO TEMPORARY MONITORING WELL)
- GZ-# — APPROXIMATE SOIL BORING LOCATION
- CB-01 — APPROXIMATE SEDIMENT SAMPLE LOCATION FROM WITHIN THE CATCH BASIN

N E S W

0 35 70 140

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

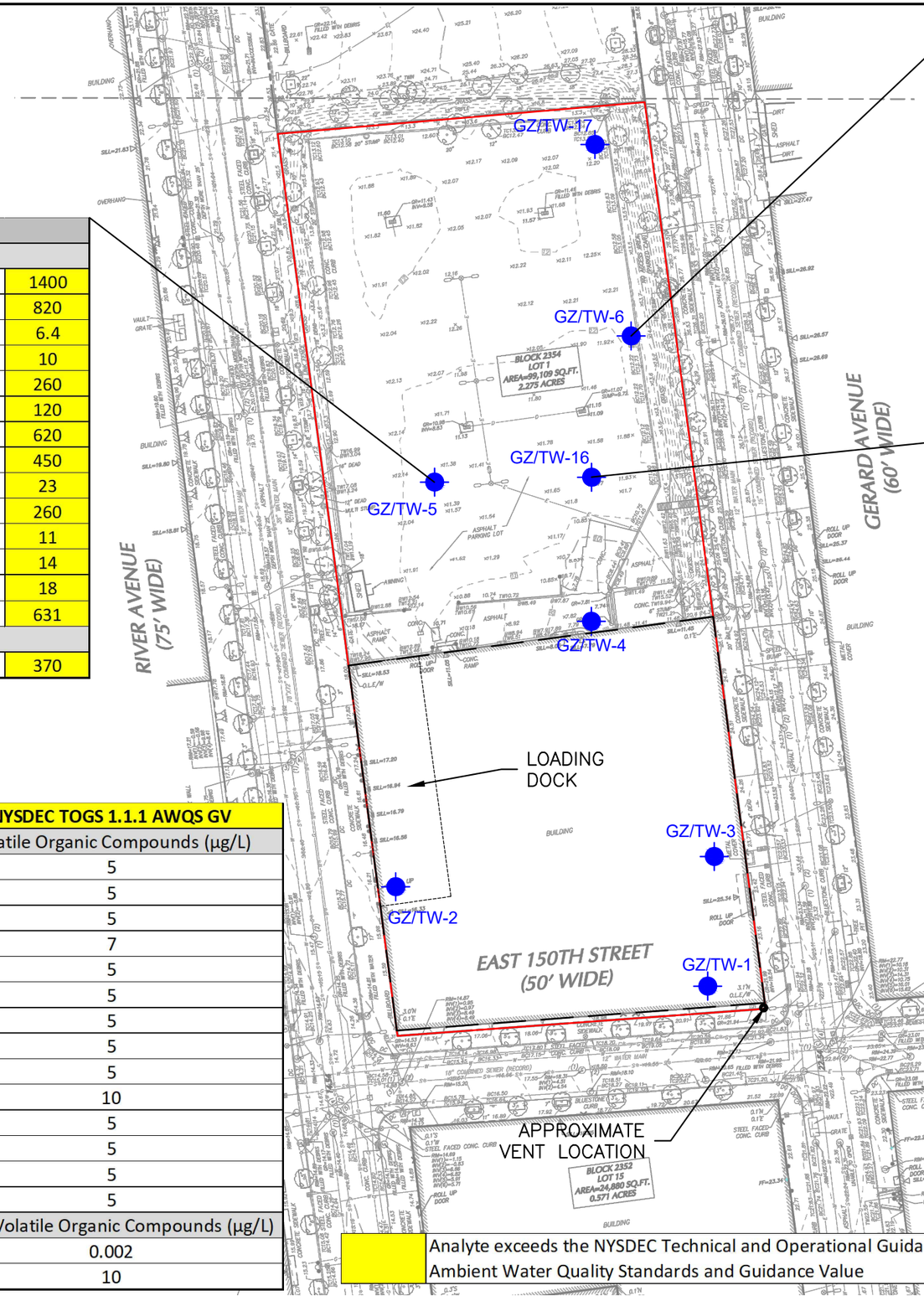
101 EAST 150TH STREET
BRONX, NEW YORK, 10451

SUMMARY OF PHASE II ESI SOIL EXCEEDANCES

PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

PREPARED FOR:
SUCCESS ACADEMY CHARTER SCHOOLS
95 PINE STREET, 6TH FLOOR
NEW YORK, NY 10005

PROJ MGR: RM	REVIEWED BY: SK	CHECKED BY: SK	FIGURE 3
DESIGNED BY: RM	DRAWN BY: JB	SCALE: 1"=70'	
DATE: MAY 2022	PROJECT NO. 41.0162951.10	REVISION NO. -	SHEET NO.



TMW-5	
VOCs	
1,2,4-Trimethylbenzene	1400
1,3,5-Trimethylbenzene	820
2-Isopropyltoluene	6.4
Chloroform	10
Ethylbenzene	260
Isopropylbenzene	120
m&p-Xylene	620
n-Butylbenzene	450
n-Propylbenzene	23
Naphthalene	260
o-Xylene	11
p-Isopropyltoluene	14
sec-Butylbenzene	18
Total Xylenes	631
SVOCs	
Naphthalene	370

TMW-6	
VOCs	
1,2,4-Trimethylbenzene	1900
1,3,5-Trimethylbenzene	780
Ethylbenzene	45
Isopropylbenzene	95
m&p-Xylene	140
n-Butylbenzene	160
n-Propylbenzene	33
Naphthalene	290
o-Xylene	44
p-Isopropyltoluene	12
Total Xylenes	184
SVOCs	
Naphthalene	140

TMW-16	
VOCs	
1,2,4-Trimethylbenzene	1200
1,3,5-Trimethylbenzene	340
2-Isopropyltoluene	5.6
Ethylbenzene	290
Isopropylbenzene	65
m&p-Xylene	470
n-Butylbenzene	390
n-Propylbenzene	19
Naphthalene	160
o-Xylene	420
p-Isopropyltoluene	13
sec-Butylbenzene	15
Total Xylenes	890
SVOCs	
Benz(a)anthracene	0.02
Naphthalene	290

	NYSDEC TOGS 1.1.1 AWQS GV
Analyte	Volatile Organic Compounds (µg/L)
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5
2-Isopropyltoluene	5
Chloroform	7
Ethylbenzene	5
Isopropylbenzene	5
m&p-Xylene	5
n-Butylbenzene	5
n-Propylbenzene	5
Naphthalene	10
o-Xylene	5
p-Isopropyltoluene	5
sec-Butylbenzene	5
Total Xylenes	5
Analyte	Semi-Volatile Organic Compounds (µg/L)
Benz(a)anthracene	0.002
Naphthalene	10

Analyte exceeds the NYSDEC Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Value

GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED "TOPOGRAPHIC BOUNDARY AND UTILITY SURVEY – SOUTH BRONX DEVELOPMENT", PREPARED BY "LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C", ORIGINAL SCALE 1"=30', DATED 06-20-2020.
2. ALL CHEMICAL CONCENTRATIONS ARE SHOWN IN MICROGRAMS PER LITER.
3. THE PURPOSE OF THIS DRAWING IS TO LOCATE, DESCRIBE, AND REPRESENT THE POSITIONS OF EXPLORATION LOCATIONS IN RELATION TO THE SUBJECT SITE. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. ALL ELEVATIONS GIVEN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGEND

APPROXIMATE SITE BOUNDARY

APPROXIMATE LIMITS OF EXISTING BUILDING

GZ/TW-# APPROXIMATE TEMPORARY WELL LOCATION (ALSO A LOCATION OF A SOIL BORING SAMPLE)

N E S W

0 35 70 140

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

101 EAST 150TH STREET
BRONX, NEW YORK, 10451

SUMMARY OF PHASE II ESI GROUNDWATER EXCEEDANCES

PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

PREPARED FOR:
SUCCESS ACADEMY CHARTER SCHOOLS
95 PINE STREET, 6TH FLOOR
NEW YORK, NY 10005

PROJ MGR: RM	REVIEWED BY: SK	CHECKED BY: SK	FIGURE
DESIGNED BY: RM	DRAWN BY: JB	SCALE: 1"=70'	4
DATE: MAY 2022	PROJECT NO. 41.0162951.10	REVISION NO. -	SHEET NO.

SV-5	
1,1,1-Trichloroethane	52200
1,1-Dichloroethane	25400
1,1-Dichloroethene	4680
1,2,4-Trimethylbenzene	61.9
1,3,5-Trimethylbenzene	19.1
4-Ethyltoluene	55
Acetone	1610
Benzene	98
Carbon disulfide	7.81
Chloroethane	175
Chloroform	247
cis-1,2-Dichloroethene	18600
Cyclohexane	216
Ethylbenzene	36.5
Heptane	47.5
Methylene chloride	27.8
o-Xylene	55.5
p/m-Xylene	141
Tetrachloroethene	2540
Tetrahydrofuran	154
Toluene	110
Trichloroethene	39500
Vinyl chloride	754

SV-15	
1,1,1-Trichloroethane	6920
1,1-Dichloroethane	1120
1,1-Dichloroethene	359
1,2,4-Trimethylbenzene	11.4
2-Butanone (Methyl Ethyl Ketone)	73.7
4-Ethyltoluene	13
Benzene	16.1
Carbon disulfide	22
cis-1,2-Dichloroethene	84.4
Cyclohexane	24.3
Ethylbenzene	90.7
Heptane	41
o-Xylene	96.3
p/m-Xylene	383
Tetrachloroethene	10.4
Toluene	70.8
Trichloroethene	48.8
Trichlorofluoromethane	18.4
Vinyl chloride	5.26

SV-13	
1,1,1-Trichloroethane	3330
1,1-Dichloroethane	86.6
1,1-Dichloroethene	65
1,2,4-Trimethylbenzene	9.24
2-Butanone (Methyl Ethyl Ketone)	73.7
4-Ethyltoluene	11
4-Methyl-2-pentanone	28.1
Carbon disulfide	11.5
Chloroform	20.1
Cyclohexane	21.9
Ethylbenzene	15.3
Heptane	19.3
o-Xylene	13.4
p/m-Xylene	50.3
Tetrachloroethene	23.9
Toluene	54.2
Trichloroethene	5.8

SV-4	
1,1,1-Trichloroethane	4250
1,1-Dichloroethane	107
1,1-Dichloroethene	94.7
1,2,4-Trimethylbenzene	37.8
1,3,5-Trimethylbenzene	13.5
1,4-Dichlorobenzene	5.41
4-Ethyltoluene	33
Acetone	624
Benzene	13.7
Carbon disulfide	33.6
Carbon tetrachloride	1.82
Chloroform	74.7
cis-1,2-Dichloroethene	5.47
Cyclohexane	20.2
Dichlorodifluoromethane	35.7
Ethylbenzene	52.9
Heptane	32.7
o-Xylene	100
p/m-Xylene	242
Tetrachloroethene	3450
Tetrahydrofuran	102
Toluene	55.7
Trichloroethene	870
Vinyl chloride	7.05

SV-14	
1,1,1-Trichloroethane	36
1,1-Dichloroethane	1.31
1,2,4-Trimethylbenzene	3.04
4-Ethyltoluene	4.46
Carbon disulfide	9.9
Chloroform	9.32
Cyclohexane	19.1
Ethylbenzene	140
Heptane	29.7
o-Xylene	105
p/m-Xylene	322
Tetrachloroethene	5.99
Toluene	49.3

SV-6	
1,1,1-Trichloroethane	971
1,1-Dichloroethane	13.1
1,2,4-Trimethylbenzene	64.9
1,3,5-Trimethylbenzene	19.9
4-Ethyltoluene	17.5
Acetone	1200
Benzene	36.1
Carbon disulfide	17.2
Chloroform	20.4
cis-1,2-Dichloroethene	1.72
Cyclohexane	29.2
Ethylbenzene	28.9
Heptane	41.4
o-Xylene	52.5
p/m-Xylene	125
Tetrachloroethene	1330
Tetrahydrofuran	51
Toluene	91.9
Trichloroethene	7.04

SV-16	
1,1,1-Trichloroethane	9160
1,1-Dichloroethane	489
1,1-Dichloroethene	70.1
1,2,4-Trimethylbenzene	19.6
1,3,5-Trimethylbenzene	7.52
2-Butanone (Methyl Ethyl Ketone)	107
4-Ethyltoluene	18.8
Acetone	144
Benzene	15.6
Carbon disulfide	34.9
Chloroform	57.1
cis-1,2-Dichloroethene	3.59
Cyclohexane	26.9
Ethylbenzene	177
Heptane	101
o-Xylene	171
p/m-Xylene	712
Tetrachloroethene	7.12
Toluene	53.9
Trichloroethene	441

IA-2	
1,2,4-Trimethylbenzene	9.58
1,4-Dichlorobenzene	109
4-Ethyltoluene	7.17
Benzene	21.6
Chloroform	1.93
Chloromethane	16.9
Cyclohexane	7.98
Dichlorodifluoromethane	21
Ethyl Acetate	8.25
Ethylbenzene	11.1
o-Xylene	14.7
p/m-Xylene	45.6
Styrene	6.22
Tetrachloroethene	2.93
Tetrahydrofuran	2.24
Toluene	52.7
Trichloroethene	0.76

IA-3	
1,4-Dichlorobenzene	36.1
Chloroform	1.59
Chloromethane	68.7
Dichlorodifluoromethane	16.8
Ethyl Acetate	8.57
Ethylbenzene	6.9
o-Xylene	8.85
p/m-Xylene	35.7
Styrene	1.66
Tetrahydrofuran	1.77
Trichloroethene	0.81

SV-2	
1,1,1-Trichloroethane	43.8
1,2,4-Trimethylbenzene	52.1
1,3,5-Trimethylbenzene	16.3
4-Ethyltoluene	41
Acetone	156
Carbon disulfide	7.37
Carbon tetrachloride	7.67
Cyclohexane	18.5
Dichlorodifluoromethane	12.6
Ethylbenzene	21.5
Heptane	19.3
o-Xylene	38.7
p/m-Xylene	93.3
Tetrachloroethene	37.1
Tetrahydrofuran	78.4
Toluene	64.4

SV-1	
1,1,1-Trichloroethane	7.14
1,2,4-Trimethylbenzene	44.4
1,3,5-Trimethylbenzene	16.5
4-Ethyltoluene	14.5
Acetone	349
Benzyl chloride	6.93
Carbon tetrachloride	34.1
Chloroform	5.66
Cyclohexane	8.26
Dichlorodifluoromethane	10
Ethylbenzene	24.6
o-Xylene	42.8
p/m-Xylene	106
Tetrachloroethene	439
Tetrahydrofuran	28
Toluene	70.8

SV-3	
1,2,4-Trimethylbenzene	47.2
1,3,5-Trimethylbenzene	14.4
4-Ethyltoluene	41.3
4-Methyl-2-pentanone	17.6
Acetone	470
Carbon tetrachloride	1.92
Chloroform	244
Cyclohexane	7.46
Ethylbenzene	24.8
o-Xylene	43.8
p/m-Xylene	109
Tetrachloroethene	1210
Tetrahydrofuran	49.5
Toluene	53.1
Trichloroethene	34.3

IA-1	
1,2,4-Trimethylbenzene	11.7
1,2-Dichloroethane	2.76
1,4-Dichlorobenzene	115
4-Ethyltoluene	9.48
Benzene	20.2
Cyclohexane	13.2
Dichlorodifluoromethane	13.6
Ethylbenzene	24.1
Hexane	31.6
o-Xylene	28
p/m-Xylene	105
Styrene	3.5
Toluene	61

	NYSDOH Guidance Values	NYSDOH Fuel Oil 2003 Indoor Air Upper Fence Limit	EPA Data 2001 90th Percentile Value
Analyte	Volatile Organic Compounds (µg/m3)		
1,1,1-Trichloroethane	100	2.5	20.6
1,1-Dichloroethane	--	0.4	<0.7
1,1-Dichloroethene	6	0.4	<1.4
1,2-Dichloroethane	--	0.4	0.9
1,2,4-Trimethylbenzene	--	2.5	9.5
1,3,5-Trimethylbenzene	--	3.9	3.7
1,4-Dichlorobenzene	--	1.2	5.5
2-Butanone (Methyl Ethyl Ketone)	--	--	12
4-Ethyltoluene	--	--	3.6
4-Methyl-2-pentanone	--	1.9	6
Acetone	--	115	98.9
Benzene	--	13	9.4
Benzyl chloride	--	--	<6.8
Carbon disulfide	--	--	4.2
Carbon tetrachloride	6	1.3	<1.3
Chloroethane	--	0.4	<1.1
Chloroform	--	1.2	1.1
Chloromethane	--	4.2	3.7
cis-1,2-Dichloroethene	6	0.4	<1.9
Cyclohexane	--	6.3	--
Dichlorodifluoromethane	--	10	16.5
Ethyl Acetate	--	--	5.4
Ethylbenzene	--	6.4	5.7
Heptane	--	18	--
Methylene chloride	60	16	10
o-Xylene	--	7.1	7.9
p/m-Xylene	--	11	22.2
Styrene	--	1.4	1.9
Tetrachloroethene	30	2.5	15.9
Tetrahydrofuran	--	0.8	--
Toluene	--	57	43
Trichloroethene	2	0.5	4.2
Trichlorofluoromethane	--	12	18.1
Vinyl chloride	6	--	<1.9

Analyte exceeds NYSDOH Guidance Values

Analyte exceeds NYSDOH Fuel Oil 2003 Indoor Air Upper Fence Limit

Analyte exceeds EPA Data 2001 90th Percentile Value

Analyte exceeds both the EPA Data 2001 90th Percentile Value and NYSDOH Fuel Oil 2003 Upper Fence Limit

SV-14 SV-13 SV-6 SV-16 SV-15 SV-5 SV-4 AA-CB AA-01 AA-02 IA-2 IA-3 SV-2 SV-3 SV-1 IA-1

GERARD AVENUE (60' WIDE)

EAST 150TH STREET (50' WIDE)

BLOCK 2354 LOT 1 AREA=99,109 SQ.FT. 2.275 ACRES

BLOCK 2352 LOT 15 AREA=24,880 SQ.FT. 0.571 ACRES

LOADING DOCK

APPROXIMATE VENT LOCATION

GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED "TOPOGRAPHIC BOUNDARY AND UTILITY SURVEY – SOUTH BRONX DEVELOPMENT", PREPARED BY "LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C", ORIGINAL SCALE 1"–30', DATED 06–20–2020.
2. ALL CHEMICAL CONCENTRATIONS ARE SHOWN IN MICROGRAMS PER CUBIC METER.
3. THE PURPOSE OF THIS DRAWING IS TO LOCATE, DESCRIBE, AND REPRESENT THE POSITIONS OF EXPLORATION LOCATIONS IN RELATION TO THE SUBJECT SITE. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. ALL ELEVATIONS GIVEN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGEND

APPROXIMATE SITE BOUNDARY

APPROXIMATE LIMITS OF EXISTING BUILDING

SV-# APPROXIMATE SOIL VAPOR SAMPLE LOCATION

AA/IA-# APPROXIMATE AMBIENT AIR SAMPLE LOCATION

N E S W

0 35 70 140

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

101 EAST 150TH STREET
BRONX, NEW YORK, 10451

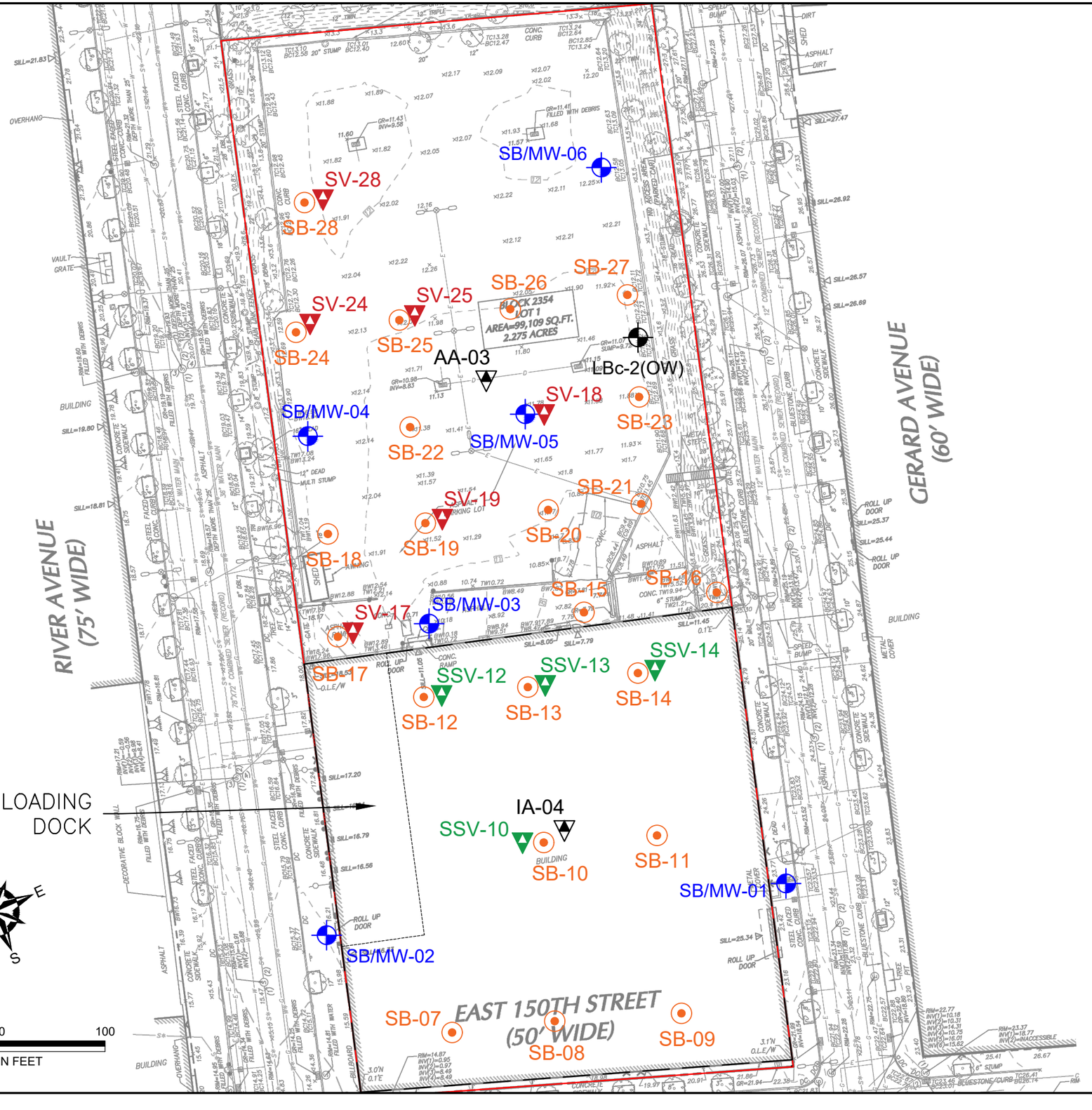
SUMMARY OF SOIL VAPOR AND INDOOR AIR SAMPLE PHASE II ESI EXCEEDANCES

PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

PREPARED FOR:
SUCCESS ACADEMY CHARTER SCHOOLS
95 PINE STREET, 6TH FLOOR
NEW YORK, NY 10005

PROJ MGR: RM	REVIEWED BY: SK	CHECKED BY: SK	FIGURE 5
DESIGNED BY: RM	DRAWN BY: JB	SCALE: 1"=70'	
DATE: MAY 2022	PROJECT NO. 41.0162951.10	REVISION NO. -	SHEET NO.

G:\Active 162900 to 162999\162951.10 – SA 586 River Avenue BCP Application\Drawings\41.0162951.Spider Diagram RIWP.dwg [4] April 20, 2022 – 2:08pm jackson.bogach



GENERAL NOTES

1. BASE MAP DEVELOPED FROM DRAWING TITLED "TOPOGRAPHIC BOUNDARY AND UTILITY SURVEY – SOUTH BRONX DEVELOPMENT", PREPARED BY "LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C", ORIGINAL SCALE 1"–30', DATED 06–20–2020.
2. THE PURPOSE OF THIS DRAWING IS TO LOCATE, DESCRIBE, AND REPRESENT THE POSITIONS OF EXPLORATION LOCATIONS IN RELATION TO THE SUBJECT SITE. THIS DRAWING IS NOT CONSIDERED A LAND SURVEY. THE LOCATIONS SHOWN SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
3. ALL ELEVATIONS GIVEN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE LIMITS OF EXISTING BUILDING
- SB/MW-# — APPROXIMATE SOIL BORING/PERMANENT MONITORING WELL LOCATION – TO BE SAMPLED
- LBc-2(OW) — APPROXIMATE LOCATION OF PREVIOUSLY INSTALLED MONITORING WELL – TO BE SAMPLED
- SB-# — APPROXIMATE SOIL BORING SAMPLE LOCATION
- SV-# — APPROXIMATE SOIL VAPOR SAMPLE LOCATION
- SSV-# — APPROXIMATE SUB–SLAB SOIL VAPOR SAMPLE LOCATION
- IA/AA-# — APPROXIMATE INDOOR/AMBIENT AIR SAMPLE LOCATION

NO.	ISSUE/DESCRIPTION	BY	DATE

101 EAST 150TH STREET
BRONX, NEW YORK, 10451

REMEDIAL INVESTIGATION
SAMPLE LOCATION MAP

PREPARED BY: GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com		PREPARED FOR: SUCCESS ACADEMY CHARTER SCHOOLS 95 PINE STREET, 6TH FLOOR NEW YORK, NY 10005	
PROJ MGR: RM	REVIEWED BY: SK	CHECKED BY: SK	FIGURE 6 SHEET NO.
DESIGNED BY: RM	DRAWN BY: JB	SCALE: 1"=50'	
DATE: MAY 2022	PROJECT NO. 41.0162951.10	REVISION NO. -	

GZA–J:\Active 162900 to 162999\162951.10 – SA 586 River Avenue BCP Application\Drawings\GZA CAD\41.0162951.10 RIWP.dwg [FIG 6] May 04, 2022 – 12:53pm jackson.bogach

Appendix A – Proposed Redevelopment Plans

SUCCESS ACADEMY CHARTER SCHOOLS

SUCCESS ACADEMY

BSA SPECIAL PERMIT APPLICATION

2 MAY 2022

101 EAST 150TH STREET, BRONX, NY 10451

SHEET LIST - BSA SET

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: BSA SPECIAL PERMIT APPLICATION COVER SHEET

SCALE:

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-001

SITE INFORMATION	
Address	101 East 150th Street , Bronx, NY 10451
Block	2354
Lot	1
Community District	Bronx Community District 4
Zoning Map	6A
Zoning District	M1-2
Special District	No
Historic District	No
Flood Zone	No
Wide Streets	River Avenue
Narrow Streets	Gerard Avenue, East 150th Street
Zoning Lot Area	99,109

USES				
		PERMITTED / REQUIRED	PROPOSED	NOTES / COMPLIANCE
ZR 42-00	Use Groups (UG)	UG 4, 6-13, 16-18	UG 3: School	Does Not Comply. UG 3 proposed for the entire building, which must be permitted by Special Permit of BSA: ZR 73-19

BULK REGULATIONS							
Floor Area Ratio (FAR) & Zoning Floor Area (ZFA)							
	USE	FAR	LOT AREA	MAX. PERMITTED ZFA	PROPOSED ZFA	PROPOSED FAR	NOTES / COMPLIANCE
ZR 43-122	Community Facility	4.80	99,109	475,723	226,310	2.28	Complies

YARD REGULATIONS				
		PERMITTED / REQUIRED	PROPOSED	NOTES / COMPLIANCE
ZR 43-25	Side Yard	None required or 8' if provided	20'	Complies
ZR 43-28 (c)	Rear Yard Equivalent (Through)	20' along side lot line	20'	Complies
ZR 43-311	Within 100 Feet of Corners	None required	0'	Complies

HEIGHT AND SETBACK REGULATIONS				
		PERMITTED / REQUIRED	PROPOSED	NOTES / COMPLIANCE
Alternate Front Setbacks				
ZR 43-44	Narrow Street Setback	15'	15'	Complies
	Wide Street Setback	10'	12' - 8 1/2"	Complies
Alternate Sky Exposure Plane				
ZR 43-44	Height Above Street Line	60'	60'	Complies
	Narrow Street SEP	3.7 to 1	3.7 to 1	Complies
	Wide Street SEP	7.6 to 1	7.6 to 1	Complies

SEAL

NO.	DATE	DESCRIPTION
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ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: ZONING ANALYSIS AND DATA

SCALE:

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-002

ACCESSORY OFF-STREET PARKING				
		PERMITTED / REQUIRED	PROPOSED	NOTES / COMPLIANCE
ZR 44-21	Community Facility (School Use)	None required	0	Complies

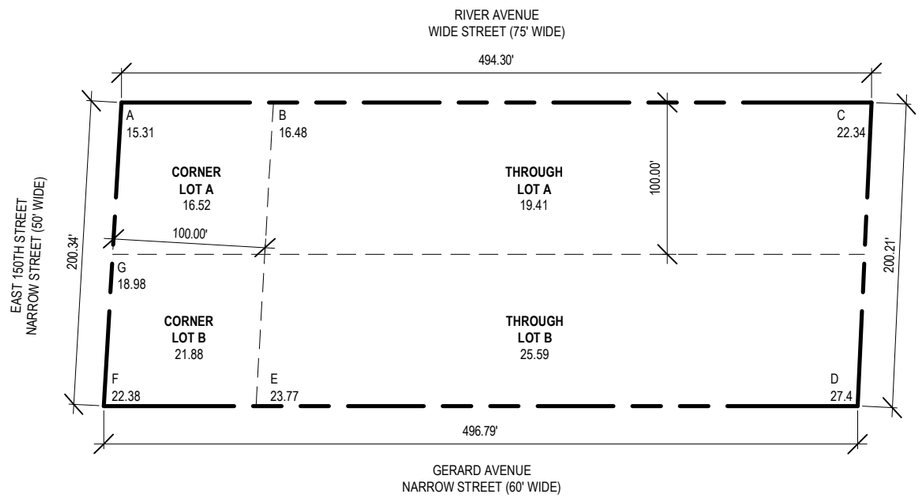
BICYCLE PARKING				
		PERMITTED / REQUIRED	PROPOSED	NOTES / COMPLIANCE
ZR 44-60	Community Facility Use	1 per 10,000 of ZFA	23	Complies

OFF STREET LOADING				
		PERMITTED / REQUIRED	PROPOSED	NOTES / COMPLIANCE
ZR 44-52	Loading Berths	None required	1	Complies

TREE PLANTING REQUIREMENTS				
		PERMITTED / REQUIRED	PROPOSED	NOTES / COMPLIANCE
	Street Frontage	1 per 25' of street frontage. River Ave. = 20 Trees East 150th St. = 8 Trees Gerard Ave. = 20 Trees	Existing trees to protect = 17 Existing tress to remove = 3 Proposed trees to plant on site = 14 Trees to plant off-site or pay into tree fund = 17	Complies * Subject to change pursuant to ZR Section 26-41; Remaining required trees will be provided off-site or paid into a fund pursuant to ZR Section 26-41.

ZONING FLOOR AREA	
FLOOR	**ZONING AREA (SF)**
LEVEL 6	19,263
LEVEL 5	25,009
LEVEL 4	41,886
LEVEL 3	41,885
LEVEL 2	43,717
LEVEL 1	54,550
* CELLAR (EXCLUDED FROM ZSF)	66,003
PROPOSED ZONING FLOOR AREA (SF)	226,310
LOT AREA (SF)	99,109
PROPOSED FAR (ALL CF)	2.28
MAXIMUM CF FAR = 4.80 > 2.28	COMPLIES

CURB LEVEL CALCULATIONS WITHIN EACH LOT		
LOT	CALCULATION	CURB LEVEL
CORNER LOT A	[(A+B)/2 + (A+G)/2] / 2	16.52
CORNER LOT B	[(E+F)/2 + (F+G)/2] / 2	21.88
THROUGH A	(B+C)/2	19.41
THROUGH B	(D+E)/2	25.59



*ALL ELEVATIONS SHOWN IN NAVD88

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: ZONING ANALYSIS AND DATA

SCALE: 1" = 100'-0"

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-003

GENERAL NOTES

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

ALL PARTITIONS AND EXITS SHALL BE AS APPROVED BY DOB.

DOB SHALL ENSURE COMPLIANCE WITH ALL OTHER APPLICABLE PROVISIONS OF THE ZONING RESOLUTION, THE ADMINISTRATIVE CODE AND ANY OTHER RELEVANT LAWS UNDER ITS JURISDICTION IRRESPECTIVE OF THE PLAN(S)/CONFIGURATION(S) NOT RELATED TO THE RELIEF GRANTED.

MAXIMUM OCCUPANT LOAD PER FLOOR AND PER SPACE SHALL BE AS APPROVED BY DOB.

ROOF BULKHEADS AND MECHANICAL EQUIPMENT WILL COMPLY AS PERMITTED OBSTRUCTIONS PER ZR 43-42(E). DOB TO VERIFY.

ENVIRONMENTAL NOTES

ALL TRANSPORTATION MEASURES AS DESCRIBED IN THE FINAL ENVIRONMENTAL ASSESSMENT STATEMENT (EAS) SHALL BE IMPLEMENTED WITH FINAL APPROVAL OF MEASURES TO BE DETERMINED BY THE DEPARTMENT OF TRANSPORTATION.

NOISE ATTENUATION MEASURES FOR ALL FACADES WILL BE IMPLEMENTED AS DESCRIBED IN THE FINAL EAS.

REMEDIAL ACTION WORK PLAN (RAWP) REQUIREMENTS INCLUDE CONSTRUCTION OF A COMPOSITE COVER SUITABLE FOR RESIDENTIAL OCCUPANCY, A CHEMICAL VAPOR BARRIER INSTALLED BENEATH THE ENTIRE BUILDING SLAB AND ALONG THE EXTERIOR FOUNDATION WALLS, AND A SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) INSTALLED BENEATH THE ENTIRE BUILDING.

THE REMEDIAL ACTIVITIES SHALL INCLUDE THE INSTALLATION OF REMEDIAL TECHNOLOGY FOR EACH AREA OF CONCERN, SOIL AND SEDIMENT EROSION CONTROL, STORM WATER MANAGEMENT, AND DUST, ODOR, AND ORGANIC VAPOR CONTROL. REMEDIAL ACTION MONITORING SHALL BE PERFORMED DURING THE CONSTRUCTION TO DOCUMENT THE IMPLEMENTATION OF THE RAWP. UPON COMPLETION OF REMEDIAL ACTIVITIES, A PROFESSIONAL ENGINEER (P.E.) SHALL SUBMIT A FINAL ENGINEERING REPORT (FER).

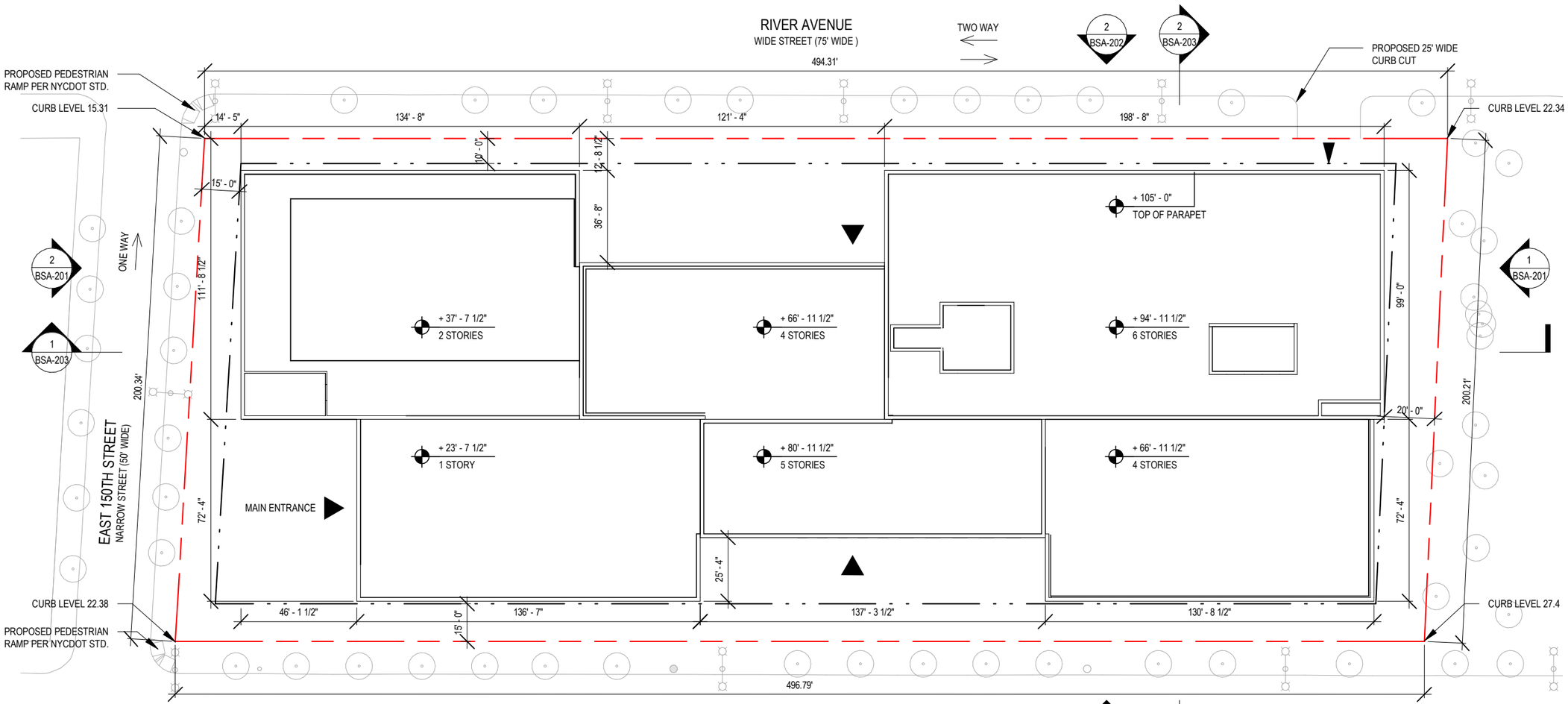
BSA SCHOOL AND DAY CARE CENTER NOTES

AN APPROVED INTERIOR FIRE ALARM SYSTEM SHALL BE INSTALLED IN THE ENTIRE SCHOOL/DAY CARE SPACE; THE SYSTEM SHALL COMPLY WITH CHAPTER 9 OF THE 2014 NEW YORK CITY BUILDING CODE AND NEW YORK CITY FIRE CODE AND SPECIAL INSPECTION REQUIREMENTS OF CHAPTER 17 OF THE NEW YORK CITY BUILDING CODE.

ENTIRE SPACE SHALL HAVE AN AUTOMATIC SPRINKLER SYSTEM THAT COMPLIES WITH CHAPTER 9 OF THE NEW YORK CITY BUILDING CODE AND NEW YORK CITY FIRE CODE. SPACE SHALL BE MONITORED BY A CENTRAL SUPERVISING STATION IN ACCORDANCE WITH CHAPTER 9 OF THE NEW YORK CITY BUILDING CODE.

LEGEND

- NEW BUILDING
- PROPERTY LINE
- SETBACK LINE
- +##'-##" — ELEVATION HEIGHT SHOWN IN NAVD88
- # STORIES — NUMBER OF STORIES BELOW ROOF
- BUILDING ENTRANCE
- LOADING
- STREET LAMP
- PROPOSED FIRE HYDRANT
- EXISTING FIRE HYDRANT TO REMAIN
- X / BSA-XXX — ELEVATION SYMBOL
- X / BSA-XXX — SECTION SYMBOL



1 PROPOSED SITE PLAN
SCALE: 1" = 45' - 0"

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED SITE PLAN

SCALE: As indicated
DATE: 05/02/22
JOB NO.: 221312

DRAWING NO.: BSA-004

GENERAL NOTES

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

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ENVIRONMENTAL NOTES

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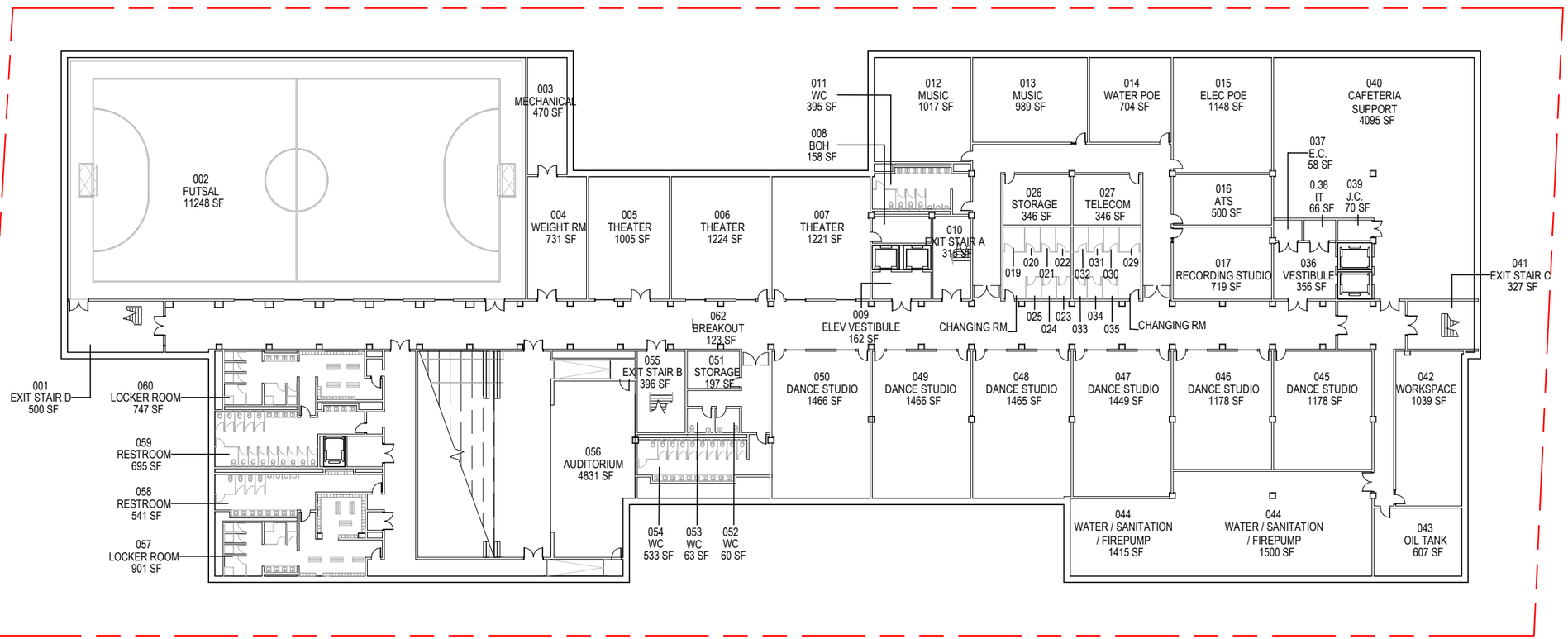
TABLE 1004.1.1 - CELLAR OCCUPANCY

RM #	ROOM NAME	AREA	OCCUPANCY GROUP	OCC. LOAD FACTOR	OCC. LOAD
002	FUTSAL	11248 SF	A-3	50	225
004	WEIGHT ROOM	731 SF	A-3	50	15
005	THEATER TECH	1005 SF	E	30	34
006	THEATER	1224 SF	E	30	41
007	THEATER	1222 SF	E	30	41
012	MUSIC	1017 SF	E	30	34
013	MUSIC	989 SF	E	30	33
014	WATER POE	704 SF	F-2	300	3
015	ELEC POE	1149 SF	F-2	300	4
016	ATS	501 SF	F-2	300	2
017	RECORDING STUDIO	721 SF	E	50	15
018-025	CHANGING RM	498 SF	E	50	10
027	TELECOM	347 SF	F-2	300	2
028-035	CHANGING RM	498 SF	E	50	10
040	CAFETERIA SUPPORT	4142 SF	F-2	300	14
042	WORKSPACE: FACILITIES	799 SF	B	100	8
042	WORKSPACE: FACILITIES	266 SF	E	15	18
043	OIL TANK	618 SF	F-2	300	3
044	WATER/SANITATION/FIREPUMP	2922 SF	F-2	300	10
045	DANCE STUDIO	1180 SF	A-3	50	24
046	DANCE STUDIO	1180 SF	A-3	50	24
047	DANCE STUDIO	1452 SF	A-3	50	30
048	DANCE STUDIO	1469 SF	A-3	50	30
049	DANCE STUDIO	1469 SF	A-3	50	30
050	DANCE STUDIO	1469 SF	A-3	50	30
056	AUDITORIUM - STAGE	995 SF	A-3	15	67
056	AUDITORIUM - SEATING	1854 SF	A-3		150
056	AUDITORIUM - REMAINING AREA	1599 SF	A-3	50	32
057	LOCKER ROOM	940 SF	E	50	19
060	LOCKER ROOM	779 SF	E	50	16
062	BREAKOUT	147 SF	E	30	5
063	BREAKOUT	113 SF	E	30	4
064	BREAKOUT	269 SF	E	30	9
340	MECH. RM	470 SF	F-2	300	2
OCCUPIED SPACE TOTAL		45985 SF			994



1 PROPOSED FLOOR PLAN - CELLAR
SCALE: 1" = 40' - 0"

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED FLOOR PLAN - CELLAR

SCALE: As indicated

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-100

GENERAL NOTES

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

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ROOF BULKHEADS AND MECHANICAL EQUIPMENT WILL COMPLY AS PERMITTED OBSTRUCTIONS PER ZR 43-42(E). DOB TO VERIFY.

ENVIRONMENTAL NOTES

ALL TRANSPORTATION MEASURES AS DESCRIBED IN THE FINAL ENVIRONMENTAL ASSESSMENT STATEMENT (EAS) SHALL BE IMPLEMENTED WITH FINAL APPROVAL OF MEASURES TO BE DETERMINED BY THE DEPARTMENT OF TRANSPORTATION.

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BSA SCHOOL AND DAY CARE CENTER NOTES

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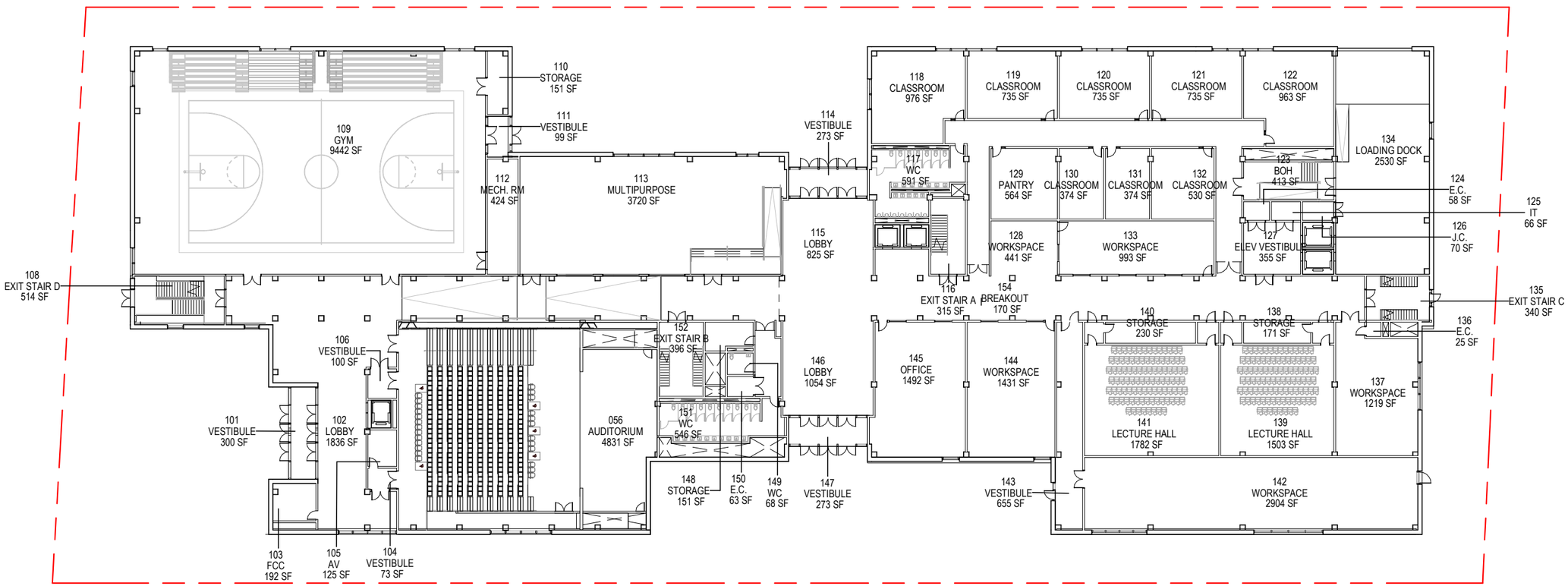
TABLE 1004.1.1 - LEVEL 1 OCCUPANCY

RM #	ROOM NAME	AREA	OCCUPANCY GROUP	OCC. LOAD FACTOR	OCC. LOAD
053	AUDITORIUM	3425 SF	A-3		150
105	AV	127 SF	F-2	300	1
109	GYM	9448 SF	A-3	15	630
113	MULTIPURPOSE	3239 SF	A-3	15	216
118	CLASSROOM	981 SF	E	20	50
119	CLASSROOM	737 SF	E	20	37
120	CLASSROOM	737 SF	E	20	37
121	CLASSROOM	737 SF	E	20	37
122	CLASSROOM	966 SF	E	20	49
128	WORKSPACE	346 SF	A-3	15	24
130	CLASSROOM	376 SF	E	20	19
131	CLASSROOM	376 SF	E	20	19
132	CLASSROOM	531 SF	E	20	27
133	WORKSPACE: TT	745 SF	B	100	8
133	WORKSPACE: TT	248 SF	A-3	15	17
134	LOADING DOCK	1829 SF	S-2	200	10
137	WORKSPACE: COUNSELING SUITE	871 SF	B	100	9
137	WORKSPACE	347 SF	A-3	15	24
139	LECTURE HALL 2	1508 SF	A-3		100
141	LECTURE HALL 1	1785 SF	A-3		100
142	WORKSPACE	2917 SF	A-3	15	195
144	WORKSPACE: COLLEGE ACCESS	1074 SF	B	100	11
144	WORKSPACE: COLLEGE ACCESS	353 SF	A-3	15	24
145	OFFICE	1123 SF	B	100	12
145	OFFICE	363 SF	A-3	15	25
154	BREAKOUT	163 SF	E	30	6
155	BREAKOUT	95 SF	E	30	4
156	BREAKOUT	72 SF	E	30	3
157	BREAKOUT	281 SF	E	30	10
OCCUPIED SPACE TOTAL		35796 SF			1854



1 PROPOSED FLOOR PLAN - LEVEL 1
SCALE: 1" = 40' - 0"

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED FLOOR PLAN - LEVEL 1

SCALE: As indicated
DATE: 05/02/2022
JOB NO.: 221312

DRAWING NO.: BSA-101

GENERAL NOTES

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

ALL PARTITIONS AND EXITS SHALL BE AS APPROVED BY DOB.

DOB SHALL ENSURE COMPLIANCE WITH ALL OTHER APPLICABLE PROVISIONS OF THE ZONING RESOLUTION, THE ADMINISTRATIVE CODE AND ANY OTHER RELEVANT LAWS UNDER ITS JURISDICTION IRRESPECTIVE OF THE PLAN(S)/CONFIGURATION(S) NOT RELATED TO THE RELIEF GRANTED.

MAXIMUM OCCUPANT LOAD PER FLOOR AND PER SPACE SHALL BE AS APPROVED BY DOB.

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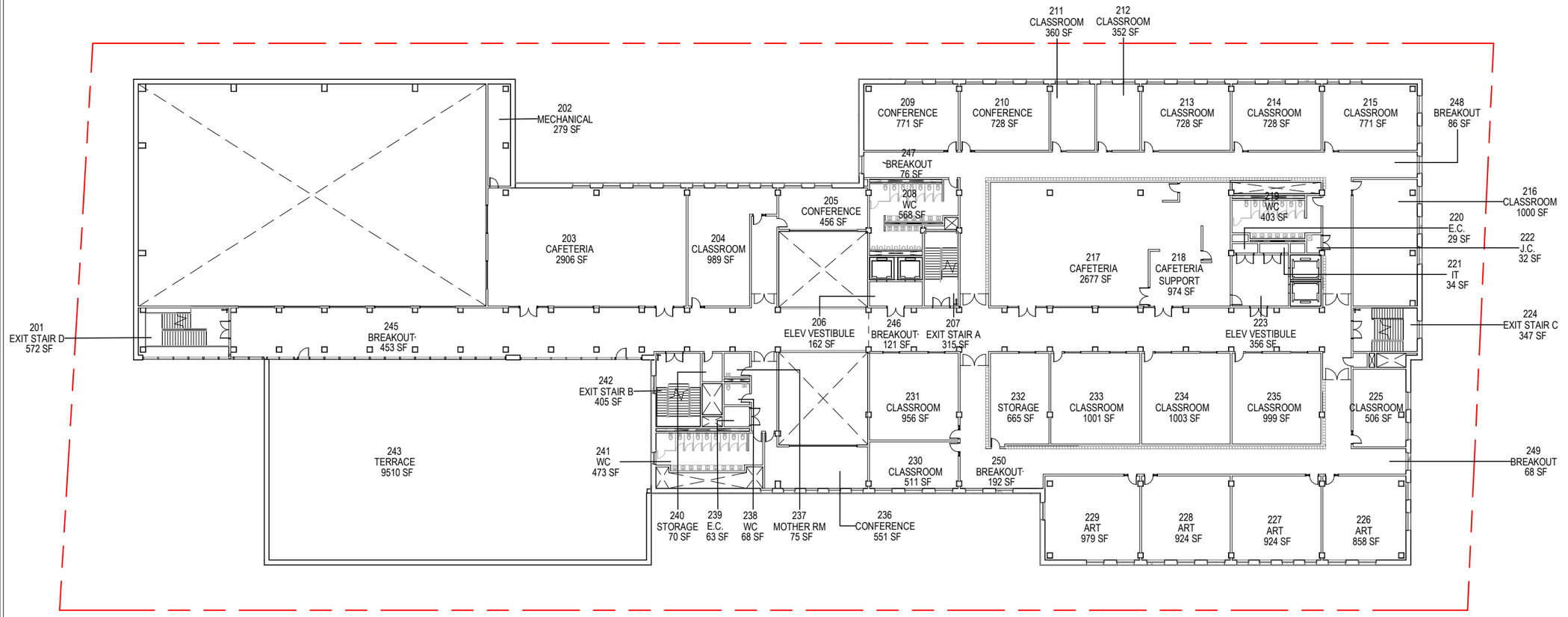
TABLE 1004.1.1 - LEVEL 2 OCCUPANCY

RM #	ROOM NAME	AREA	OCCUPANCY GROUP	OCC. LOAD FACTOR	OCC. LOAD
203	CAFETERIA	2915 SF	A-2	15	195
204	CLASSROOM	991 SF	E	20	50
205	CONFERENCE	459 SF	B	100	5
209	CONFERENCE	777 SF	B	100	8
210	CONFERENCE	730 SF	B	100	8
211	CLASSROOM	361 SF	E	20	19
212	CLASSROOM	354 SF	E	20	18
213	CLASSROOM	730 SF	E	20	37
214	CLASSROOM	730 SF	E	20	37
215	CLASSROOM	777 SF	E	20	39
216	CLASSROOM	1012 SF	E	20	51
217	CAFETERIA	2693 SF	A-2	15	180
218	CAFETERIA SUPPORT	1003 SF	A-2	200	6
225	CLASSROOM	510 SF	E	20	26
226	ART	869 SF	E	30	29
227	ART	929 SF	E	30	31
228	ART	929 SF	E	30	31
229	ART	989 SF	E	30	33
230	CLASSROOM	514 SF	E	20	26
231	CLASSROOM	958 SF	E	20	48
233	CLASSROOM	1003 SF	E	20	51
234	CLASSROOM	1003 SF	E	20	51
235	CLASSROOM	1001 SF	E	20	51
236	CONFERENCE	553 SF	B	100	6
243	TERRACE	9486 SF	A-3	25	380
245	BREAKOUT	453 SF	E	30	16
247	BREAKOUT	234 SF	E	30	8
248	BREAKOUT	210 SF	E	30	7
249	BREAKOUT	174 SF	E	30	6
250	BREAKOUT	263 SF	E	30	9
OCCUPIED SPACE TOTAL		33609 SF			1462



1 PROPOSED FLOOR PLAN - LEVEL 2
SCALE: 1" = 40' - 0"

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED FLOOR PLAN - LEVEL 2

SCALE: As indicated
DATE: 05/02/2022
JOB NO.: 221312

DRAWING NO.: BSA-102

GENERAL NOTES

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

ALL PARTITIONS AND EXITS SHALL BE AS APPROVED BY DOB.

DOB SHALL ENSURE COMPLIANCE WITH ALL OTHER APPLICABLE PROVISIONS OF THE ZONING RESOLUTION, THE ADMINISTRATIVE CODE AND ANY OTHER RELEVANT LAWS UNDER ITS JURISDICTION IRRESPECTIVE OF THE PLAN(S)/CONFIGURATION(S) NOT RELATED TO THE RELIEF GRANTED.

MAXIMUM OCCUPANT LOAD PER FLOOR AND PER SPACE SHALL BE AS APPROVED BY DOB.

ROOF BULKHEADS AND MECHANICAL EQUIPMENT WILL COMPLY AS PERMITTED OBSTRUCTIONS PER ZR 43-42(E). DOB TO VERIFY.

ENVIRONMENTAL NOTES

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REMEDIAL ACTION WORK PLAN (RAWP) REQUIREMENTS INCLUDE CONSTRUCTION OF A COMPOSITE COVER SUITABLE FOR RESIDENTIAL OCCUPANCY, A CHEMICAL VAPOR BARRIER INSTALLED BENEATH THE ENTIRE BUILDING SLAB AND ALONG THE EXTERIOR FOUNDATION WALLS, AND A SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) INSTALLED BENEATH THE ENTIRE BUILDING.

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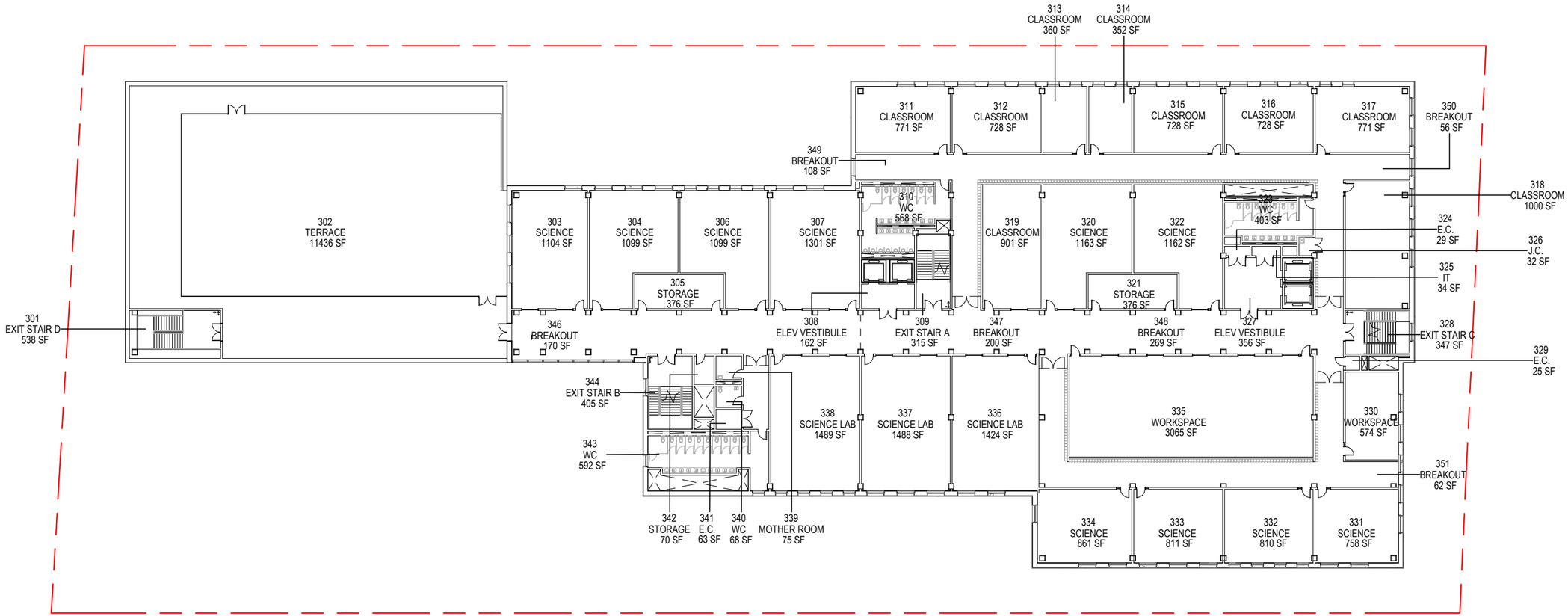
TABLE 1004.1.1 - LEVEL 3 OCCUPANCY

RM #	ROOM NAME	AREA	OCCUPANCY GROUP	OCC. LOAD FACTOR	OCC. LOAD
302	TERRACE	12168 SF	A-3	25	487
303	SCIENCE	1110 SF	E	30	37
304	SCIENCE	1102 SF	E	30	37
306	SCIENCE	1102 SF	E	30	37
307	SCIENCE	1305 SF	E	30	44
311	CLASSROOM	777 SF	E	20	39
312	CLASSROOM	730 SF	E	20	37
313	CLASSROOM	361 SF	E	20	19
314	CLASSROOM	354 SF	E	20	18
315	CLASSROOM	730 SF	E	20	37
316	CLASSROOM	730 SF	E	20	37
317	CLASSROOM	777 SF	E	20	39
318	CLASSROOM	1012 SF	E	20	51
319	CLASSROOM	902 SF	E	20	46
320	SCIENCE	1166 SF	E	30	39
322	SCIENCE	1166 SF	E	30	39
330	TEACHERS' WORKSPACE	433 SF	B	100	5
330	WORKSPACE	144 SF	A-3	15	10
331	SCIENCE	763 SF	E	30	26
332	SCIENCE	812 SF	E	30	28
333	SCIENCE	814 SF	E	30	28
334	SCIENCE	867 SF	E	30	29
335	WORKSPACE	2299 SF	B	100	23
335	WORKSPACE	766 SF	A-3	15	52
336	SCIENCE LABS	1427 SF	E	50	29
337	SCIENCE LABS	1493 SF	E	50	30
338	SCIENCE LABS	1493 SF	E	50	30
346	BREAKOUT	173 SF	E	30	6
347	BREAKOUT	192 SF	E	30	7
348	BREAKOUT	300 SF	E	30	10
349	BREAKOUT	234 SF	E	30	8
350	BREAKOUT	210 SF	E	30	7
351	BREAKOUT	174 SF	E	30	6
OCCUPIED SPACE TOTAL		38087 SF			1377



1 PROPOSED FLOOR PLAN - LEVEL 3
SCALE: 1" = 40' - 0"

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED FLOOR PLAN - LEVEL 3

SCALE: As indicated

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-103

GENERAL NOTES

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

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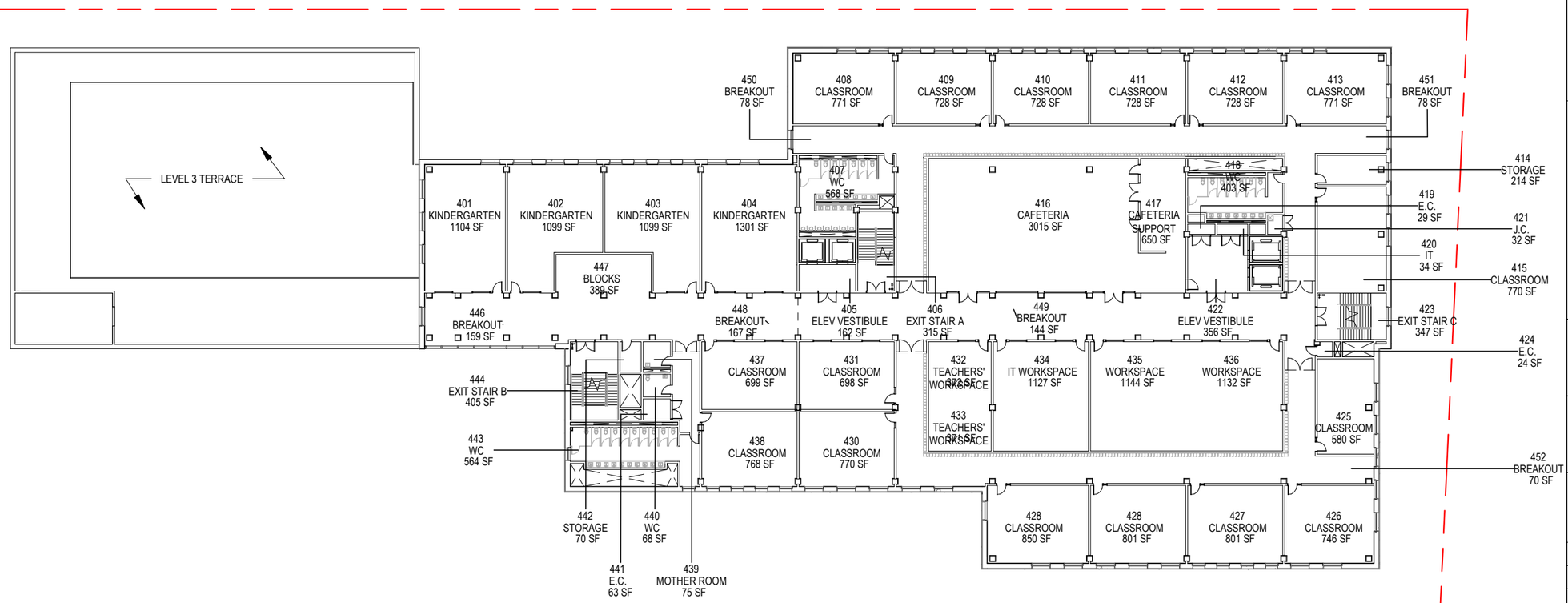
TABLE 1004.1.1 - LEVEL 4 OCCUPANCY

RM #	ROOM NAME	AREA	OCCUPANCY GROUP	OCC. LOAD FACTOR	OCC. LOAD
401	KINDERGARTEN	1110 SF	E	30	37
402	KINDERGARTEN	1102 SF	E	30	37
403	KINDERGARTEN	1102 SF	E	30	37
404	KINDERGARTEN	1305 SF	E	30	44
408	CLASSROOM	777 SF	E	20	39
409	CLASSROOM	730 SF	E	20	37
410	CLASSROOM	730 SF	E	20	37
411	CLASSROOM	730 SF	E	20	37
412	CLASSROOM	730 SF	E	20	37
413	CLASSROOM	777 SF	E	20	39
415	CLASSROOM	778 SF	E	20	39
416	CAFETERIA	3020 SF	A-2	15	202
417	CAFETERIA SUPPORT	651 SF	A-2	200	4
425	CLASSROOM	584 SF	E	20	30
426	CLASSROOM	752 SF	E	20	38
427	CLASSROOM	804 SF	E	20	41
428	CLASSROOM	804 SF	E	20	41
429	CLASSROOM	856 SF	E	20	43
430	CLASSROOM	772 SF	E	20	39
431	CLASSROOM	701 SF	E	20	36
432-433	TEACHERS' WORKSPACE	558 SF	B	100	6
432-433	TEACHERS' WORKSPACE	186 SF	A-3	15	13
434	IT WORKSPACE	846 SF	B	100	9
434	IT WORKSPACE	282 SF	A-3	15	19
435-436	WORKSPACE	1708 SF	B	100	18
435-436	WORKSPACE	569 SF	A-3	15	38
437	CLASSROOM	701 SF	E	20	36
438	CLASSROOM	772 SF	E	20	39
446	BREAKOUT	298 SF	E	30	10
447	BLOCK	397 SF	E	30	14
448	BREAKOUT	143 SF	E	30	5
449	BREAKOUT	143 SF	E	30	5
450	BREAKOUT	234 SF	E	30	8
451	BREAKOUT	210 SF	E	30	7
452	BREAKOUT	174 SF	E	30	6
OCCUPIED SPACE TOTAL		26036 SF			1127



1 PROPOSED FLOOR PLAN - LEVEL 4
SCALE: 1" = 40' - 0"

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED FLOOR PLAN - LEVEL 4

SCALE: As indicated

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-104

GENERAL NOTES

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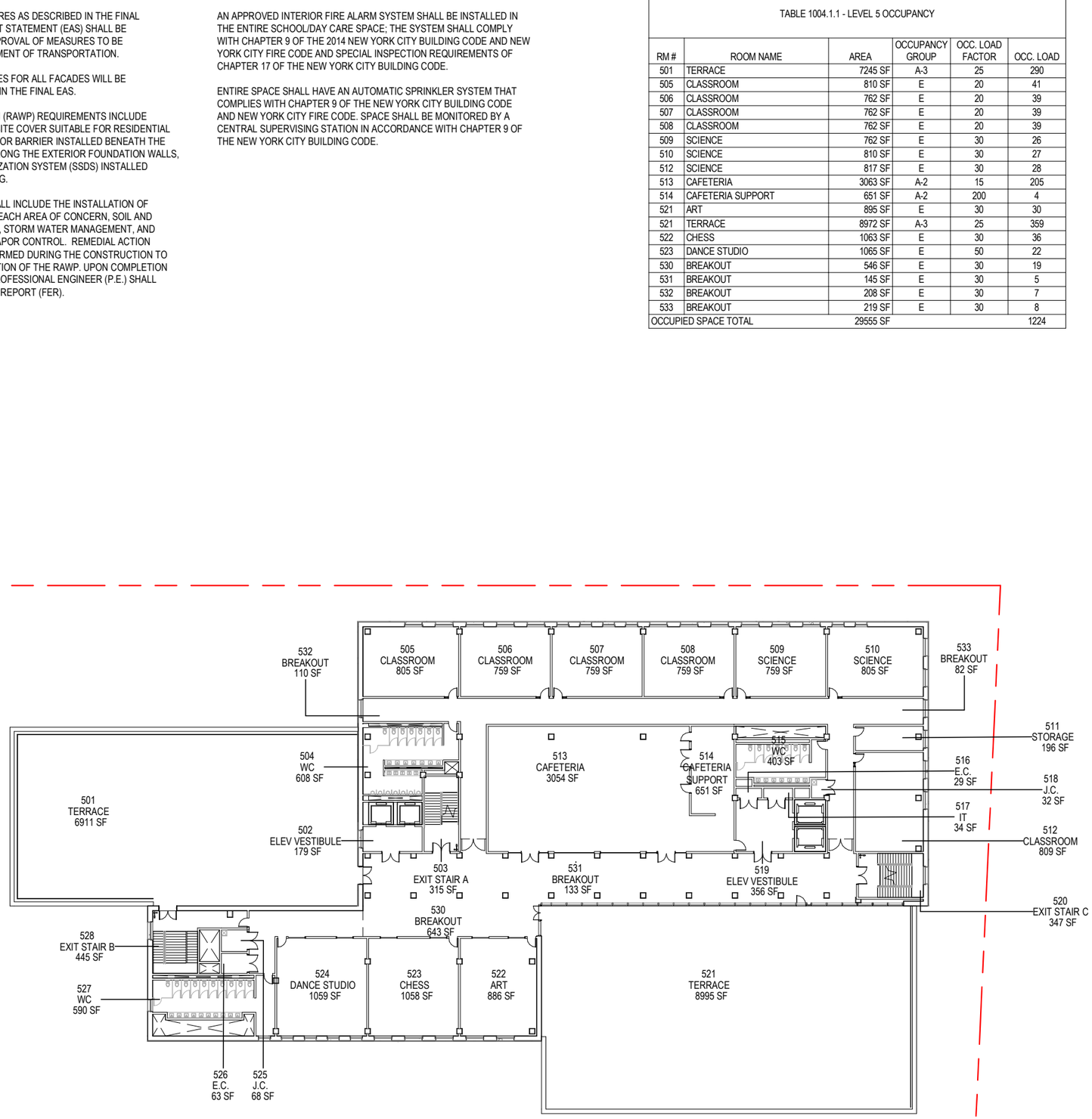
TABLE 1004.1.1 - LEVEL 5 OCCUPANCY

RM #	ROOM NAME	AREA	OCCUPANCY GROUP	OCC. LOAD FACTOR	OCC. LOAD
501	TERRACE	7245 SF	A-3	25	290
505	CLASSROOM	810 SF	E	20	41
506	CLASSROOM	762 SF	E	20	39
507	CLASSROOM	762 SF	E	20	39
508	CLASSROOM	762 SF	E	20	39
509	SCIENCE	762 SF	E	30	26
510	SCIENCE	810 SF	E	30	27
512	SCIENCE	817 SF	E	30	28
513	CAFETERIA	3063 SF	A-2	15	205
514	CAFETERIA SUPPORT	651 SF	A-2	200	4
521	ART	895 SF	E	30	30
521	TERRACE	8972 SF	A-3	25	359
522	CHESS	1063 SF	E	30	36
523	DANCE STUDIO	1065 SF	E	50	22
530	BREAKOUT	546 SF	E	30	19
531	BREAKOUT	145 SF	E	30	5
532	BREAKOUT	208 SF	E	30	7
533	BREAKOUT	219 SF	E	30	8
OCCUPIED SPACE TOTAL		29555 SF			1224



1 PROPOSED FLOOR PLAN - LEVEL 5
SCALE: 1" = 40' - 0"

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED FLOOR PLAN - LEVEL 5

SCALE: As indicated

DATE: 05/02/22

JOB NO.: 221312

DRAWING NO.: BSA-105

GENERAL NOTES

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

ALL PARTITIONS AND EXITS SHALL BE AS APPROVED BY DOB.

DOB SHALL ENSURE COMPLIANCE WITH ALL OTHER APPLICABLE PROVISIONS OF THE ZONING RESOLUTION, THE ADMINISTRATIVE CODE AND ANY OTHER RELEVANT LAWS UNDER ITS JURISDICTION IRRESPECTIVE OF THE PLAN(S)/CONFIGURATION(S) NOT RELATED TO THE RELIEF GRANTED.

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ROOF BULKHEADS AND MECHANICAL EQUIPMENT WILL COMPLY AS PERMITTED OBSTRUCTIONS PER ZR 43-42(E). DOB TO VERIFY.

ENVIRONMENTAL NOTES

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NOISE ATTENUATION MEASURES FOR ALL FACADES WILL BE IMPLEMENTED AS DESCRIBED IN THE FINAL EAS.

REMEDIAL ACTION WORK PLAN (RAWP) REQUIREMENTS INCLUDE CONSTRUCTION OF A COMPOSITE COVER SUITABLE FOR RESIDENTIAL OCCUPANCY, A CHEMICAL VAPOR BARRIER INSTALLED BENEATH THE ENTIRE BUILDING SLAB AND ALONG THE EXTERIOR FOUNDATION WALLS, AND A SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) INSTALLED BENEATH THE ENTIRE BUILDING.

THE REMEDIAL ACTIVITIES SHALL INCLUDE THE INSTALLATION OF REMEDIAL TECHNOLOGY FOR EACH AREA OF CONCERN, SOIL AND SEDIMENT EROSION CONTROL, STORM WATER MANAGEMENT, AND DUST, ODOR, AND ORGANIC VAPOR CONTROL. REMEDIAL ACTION MONITORING SHALL BE PERFORMED DURING THE CONSTRUCTION TO DOCUMENT THE IMPLEMENTATION OF THE RAWP. UPON COMPLETION OF REMEDIAL ACTIVITIES, A PROFESSIONAL ENGINEER (P.E.) SHALL SUBMIT A FINAL ENGINEERING REPORT (FER).

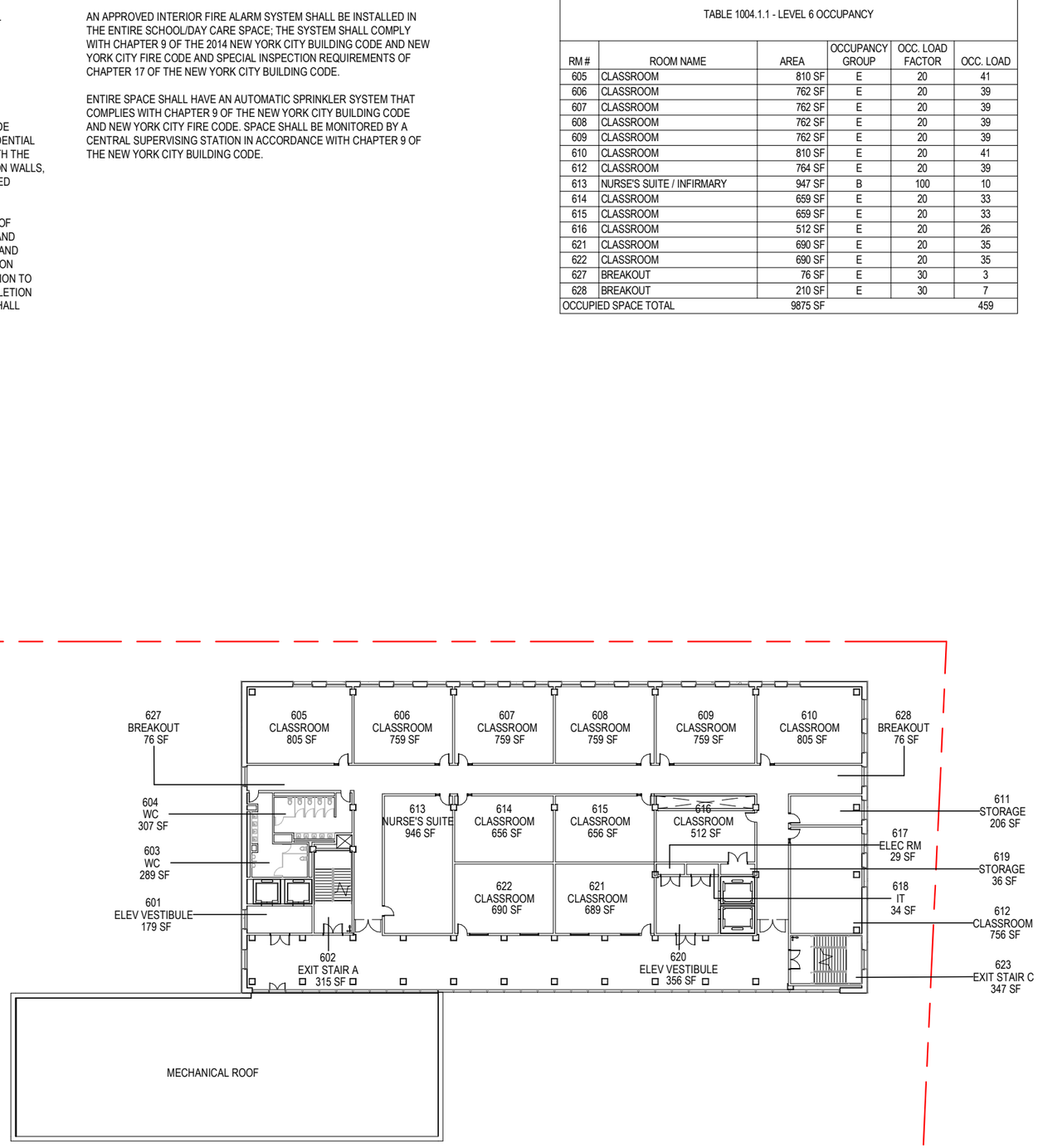
BSA SCHOOL AND DAY CARE CENTER NOTES

AN APPROVED INTERIOR FIRE ALARM SYSTEM SHALL BE INSTALLED IN THE ENTIRE SCHOOL/DAY CARE SPACE; THE SYSTEM SHALL COMPLY WITH CHAPTER 9 OF THE 2014 NEW YORK CITY BUILDING CODE AND NEW YORK CITY FIRE CODE AND SPECIAL INSPECTION REQUIREMENTS OF CHAPTER 17 OF THE NEW YORK CITY BUILDING CODE.

ENTIRE SPACE SHALL HAVE AN AUTOMATIC SPRINKLER SYSTEM THAT COMPLIES WITH CHAPTER 9 OF THE NEW YORK CITY BUILDING CODE AND NEW YORK CITY FIRE CODE. SPACE SHALL BE MONITORED BY A CENTRAL SUPERVISING STATION IN ACCORDANCE WITH CHAPTER 9 OF THE NEW YORK CITY BUILDING CODE.

TABLE 1004.1.1 - LEVEL 6 OCCUPANCY

RM #	ROOM NAME	AREA	OCCUPANCY GROUP	OCC. LOAD FACTOR	OCC. LOAD
605	CLASSROOM	810 SF	E	20	41
606	CLASSROOM	762 SF	E	20	39
607	CLASSROOM	762 SF	E	20	39
608	CLASSROOM	762 SF	E	20	39
609	CLASSROOM	762 SF	E	20	39
610	CLASSROOM	810 SF	E	20	41
612	CLASSROOM	764 SF	E	20	39
613	NURSE'S SUITE / INFIRMARY	947 SF	B	100	10
614	CLASSROOM	659 SF	E	20	33
615	CLASSROOM	659 SF	E	20	33
616	CLASSROOM	512 SF	E	20	26
621	CLASSROOM	690 SF	E	20	35
622	CLASSROOM	690 SF	E	20	35
627	BREAKOUT	76 SF	E	30	3
628	BREAKOUT	210 SF	E	30	7
OCCUPIED SPACE TOTAL		9875 SF			459



1 PROPOSED FLOOR PLAN - LEVEL 6
SCALE: 1" = 40' - 0"

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
1	05/02/2022	BSA SPECIAL PERMIT APPLICATION

ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED FLOOR PLAN - LEVEL 6

SCALE: As indicated

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-106

GENERAL NOTES

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

ALL PARTITIONS AND EXITS SHALL BE AS APPROVED BY DOB.

DOB SHALL ENSURE COMPLIANCE WITH ALL OTHER APPLICABLE PROVISIONS OF THE ZONING RESOLUTION, THE ADMINISTRATIVE CODE AND ANY OTHER RELEVANT LAWS UNDER ITS JURISDICTION IRRESPECTIVE OF THE PLAN(S)/CONFIGURATION(S) NOT RELATED TO THE RELIEF GRANTED.

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ENVIRONMENTAL NOTES

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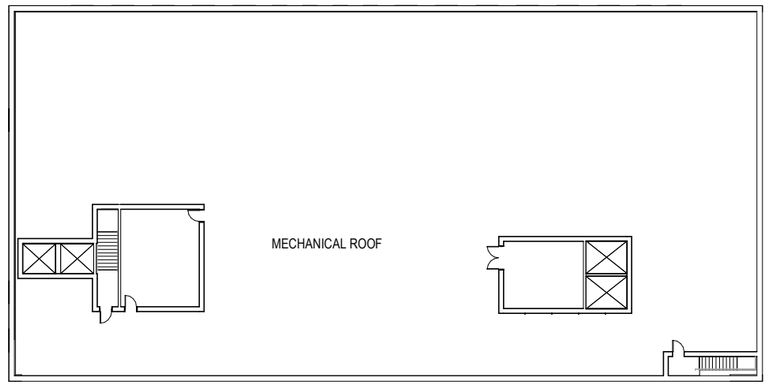

1 PROPOSED MECHANICAL ROOF
SCALE: 1" = 40' - 0"

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
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7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED MECHANICAL ROOF

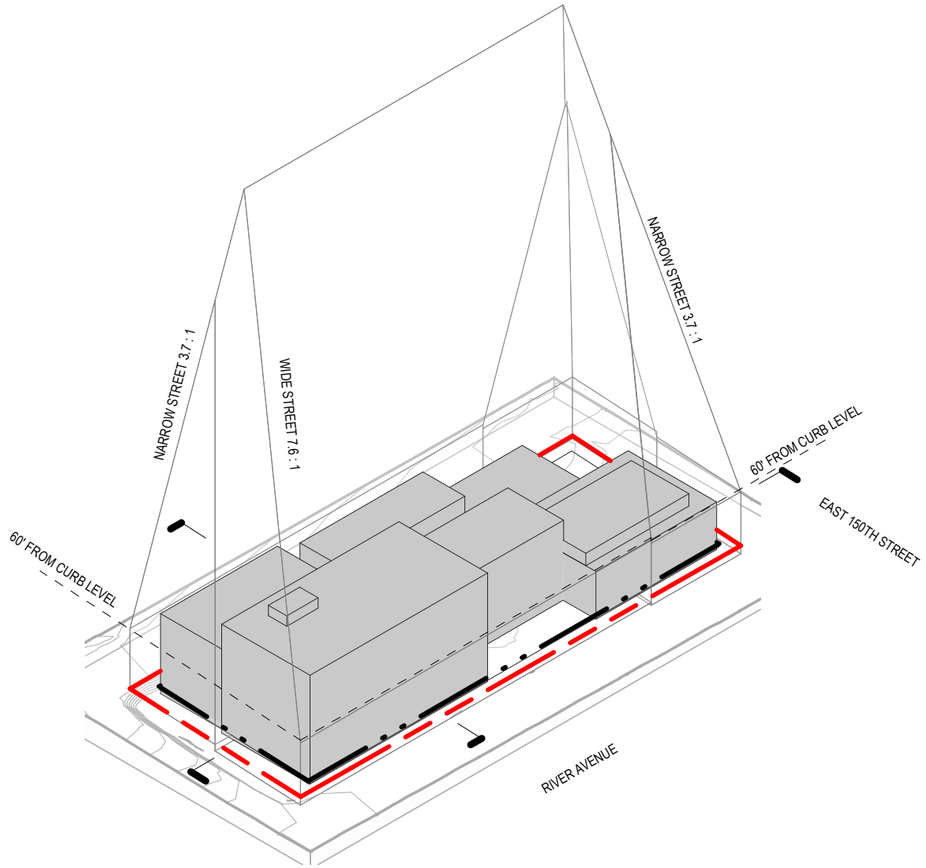
SCALE: As indicated
DATE: 05/02/22
JOB NO.: 221312

DRAWING NO.:
BSA-107

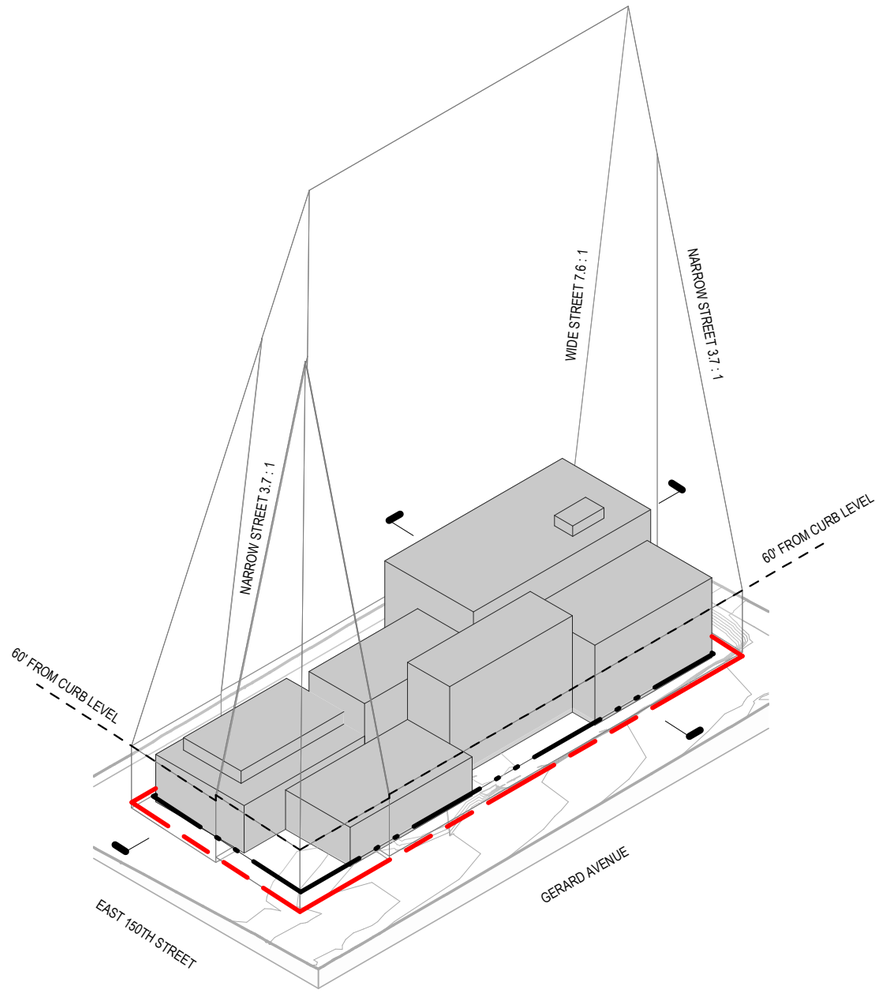
LEGEND

PROPERTY LINE

SETBACK LINE



2 ZONING ENVELOPE AXON - NORTH WEST CORNER
SCALE: NTS



1 ZONING ENVELOPE AXON - SOUTH EAST CORNER
SCALE: NTS

REGISTERED ARCHITECT
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No. 019506
STATE OF NEW YORK

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NO.	DATE	DESCRIPTION
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250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

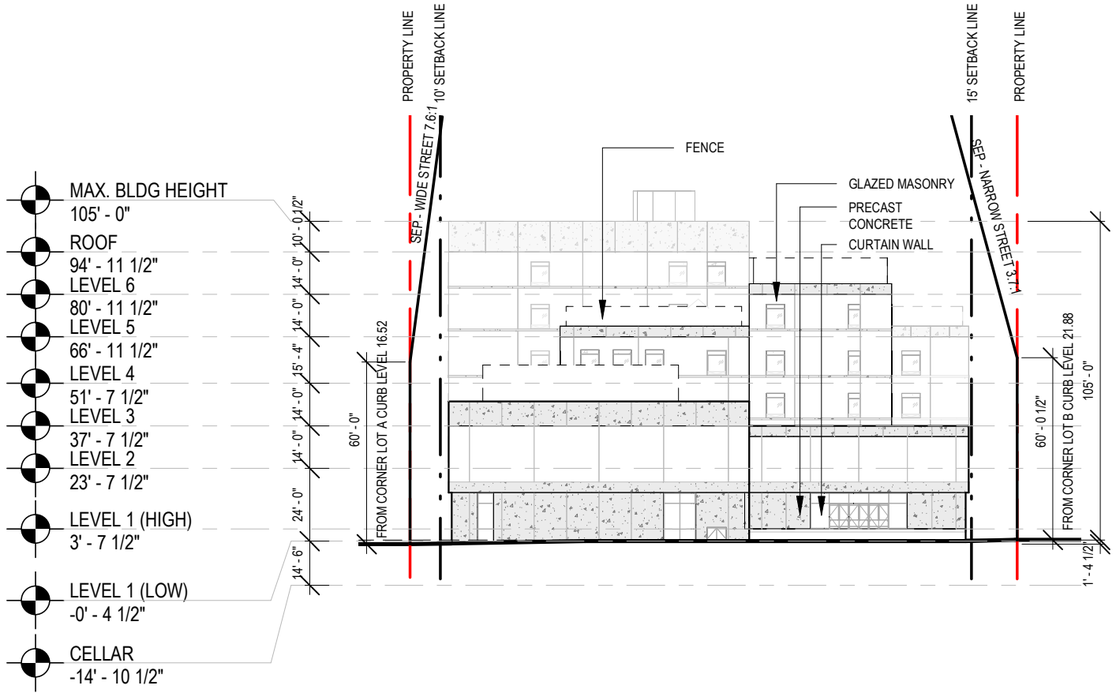
TITLE: ZONING ENVELOPE

SCALE: As indicated

DATE: 05/02/2022

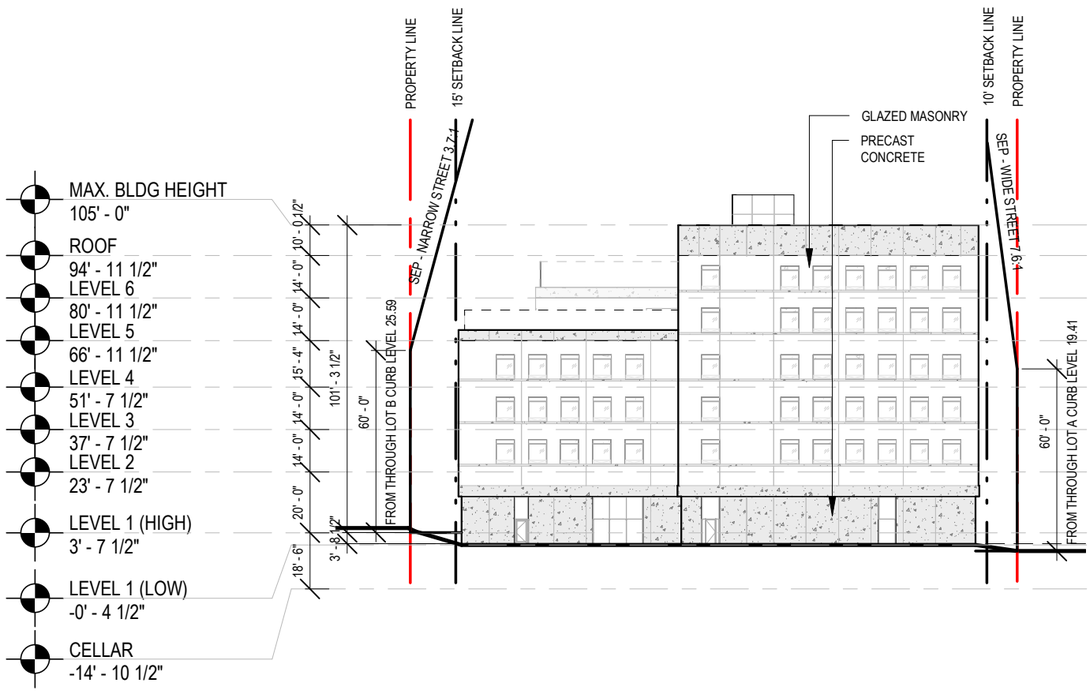
JOB NO.: 221312

DRAWING NO.: BSA-201



2 PROPOSED ELEVATION - SOUTH

SCALE: 1" = 50' - 0"



1 PROPOSED ELEVATION - NORTH

SCALE: 1" = 50' - 0"

GENERAL NOTES

PROJECT BASE 0' - 0" = NAVD88 DATUM 21.88

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NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED ELEVATIONS - NORTH AND SOUTH

SCALE: As indicated

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-202

GENERAL NOTES

PROJECT BASE 0' - 0" = NAVD88 DATUM 21.88

ALL WORK AND SITE CONDITIONS SHALL SUBSTANTIALLY CONFORM TO DRAWINGS FILED AT BSA.

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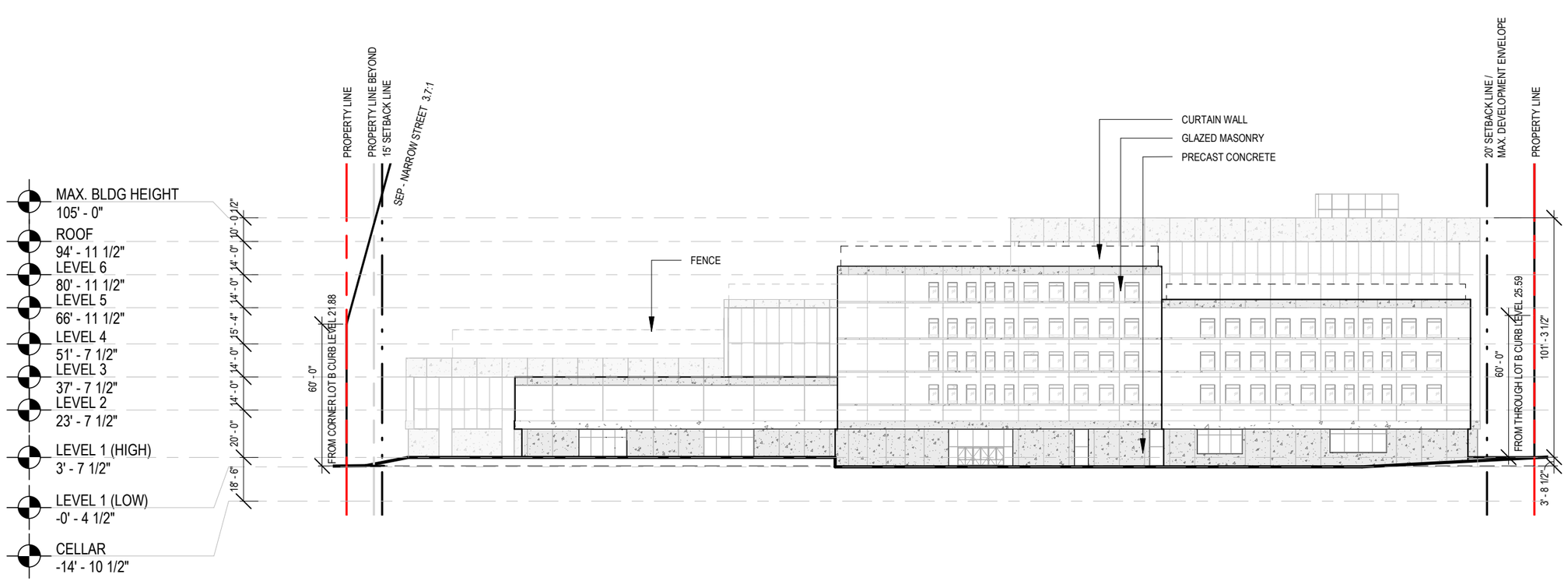

1 PROPOSED ELEVATION - EAST
SCALE: 1" = 50' - 0"

REGISTERED ARCHITECT
LAURA ETTELMAN
No. 019506
STATE OF NEW YORK

SEAL

NO.	DATE	DESCRIPTION
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ARCHITECT: **SKIDMORE, OWINGS & MERRILL LLP**
7 WORLD TRADE CENTER
250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

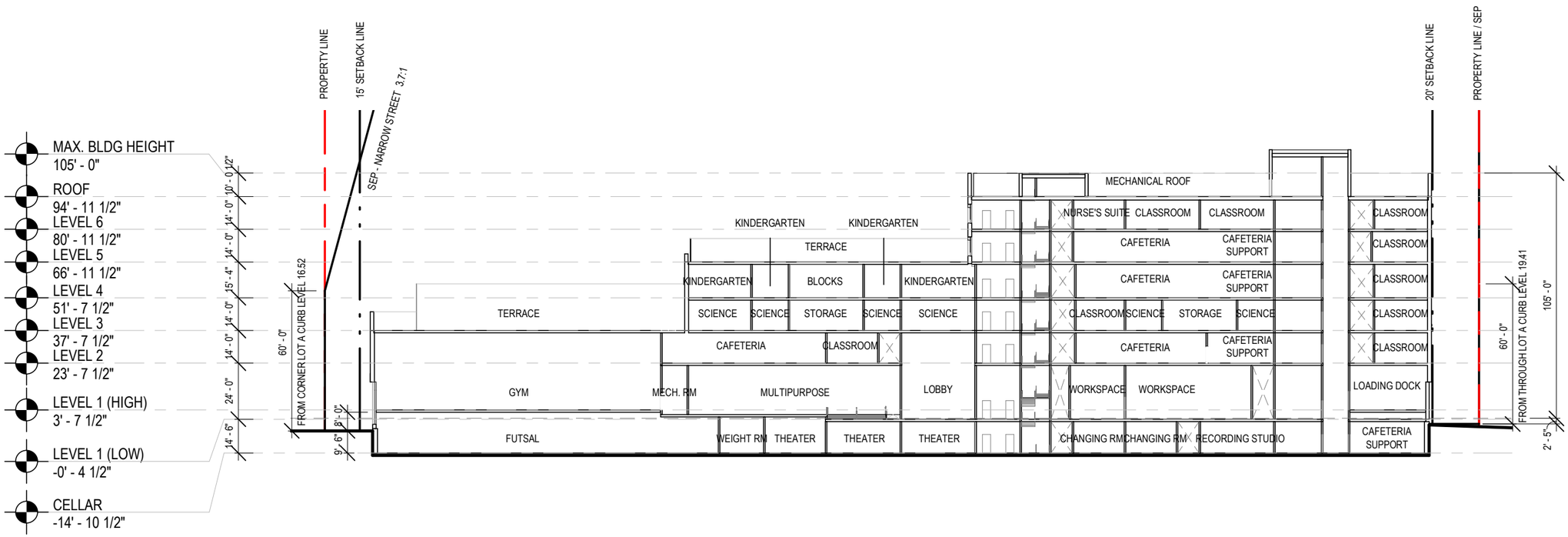
TITLE: PROPOSED ELEVATIONS - EAST

SCALE: As indicated
DATE: 05/02/2022
JOB NO.: 221312

DRAWING NO.:
BSA-203

2 | PROPOSED SECTION - EAST - WEST

SCALE: 1" = 50' - 0"



1 | PROPOSED SECTION - NORTH - SOUTH

SCALE: 1" = 50' - 0"

GENERAL NOTES

PROJECT BASE 0' - 0" = NAVD88 DATUM 21.88

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250 GREENWICH STREET
NEW YORK, NY 10007

CLIENT: **SUCCESS ACADEMY**
101 E 150TH STREET
BRONX, NY 10451

TITLE: PROPOSED SECTIONS

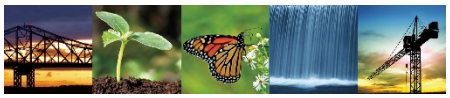
SCALE: As indicated

DATE: 05/02/2022

JOB NO.: 221312

DRAWING NO.: BSA-205

Appendix B – Quality Assurance Project Plan / Field Sampling Plan



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F: 212.279.8180
www.gza.com

QUALITY ASSURANCE PROJECT PLAN (QAPP) / FIELD SAMPLING PLAN (FSP)

101 E. 150th St.
A.K.A. 586 River Ave
Bronx, New York, 10451

PREPARED FOR:
586 River Ave., LLC
c/o Success Academy Charter Schools
95 Pine Street, Floor 6
New York, NY, 10005

PREPARED BY:
Goldberg Zoino Associates of New York, P.C.
d/b/a GZA GeoEnvironmental of New York
104 West 29th Street, 10th Floor
New York, New York 10001

File No. 41.0162951.10

TABLE OF CONTENTS

FIGURES

TABLE

ATTACHMENTS

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the Remedial Investigation Work Plan (RIWP) at the 101 E 150th St. (a.k.a., 586 River Ave.) in the New York City (NYC) Borough of the Bronx, New York (Site). **Figure 1** presents a Site location map.

This QAPP/FSP describes specific protocols for field sampling, sample handling and storage, chain-of-custody, laboratory analysis, and data handling and management. Preparation of the Plan was based on EPA Quality Assurance Project Plan guidance documents, including:

EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, March 2001); and

Guidance for Quality Assurance Project Plans (EPA QA/G-5, December 2002).

The data generated from the analysis of samples will be used to determine the extent of contamination, identify impacted targets, and to compare the results of the remedial actions to site-specific cleanup goals. Potential parameters to be analyzed, including their respective quantitation limits (QLs), and data quality levels (DQLs), are provided in **Tables 1A through 1C**.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

A qualified person will coordinate and manage the Site sampling and analysis program, data reduction, QA/QC, data validation, analysis, and reporting. A Stephen M. Kline, P.E. is a qualified environmental professional (QEP), as defined by the New York State Department of Environmental Conservation (NYSDEC) and will direct the sampling activities and coordinate laboratory and drilling activities. The intent of this QAPP/FSP is to be performed the RI in accordance with the technical guidance applicable to Technical Guidance for Site Investigation and Remediation (DER-10), and Sampling, Analysis and Assessment of Per- and Polyfluoroalykly Substances (PFAS) under NYSDEC's Part 375 Remedial Programs dated June 2021.

A qualified person will ensure that the QA/QC plan is implemented and will oversee data validation. GZA's Senior Technical Specialist, Dr. Chunhua Liu will provide oversight and technical support for the sampling and analytical procedures followed acting as the project QA Officer. This individual has the broad authority to approve or disapprove project plans, specific analyses, and final reports. The QEP is independent from the data generation activities. In general, the QA officer will be responsible for reviewing and advising on all QA/QC aspects of this program.

Laboratories used will be New York State Department of Health Environmental (NYSDOH) Laboratory Approval Program (ELAP) certified laboratories. The laboratories will communicate directly with the sampler regarding the analytical results and reporting and will be responsible for providing all labels, sample containers, field blank water, trip blanks, shipping coolers, and laboratory documentation. Qualifications of the QA officer are provided in **Attachment A.**

3.0 QA OBJECTIVES FOR DATA MANAGEMENT

The analytical data will be provided by the laboratory using the NYSDEC Category B deliverable format. Analytical data collected for disposal characteristics that may be requested by off-site soil or wastewater disposal facilities will be provided in the format that the facility requests.

All analytical measurements will be made so that the results are representative of the media sampled and the conditions measured. Data will be reported in consistent dry weight units for solid samples [i.e., micrograms per kilogram (µg/kg) and/or milligram per kilogram (mg/kg), micrograms per liter (µg/L) or milligrams per liter (mg/L) for aqueous samples and in micrograms per cubic meter (µg/m^3) for soil vapor and air samples. **Table 2** presents the proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements and containers.

Quantitation Limits (QLs) are laboratory-specific and reflect those values achievable by the laboratory performing the analyses. Data Quality Levels (DQLs) are those reporting limits required to meet the objectives of the program (i.e., program action levels, cleanup standards, etc.). Data Quality Objectives (DQOs) define the quality of data and documentation required to support decisions made in the various phases of the data collection activities. The DQOs are dependent on the end uses of the data to be collected and are also expressed in terms of objectives for precision, accuracy, representativeness, completeness, and comparability.

The analytical methods to be used at this Site provide the highest level of data quality and can be used for purposes of risk assessment, evaluation of remedial alternatives and verification that cleanup standards have been met. However, in order to ensure that the analytical methodologies are capable of achieving the DQOs, measurement performance criteria have been set for the analytical measurements in terms of accuracy, precision, and completeness.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting which will provide results that are scientifically valid, and the levels of which are sufficient to meet DQOs. Specific procedures for sampling, chain of custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, and corrective action are described in other sections of this QAPP/FSP.

Tables 3, **4**, and **5** present the precision and accuracy requirements for each parameter to be analyzed. For quantitation limits for parameters associated with soil, sediment, and solid waste samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits listed in 6 NYCRR Part 375.

For quantitation limits for parameters associated with groundwater samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits for groundwater from the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Ambient Water Quality Standards and Guidance Values. In certain instances, if the TOGS criteria are not achievable due to analytical limitations, the laboratory will report the lowest possible quantitation limit.

For quantitation limits for parameters associated with soil gas samples, the laboratory will be required to meet the parameter-specific limits from EPA's Draft Guidance for Evaluating the Vapor Intrusion to

Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), Table 3c-SG: Question 5 Soil Gas Screening Levels for Scenario-Specific Vapor Attenuation Factors (**α=**$2H10^{-3}$), November 2002. In certain instances, if these criteria are not achievable due to analytical limitations, the laboratory will report the lowest possible quantitation limits (see **Tables 1A through 1C** for affected analytes).

The QA objectives are defined as follows:

Accuracy is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

Accuracy in the field is assessed through the adherence to all field instrument calibration procedures, sample handling, preservation, and holding time requirements, and through the collection of equipment blanks prior to the collection of samples for each type of equipment being used (e.g., split spoons, groundwater sampling pumps).

The laboratory will assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of "standards," materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of blank results, the percent recovery (%R) of surrogate compounds in organic analyses, or %R of spiked compounds in matrix spikes (MSs), matrix spike duplicates (MSDs) and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. **Tables 3**, **4**, and **5** summarize the laboratory accuracy requirements.

Precision is the agreement among a set of replicate measurements without consideration of the "true" or accurate value: i.e., variability between measurements of the same material for the same analyte. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation.

Precision in the field is assessed through the collection and measurement of field duplicates (one extra sample in addition to the original field sample). Field duplicates will be collected at a frequency of one per twenty investigative samples per matrix per analytical parameter, with the exception of the Toxicity Characteristic Leaching Procedure (TCLP) parameters and parameters associated with wastewater samples. Precision will be measured through the calculation of relative percent differences (RPDs). The resulting information will be used to assess sampling and analytical variability. Field duplicate RPDs must be $\leq$ 50 for soil samples and $\leq$ 30 for aqueous samples. These criteria apply only if the sample and/or duplicate results are >5x the quantitation limit; if both results are $\leq$ 5x the quantitation limit, the criterion will be doubled. Due to the uncertainty of available representative soil gas volume, field duplicates will not be collected for this matrix.

Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic soil, sediment and water analyses, laboratory precision will be assessed through the analysis of MS/MSD samples and field duplicates. For the inorganic analyses, laboratory precision will be

assessed through the analysis of matrix duplicates and field duplicates. For soil gas analyses, laboratory precision will be assessed through the analysis of matrix duplicates. MS/MSD samples or matrix duplicates will be performed at a frequency of one per twenty investigative samples per matrix per parameter. **Tables 3**, **4**, and **5** summarize the laboratory precision requirements.

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective is greater than 90 percent.

Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent.

Representativeness is a qualitative parameter that expresses the degree to which data accurately and precisely represent either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data. In addition, field duplicate samples will provide an additional measure of representativeness at a given location.

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed, and that proper sampling, sample handling, and sample preservation techniques are used.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

Comparability expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

Comparability is dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures are consistent with those used for previous sampling efforts.

4.0 SAMPLING PLAN

Environmental sampling may include soil, groundwater, soil vapor and sediment sampling. Additionally, wastes generated during remediation or development will be sampled and tested for characterization for disposal. Direct push drilling (GeoProbe®), sonic drilling, and/or test pit excavations will be the

preferred methods for obtaining subsurface soil samples. However, other drilling methods including mud rotary and drive and wash may also be used if warranted by site conditions. Hand auger and/or hand-held sampling equipment will be the preferred method for collecting surficial and/or shallow soil samples. Groundwater samples will be collected using bailers or peristaltic, bladder or submersible pumps. Soil vapor samples will be collected in SUMMA® canisters. Performing grab or composite sampling using appropriate hand-held sampling equipment will be the preferred method for waste characterization sampling.

4.1. Utility Clearance

New York State law requires that New York 811 be notified at least three working days prior to subsurface work is conducted to initiate the utility locating activities. Companies with subsurface utilities present will locate and mark out subsurface utility lines. However, New York 811 contractors will only locate utilities on public property and rights-of-way.

During the recent, subsurface investigations, GZA contracted for underground utilities within the Site, including electric lines, gas lines, storm and sanitary sewers, and communication lines will need to be to be located by survey and geophysical survey. If additional subsurface utility locating is considered necessary, a private locating company will be contracted to locate on-site utilities that have not been identified by New York 811 contractors or the Owner.

4.2. Test Pit Soil Sampling

Test pitting and/or excavating may be conducted during the RI, if necessary. Test pits will allow for visual characterization of subsurface soil conditions and the collection of grab soil samples. Prior to soil sample collection, headspace screening will be conducted to evaluate whether analysis of soil samples is warranted, and if so, which soils should be collected.

Prior to completing a test pit or excavation, underground utilities should be identified as discussed in **Section 4.1**. Should active, underground utilities be located in the vicinity of the intended excavation, hand or vacuum excavation methods should be employed, as appropriate, to confirm the location and depth prior to initiating the excavation.

The size and type of excavator used to complete the test pits will be selected based on the anticipated depth and overall size of the excavation required to meet the project objectives. At no time will field personnel enter a test pit/excavation unless it has been deemed safe to enter by an Excavation Competent person based on training and experience required by 29CFR 1926.652.

Grab soil/solid samples will be collected from the material or interval in question by retrieving a volume for analysis using a clean stainless steel, aluminum, or mild steel/ disposable scoop, trowel, spoon, or bucket auger and placing the soil in a cleaned stainless steel pan for homogenization before inserting into the sample container. Samples collected for analysis for volatile organic compounds and total

organic halides will not be homogenized. Samples for volatile organics analysis and total organic halides will be placed directly into the sample container.

Composite samples will be collected in the same manner described above, except that the discrete sample volumes will be placed in a clean stainless steel pan and mixed to form the composite. Composite sampling will be performed for the following objectives:

- Waste characterization;
- Determination of the suitability of the soil for on-site re-use; and
- Evaluation of health and safety requirements for workers that will disturb the soil during subsequent construction work.

4.3. Direct Push Drilling Soil Sampling

This drilling method is typically used to collect shallow overburden soils and create boreholes for temporary monitoring well installations, or soil vapor sampling points. Sampling will be performed using four or five-foot-long acetate sleeves that will be advanced continuously to the desired depth below the surface. Soil samples from each sleeve will be screened using a photoionization detector (PID) to detect possible organic vapors. Organic vapor screening will be performed by slicing open the acetate sleeve, making a small slice in the soil column with a clean knife or sampling tool, inserting the PID probe and pushing the slice closed, and monitoring the soil for approximately 5 to 10 seconds. This procedure will be repeated at intervals along the soil column at the field geologist's discretion.

The samples will be examined for staining, discoloration, odors, and debris indicative of contamination (ash, coal fragments, wood chips, cinders, petroleum staining, etc.). Samples for laboratory analysis will be collected from the six-inch interval most likely to be contaminated, based on PID readings, discoloration, staining, and the field geologist's judgment (field conditions may require a section longer than six inches to make sufficient sample; however, this decision will be field-based).

The samples will be collected by cutting the soil in two places with a decontaminated steel, stainless steel, or aluminum trowel, spoon, or knife and homogenized in a decontaminated stainless steel pan before being placed in the sample bottles. Samples collected for analysis for VOCs and total organic halides will be placed directly into the sample containers without homogenization (as per EPA sampling method 5035A). Samplers will wear phthalate-free gloves such as nitrile (no latex will be used) and will avoid contact of the gloves with the sample. Clean metal/disposable instruments will be used to transfer samples. If there is insufficient soil volume in the spoon, then this will be made up by attempting a second direct push sleeve at the same depth, or by using the next immediate sample interval above or below this depth, if appropriate. If there is no recovery, then the sample depth will be skipped, and drilling will progress to the next depth interval.

Soil samples will be collected in laboratory provided containers and transported to a NYSDOH ELAP certified laboratory, under proper chain of custody procedures for analysis. Once the sample containers

are filled, they will be immediately placed in the cooler with ice (in Ziploc plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at below 4°C.

4.4. Sonic Drill Rig Soil Sampling

The sonic drilling system employs simultaneous high frequency vibration and low speed rotational motion along with down pressure to advance the cutting shoes of the drill string. This technique provides a continuous soil core and generates minimal cuttings. Due to the continuous sampling of the system, accurate depictions of the stratigraphy and lithology of the overburden are obtained (minimal sloughing). Additionally, few cuttings are mobilized to the surface. Most of the formation material enters the core barrel, except small amounts, which are pushed into the borehole wall.

Drilling operations take place from the drill platform, which is about 4 feet above ground. Steel drill casing and core barrel are connected to the head from the work platform/support truck and are then hoisted to vertical in the derrick. Tool joints are connected and broken by a hydraulic vise/wrench that is in the base of the derrick. The sonic head is able to pivot 90 degrees to facilitate connection of the drilling rods.

The sonic drilling system uses an override core barrel system and can create a 4- or 6-inch diameter borehole. This is followed by the override casing drilled to the same depth as the core barrel cutting shoe. The core barrel is then removed, and cores are extruded into plastic sleeves. The outer casing prevents cross contamination and formation mixing and allows for a very controlled placement of wells.

GZA proposes to use a track-mounted sonic drill rig collecting soil continuously from either five-foot long or 10-foot long cores. Samples will be extruded from the core barrel into polyethylene sleeves. Once the plastic sleeve is cut open, soil will be screened using a PID to detect possible organic vapors. Organic vapor screening will be performed by making a small slice in the soil column with a clean knife or sampling tool, inserting the PID probe and pushing the slice closed, and monitoring the soil for approximately 5 to 10 seconds. This procedure will be repeated at intervals along the soil column at the field geologist's discretion.

The samples will be examined for staining, discoloration, odors, and debris indicative of contamination (ash, coal fragments, wood chips, cinders, petroleum staining, etc.) Samples for laboratory analysis will be collected from the six-inch interval most likely to be contaminated, based on PID readings, discoloration, staining, and the field geologist's judgment (field conditions may require a section longer than six inches to make sufficient sample; however, this decision will be field-based).

The samples will be collected by cutting the soil in two places with a decontaminated steel, stainless steel, or aluminum trowel, spoon, or knife and homogenized in a decontaminated stainless steel pan before being placed in the sample bottles. Samples collected for analysis for VOCs and total organic halides will be placed directly into the sample containers without homogenization (as per EPA sampling method 5035A). Samplers will wear phthalate-free gloves such as nitrile (no latex will be used) and will

avoid contact of the gloves with the sample. Clean metal/disposable instruments will be used to transfer samples. If there is insufficient soil volume in the spoon, then this will be made up by attempting a second direct push sleeve at the same depth, or by using the next immediate sample interval above or below this depth, if appropriate. If there is no recovery, then the sample depth will be skipped, and drilling will progress to the next depth interval.

Soil samples will be collected in laboratory provided containers and transported to a NYSDOH ELAP certified laboratory, under proper chain of custody procedures for analysis. Once the sample containers are filled, they will be immediately placed in the cooler with ice (in Ziploc plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at below 4°C.

4.5. Temporary Well Point Installation and Sampling

If proposed for site characterization, temporary well points will be immediately installed in drilled soil direct-push soil borings by placing a one-inch diameter PVC screen and riser pipe directly into the borehole. No additional materials will be placed around the annual space. The screen will be set so as to straddle the water table. Temporary wells will not be purged prior to sample collection. Depth to water will be measured in each well point to provide data to approximate groundwater flow direction.

Groundwater samples will be collected from the temporary well point using a dedicated microbailer. The samples will be collected in sample bottles (pre-preserved, if appropriate), placed in iced coolers and removed from light immediately after collection. In addition, all sample bottles must be filled to the top so that no aeration of the samples occurs during transport. All bottles will be filled to avoid cascading and aeration of the samples, the goal being to minimize any precipitation of colloidal matter. Samples for dissolved metals will be collected in unpreserved containers and will be filtered and preserved at the laboratory within 24 hours of sampling. Samples will be transported to a NYSDOH ELAP certified laboratory under proper chain of custody procedures for analysis.

Screen and riser pipes will be removed from the borehole and the borehole will be backfilled.

4.6. Permanent Well Installation and Sampling

Groundwater sampling of permanent monitoring wells is described according to the following distinct phases of this work: well installation/construction, well development, well purging, and well sampling.

4.6.1. *Well Installation/Construction*

To collect representative groundwater samples, soil borings drilled with the sonic drilling method will be converted into permanent two-inch diameter monitoring wells. Groundwater monitoring wells will be constructed of threaded two-inch diameter PVC well casing and 20-slot well screen (to investigate the potential of floating product). The 10-foot screen will be set seven feet below the measured water table.

Clean silica sand, Morie No. 1 or equivalent, will be placed in the annular space around the well to a minimum of one foot above the top of the well screen, two feet being optimal. Solid PVC riser, attached to the well screen, will extend to grade or above if the well is a stick-up. For a two-inch diameter well, the annular space for the filter pack should be 4 inches thick. A two-foot thick bentonite seal will then be placed above the sand pack and moistened with potable water for a minimum of 15 minutes before backfilling the remaining space with a cement-bentonite grout. If warranted by depth, filling will be completed using a tremie pipe placed below the surface of the grout. A stick-up or flush-mount protective casing with a locking well cap will then be installed, and a measuring point marked on each PVC well riser. Well construction diagrams will be prepared for each well.

4.6.2. Well Development

Following installation, the groundwater monitoring wells will be developed using a two-inch diameter submersible pump(s) (or equivalent) until the water is reasonably free of turbidity and field readings (pH, conductivity, temperature, and dissolved oxygen) sufficiently stabilize. Fifty nephelometric turbidity units (NTUs) or less will be the turbidity goal but not an absolute value. The wells will be developed aggressively to remove fines from the formation and sand pack. The wells will be allowed to equilibrate for seven days prior to sampling. The volume of water removed, the well development time, and field instrument readings will be recorded in the logbook.

4.6.3. Well Purging

The objective is to purge monitoring wells until turbidity stabilizes to a level as low as possible and this parameter will be given the greatest weight in determining when groundwater sampling may begin. With this objective in mind, a low-flow pump will be used to avoid entrainment of particulates within the well or from the formation. Groundwater from each well will be purged until parameters have stabilized. A turbidity level of fifty NTUs or less is the well purging goal, but not an absolute value before sampling. Other field parameters including temperature, conductivity, pH, and dissolved oxygen (DO) will also be monitored. As practical, all field measurements will be taken from the flow cell and will be recorded during and after purging, and before sampling. Field parameters should generally be within ±10 percent for three consecutive readings, one minute apart, prior to sampling.

Upon opening each monitoring well and point, the concentration of VOCs in the headspace will be measured using a PID and water level measurements will be recorded using an electronic interface probe. The depth to product (if present), depth to water, and the total depth will be measured from the top of the marked PVC casings. Water level and free product measurements will first be made and the volume of water in the well determined. The volume of water in the well will be calculated so that the number of well volumes purged and an estimate of the time required to purge the well can be made. Before sampling, the wells will be purged utilizing a low-flow submersible stainless steel pump using dedicated Teflon® or Teflon®-lined polyethylene tubing connected to a flow cell. Very low purging rates

are proposed, on the order of 100 ml/minute to 500 ml/minute, to minimize suspension of particulate matter in the well.

Purging will be done with the pump intake placed at the midpoint of the well screen or the midpoint of the water column (to be determined based on the depth and length of the screen interval) to ensure that all stagnant water in the well is removed, while not stirring up sediment that may have accumulated on the bottom of the well. Equipment will be lowered into the well very carefully to prevent suspension of bottom sediment and subsequent entrainment onto sampling equipment. Surging will be avoided. Tubing will be replaced between each well. Pumps must be carefully cleaned between wells according to the procedures specified in **Section 4.15,** below. It is anticipated that no more than three well volumes will be purged in order for turbidity to reach a minimum and the other parameters to stabilize. Ideally, pumping rates will be at a rate so that no drawdown of the groundwater level occurs (i.e., pumping rate is less than recharge rate). During purging, the sampler will actively monitor and track the volume of water purged and the field parameter readings. Data will be recorded in the field logbook. For example, the sampler will record the running total volume purged from each well and note the readings for the corresponding field parameters.

4.6.4. Well Sampling

Once groundwater conditions have stabilized and groundwater levels have recovered, samples will be collected from the flow cell outlet (connected to the low-flow submersible pump). All non-disposable/non-dedicated (re-usable) sampling equipment will be cleaned according to the procedures specified in **Section 4.15**.

Sampling will be performed with the pump intake at the same location used for purging. Pumping rates for withdrawing the samples will be similar to those followed for well purging.

The samples will be collected in sample bottles (pre-preserved, if appropriate), placed in iced coolers and removed from light immediately after collection. In addition, all sample bottles must be filled to the top so that no aeration of the samples occurs during transport. All bottles will be filled to avoid cascading and aeration of the samples, the goal being to minimize any precipitation of colloidal matter. Samples will be transported to a NYSDOH ELAP certified laboratory under proper chain of custody procedures for analysis. Samples for dissolved metals will be collected in unpreserved containers and will be filtered and preserved at the laboratory within 24 hours of sampling.

4.7. Borehole Abandonment

Soils extracted during the advancement of the borings will be used to backfill the borings, provided that the borings are not to be used for installation of permanent monitoring wells. However, soils that exhibit "gross" contamination, as evidenced by staining or free-phase product, or any visual, olfactory, or PID readings greater than 100 ppm above background, will be managed in accordance with **Section 9**. In this

event, bentonite chips or pellets to within 0.5 feet below ground surface. The ground surface will be restored to a similar condition as the surrounding grade (e.g., topsoil, asphalt, or concrete).

4.8. Monitoring Well Abandonment

There may be occasions when monitoring wells will require abandonment. For temporary monitoring wells, the approach will be to pull the PVC well materials from the borehole and backfill the remaining open portion of the borehole with cement/bentonite grout to approximately 0.5 feet below the ground surface. The ground surface will be restored to a similar condition as the surrounding grade (e.g., topsoil, asphalt, or concrete). For permanent overburden and bedrock monitoring wells, depending on the site-specific subsurface geologic conditions and nature of contamination, the abandonment approach will be in accordance with NYSDEC Policy CP-43 – Groundwater Monitoring Well Decommissioning Policy.

4.9. Soil Reuse and Worker Health & Safety Sampling

Soil reuse sampling may be performed to determine whether the soil can be reused elsewhere on the Site, or to determine whether contaminant levels in the soil would warrant OSHA 40-hour HAZWOPER training for workers disturbing the soil during post-remediation construction activities. This sampling would consist of compositing discrete soil samples from borings advanced by direct push (see **Section 4.3**), or during test pits following the procedures outlined in **Section 4.2**.

4.10. Waste Characterization Sampling

Waste classification sampling may be conducted to characterize soil, liquids and/or groundwater for the purpose of proper off-site waste disposal. Specific methods for sampling liquid and solid wastes are briefly discussed below.

4.10.1. Solid Waste

Solid sampling methods include utilizing dedicated stainless steel or Teflon® scoops/shovels, triers, and thiefs. Scoops and shovels are the preferred method for sampling solids from piles or containers. Stainless steel triers are similar to a scoop and are used for the collection of a core sample of a solid material.

4.10.2. Liquid Waste

Liquid sampling methods include utilizing dedicated dippers, glass tube samplers, pump and tubing, kemmerer bottles, and Bacon Bomb samplers. Dippers are used to collect samples from the surface of the liquid and are appropriate for wastes that are homogeneous. Glass tube samplers consist of glass tubes of varying length and diameter used to collect a full-depth liquid sample from a drum or similar container. Pump and tubing (e.g., bladder pump or peristaltic pump) are used to collect liquid samples from a depth (up to approximately 20 feet below grade), and are typically relied upon for sampling

subsurface structures, such as underground storage tanks. To minimize the loss of volatile organic components in the liquid, the lowest achievable flow rate is utilized for collecting the sample by this method. Kemmerer bottles and Bacon Bomb samplers are discrete-depth samplers. These samplers are lowered into the liquid and opened to collect a sample at a desired depth.

4.10.3. Grab versus Composite Sampling

Waste characterization of a liquid or a solid can involve grab or composite sampling depending upon the homogeneity and the volume of the waste. Grab sampling consists of collecting a discrete sample or samples of a material and submitting each sample for separate analysis. Grab sampling is appropriate for characterizing small quantities of waste as well as waste streams of varying content (e.g., drums of different contents). Composite sampling consists of taking discrete grab samples of a material and combining them into a smaller number of samples for analysis. Composite sampling generally is appropriate for large volumes of a homogenous waste material, such as a pile of soil or construction debris. The specific number of composite and grab samples largely will depend upon the size and nature of the waste pile (i.e., cubic yards) as well as the analysis required for characterization of the waste.

4.11. Soil Gas Sampling

A direct-push drill rig will be utilized to drive rods with a decontaminated stainless steel probe to the desired sample depth, which will be a minimum of 5 feet bgs or two feet above the water table if groundwater is present at 5 feet. The soil gas probe will then be purged at a flow rate not greater than 0.2 liters/minute to evacuate one to three volumes using a photoionization detector (PID) with an integrated vacuum pump (MiniRAE 3000 or appropriate alternate). Peak and stabilized PID readings will be recorded prior to sample collection. Following the stabilization period, each probe will be connected to an evacuated laboratory-supplied 6-liter SUMMA® canister. SUMMA® canisters are passivated stainless steel vessels that have been cleaned and certified contaminant-free by the contract laborer. After connecting the SUMMA® canister to the soil gas probe, a regulator valve on the canister will be opened and the vacuum will slowly draw the sample into the canister over a period of 20 minutes. The samples will not be drawn at greater than 0.2 liters per minute. Quantitation limits for all analytes range between 1.6 ppbV and 4.0 ppbV, depending on the compound. After collecting the soil gas sample, the valve will be closed and disconnected from the soil gas probe. The soil-gas samples will be transported to a NYSDOH ELAP certified laboratory for TO-15 analysis.

Prior to sample collection, helium will be used as a tracer gas to evaluate the potential for infiltration of outdoor air into the sample. Subsequent rounds of soil gas sampling would include the use of tracer gas only if the initial round of sampling indicates that outdoor air has the potential to influence soil gas sample results.

When soil vapor samples are collected, the following conditions that may influence the interpretation of results will be documented:

- Identification of any nearby commercial or industrial buildings that likely uses volatile organic compounds;
- A sketch of the Site, showing streets, neighboring commercial or industrial facilities (with estimated distances to the Site, and soil-gas sampling locations);
- Weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction); and
- Any pertinent observations, such as odors or readings from field instrumentation.

4.12. Ambient Air Sampling

Ambient air samples will be collected with an evacuated laboratory-supplied 6-liter SUMMA® canister. SUMMA® canisters are passivated stainless steel vessels that have been cleaned and certified contaminant-free by the contract laborer. The sample will be set at an elevation of approximately 4 to 5 feet above grade, to represent breathing zone air quality conditions. The samples will not be drawn at greater than 0.2 liters per minute. After collecting the ambient air sample, the valve will be closed, and the canister will be labeled with the necessary information. The soil-gas samples will be transported to a NYSDOH ELAP certified laboratory for TO-15 analysis.

When ambient air samples are collected, the following conditions that may influence the interpretation of results will be documented:

- Identification of any nearby commercial or industrial buildings that likely uses volatile organic compounds;
- A sketch of the Site, showing streets, neighboring commercial or industrial facilities (with estimated distances to the Site, and soil-gas sampling locations);
- Weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction); and
- Any pertinent observations, such as odors or readings from field instrumentation.

4.13. QC Sample Collection

QC samples will include equipment blanks, trip blanks, field duplicates and MS/MSDs.

Equipment blanks will consist of distilled water and will be used to check for potential contamination of the equipment that may cause sample contamination. Equipment blanks will be collected by routing the distilled water through the sampling equipment prior to sample collection. Equipment blanks will be

submitted to the laboratory at a frequency of one per day per matrix per type of equipment being used per parameter. Equipment blanks will not be collected with samples for analysis for TCLP parameters, parameters associated with wastewater samples, samples collected for disposal purposes, soil gas samples, chip samples, wipe samples and samples collected for grain size analyses.

Trip blanks will consist of distilled water (supplied by the laboratory) and will be used to assess the potential for volatile organic compound contamination of groundwater samples due to contaminant migration during sample shipment and storage. Trip blanks will be transported to the site unopened, stored with the investigative samples, and kept closed until analyzed by the laboratory. Trip blanks will be submitted to the laboratory at a frequency of one per cooler that contains groundwater samples for analysis for VOCs.

Field duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Field duplicates will be used to assess the sampling and analytical reproducibility. Field duplicates will be collected by alternately filling sample bottles from the source being sampled. Field duplicates will be submitted at a frequency of one per 20 samples for all matrices and all parameters with the exception of TCLP parameters, parameters associated with wastewater samples, samples collected for waste characterization purposes, chip samples, wipe samples and samples collected for grain size analyses. Soil gas field duplicates will be obtained by using a tubing a T-splitter.

MSs and MSDs are two additional aliquots of the same sample submitted for the same parameters as the original sample. However, the additional aliquots are spiked with the compounds of concern. Matrix spikes provide information about the effect of the sample matrix on the measurement methodology. MS/MSDs will be submitted at a frequency of one per 20 investigative samples per matrix for organic parameters for soil, sediment, and groundwater. MSs will be submitted at a frequency of one per 20 investigative samples per matrix for inorganic parameters.

4.14. Sample Preservation and Containerization

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's *Specifications and Guidance for Contaminant-Free Sample Containers*. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. The containers will be pre-preserved, where appropriate (see **Table 2**).

Table 6 presents a summary of QC sample preservation and container requirements.

4.15. Equipment Decontamination

Re-usable Teflon®, stainless steel, and aluminum sampling equipment shall be cleaned between each use in the following manner:

- Wash/scrub with a biodegradable degreaser ("Simple Green") if there is oily residue on equipment surface
- Tap water rinse
- Wash and scrub with Alconox and water mixture
- Tap water rinse
- Distilled/deionized water rinse
- Air dry

Cleaned equipment shall be wrapped in aluminum foil if not used immediately after air-drying.

Groundwater sampling pumps will be cleaned by washing and scrubbing with an Alconox/water mixture, rinsing with tap water and irrigating with distilled/deionized water.

5.0 DOCUMENTATION AND CHAIN-OF-CUSTODY

5.1. Sample Collection Documentation

5.1.1. Field Notes

Field team members will keep a field logbook to document all field activities. Field logbooks will provide the means of recording the chronology of data collection activities performed during the remediation. As such, entries will be described in as much detail as possible so that a particular situation could be reconstructed without reliance on memory.

The logbook will be a bound notebook with water-resistant pages. Logbook entries will be dated, legible, and contain accurate and inclusive documentation of the activity. The title page of each logbook should contain the following:

- Person to whom the logbook is assigned
- The logbook number
- Project name and number
- Site name and location
- Project start date
- End date

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, and names of sampling team members present will be entered. Each page of the logbook will be signed and dated by the person making the entry. All entries will be made in permanent ink, signed, and dated and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark that is signed and dated by the sampler. The correction shall be written adjacent to the error.

Field activities will be fully documented. Information included in the logbook should include, but may not be limited to, the following:

- Chronology of activities, including entry and exit times
- Names of all people involved in sampling activities
- Level of personal protection used
- Any changes made to planned protocol
- Names of visitors to the site during sampling and reason for their visit
- Sample location and identification
- Changes in weather conditions
- Dates (month/day/year) and times (military) of sample collection
- Measurement equipment identification (model/manufacturer) and calibration information
- Sample collection methods and equipment
- Sample depths
- Whether grab or composite sample collected
- How sample composited, if applicable
- Sample description (color, odor, texture, etc.)
- Sample identification code
- Tests or analyses to be performed
- Sample preservation and storage conditions
- Equipment decontamination procedures
- QC sample collection
- Unusual observations
- Record of photographs
- Sketches or diagrams
- Signature of person recording the information

Field logbooks will be reviewed on a daily basis by the Field Team Leader. Logbooks will be supported by standardized forms.

5.1.2. Chain-of-Custody Records

On a regular basis (daily or on such a basis that all holding times will be met), samples will be transferred to the custody of the respective laboratories, via third-party commercial carriers or via laboratory courier service.

Chain-of-custody records are initiated by the samplers in the field. The field portion of the custody documentation should include: (1) the project name; (2) signatures of samplers; (3) the sample number, date and time of collection, and whether the sample is grab or composite; (4) signatures of individuals involved in sampling; and (5) if applicable, air bill or other shipping number. Sample receipt and log-in procedures at the laboratory are described in **Section 5.2.2** of this Plan.

5.1.3. Sample Labeling

Immediately upon collection, each sample will be labeled with a pre-printed adhesive label, which includes the date and time of collection, sampler's initials, tests to be performed, preservative (if applicable), and a unique identifier.

A. The following identification scheme will be used:

Soil borings will be assigned sequential numbers. For soil samples collected from soil borings, sample numbers will be assigned as follows:

SB-#(sampling interval)

Example:
Sample SB-4(4-6') = soil sample collected from soil boring #4 at a depth of 5-6' below grade.

Groundwater wells will be assigned sequential numbers, with the exception of the existing well (LBc-2(OW)). Groundwater samples will be identified by the well that the sample was collected from.

Examples:
MW-1 = groundwater sample collected from permanent well point #1
LBc-2(OW) = groundwater sample collected from existing permanent monitoring well LBc-2(OW)

Sub-slab soil vapor/soil vapor/ambient air will be assigned numbers coordinating with the adjacent soil boring or a sequential number due to sample names being identical to a previous Site sampling event. Vapor samples will be identified by the soil gas point that the sample was collected from.

Examples:
SSV-12 = Sub-slab soil gas sample collected from the soil gas point coinciding with SB-12
SV-21 = Soil vapor sample collected from the soil gas point coinciding with SB-21

AA-03 = Ambient air sample
IA-04 = Indoor ambient air sample

Duplicate samples will be labeled as blind duplicates by giving them sample numbers indistinguishable from a normal sample.

Blanks should be spelled out and identify the associated matrix, e.g., Equipment Blank, Soil

MS/MSDs will be noted in the Comments column of the COC.

B. The analysis required will be indicated for each sample.

Example: SVOC

C. Date taken will be the date the sample was collected, using the format: MM-DD-YY.

Example: 04-22-22

D. Time will be the time the sample was collected, using military time.

Example: 14:30

E. The sampler's name will be printed in the "Sampled By" section.

F. Other information relevant to the sample.

Example: Equipment Blank

An example sample label is presented below:

Job No:	XXXXXXXXX
Client:	Name
Sample No:	B22(5-5.5')
Matrix:	Soil
Date Taken:	4/22/22
Time Taken:	14:30
Sampler:	B. Smith
Analysis:	SVOC

Job No. _____
Client: _____
Sample Number _____

Date _____ Sample Time _____
Sample Matrix _____
Grab or Composite (explain) _____
Preservatives _____
Analyses _____
Sampler Signature _____

This sample label contains the authoritative information for the sample. Inconsistencies with other documents will be settled in favor of the vial or container label unless otherwise corrected in writing from the field personnel collecting samples or the QEP.

5.2. Sample Custody

Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

A sample or evidence file is considered to be under a person's custody if

- the item is in the actual possession of a person
- the item is in the view of the person after being in actual possession of the person
- the item was in the actual physical possession of the person but is locked up to prevent tampering
- the item is in a designated and identified secure area

5.2.1. Field Custody Procedures

Samples will be collected following the sampling procedures documented in **Section 4.0** of this Plan. Documentation of sample collection is described in **Section 5.1** of this Plan. Sample chain-of-custody and packaging procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.

- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis.

- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and placed in the project files.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. If third party commercial carriers are used for transfer to the laboratory, shipping containers will be secured with strapping tape and custody seals prior to shipment. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations.

- If the samples are sent by third party commercial carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.

- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory courier or sample custodian, and signature of the laboratory courier or sample custodian on chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

5.2.2. Laboratory Custody Procedures

Samples will be received and logged in by a designated sample custodian or his/her designee. Upon sample receipt, the sample custodian will

- Examine the shipping containers to verify that the custody tape is intact,

- Examine all sample containers for damage,

- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the chain-of-custody records,
- Compare samples received against those listed on the chain-of-custody,
- Verify that sample holding times have not been exceeded,
- Examine all shipping records for accuracy and completeness,
- Determine sample pH (if applicable) and record on chain-of-custody forms,
- Sign and date the chain-of-custody immediately (if shipment is accepted) and attach the air bill,
- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the Laboratory Project Manager, who will be responsible for contacting the QEP,
- Attach laboratory sample container labels with unique laboratory identification and test, and
- Place the samples in the proper laboratory storage.

Following receipt, samples will be logged in according to the following procedure:

- The samples will be entered into the laboratory tracking system. At a minimum, the following information will be entered: project name or identification, unique sample numbers (both client and internal laboratory), type of sample, required tests, date and time of laboratory receipt of samples, and field ID provided by field personnel.
- The Laboratory Project Manager will be notified of sample arrival.
- The completed chain-of-custody, air bills, and any additional documentation will be placed in the final evidence file.

6.0 CALIBRATION PROCEDURES

6.1. Field Instruments

Field instruments will be calibrated according to the manufacturer's specifications. Calibration procedures performed will be documented in the field logbook and will include the date/time of calibration, name of person performing the calibration, reference standard used, temperature at which the readings were taken, and the readings.

6.2. Laboratory Instruments

Calibration procedures for a specific laboratory instrument will consist of initial calibrations, initial calibration verifications, and/or continuing calibration verification. Detailed descriptions of the calibration procedures for a specific laboratory instrument are included in the laboratory's standard operating procedures (SOPs), which describe the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration. These procedures are as required in the respective analytical methodologies (summarized in **Table 2** of this Plan). The initial calibration associated with all analyses must contain a low-level calibration standard which is less than or equal to the quantitation limit.

7.0 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

No field analyses are anticipated for this program. If site conditions were to warrant field analysis, the responsible contractor will prepare an addendum establishing the field analytical procedures. Analyses of all samples will be performed by NYSDOH ELAP certified laboratories. **Table 2** summarizes the analytical methods to be used during the remediation.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

Appropriate QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in this project. Complete data packages suitable for data validation will be provided by the analytical laboratory.

For all analyses, the laboratory will report results that are below the laboratory's reporting limit; these results will be qualified as estimated (J) by the laboratory. The laboratory may be required to report tentatively identified compounds (TICs) for the VOC and SVOC analyses; this will be requested by the sampler on an as-needed basis. A Data Usability Summary Report (DUSR) will be prepared and will be included in the Remedial Investigation Report (RIR). Qualifications of the DUSR preparer can be found in **Attachment A.**

8.1. Data Evaluation/Validation

8.1.1. Field Data Evaluation

Measurements and sample collection information will be transcribed directly into the field logbook or onto standardized forms. If errors are made, results will be legibly crossed out, initialed and dated by the person recording the data, and corrected in a space adjacent to the original (erroneous) entry. Daily reviews of the field records by the Field Team Leader will ensure that:

- Logbooks and standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.

- Records are legible and in accordance with good record keeping procedures, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained.

- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the Plan, and that any deviations were documented and approved by the appropriate personnel.

8.1.2. Data Usability

A Data Usability Summary Report (DUSR) will be prepared in accordance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

The data usability evaluation will include reviewing the quality assurance/quality control (QA/QC) information including: (1) chain-of-custody; (2) the summary QA/QC information provided by the laboratory; and (3) the project narrative.

For each data package the following questions will be evaluated:

- Is the data package complete as defined under the requirements for the NYSDEC ASP Category B, USEPA CLP deliverables or other standards/guidance?
- Have all holding times and preservation requirements been met?
- Do the quality control (QC) data fall within the laboratory and project established limits and specifications?

8.2. Identification and Treatment of Outliers

Any data point which deviates markedly from others in its set of measurements will be investigated; however, the suspected outlier will be recorded and retained in the data set. One or both of the following tests will be used to identify outliers.

Dixon's test for extreme observations is an easily computed procedure for determining whether a single very large or very small value is consistent with the remaining data. The one-tailed t-test for difference may also be used in this case. It should be noted that these tests are designed for testing a single value. If more than one outlier is suspected in the same data set, other statistical sources may be consulted and the most appropriate test of hypothesis will be used and documented, if warranted.

Since an outlier may result from unique circumstances at the time of sample analysis or data collection, those persons involved in the analysis and data reduction will be consulted. This may provide an experimental reason for the outlier. Further statistical analysis may be performed with and without the outlier to determine its effect on the conclusions. In many cases, two data sets may be reported, one including, and one excluding the outlier.

In summary, every effort will be made to include the outlying values in the reported data. If the value is rejected, it will be identified as an outlier, reported with its data set and its omission noted.

9.0 INTERNAL QUALITY CONTROL

The subcontracting laboratories' Quality Assurance Project Plans will identify the supplemental internal analytical quality control procedures to be used. At a minimum, this will include:

- Matrix spike and/or matrix spike duplicate samples
- Matrix duplicate analyses
- Laboratory control samples
- Instrument calibrations
- Instrument tunes for SW-846 8260B and 8270C and EPA Method TO-15 analyses
- Method and/or instrument blanks
- Surrogate spikes for organic analyses
- Internal standard spikes for SW-846 8260B and 8270C and EPA Method TO-15 analyses
- Quantitation limit determination and confirmation by analysis of low-level calibration standard

As outline on **Table 5** and summarized in **Section 4.13**, field quality control samples will include:

- Equipment blanks
- Field duplicate samples
- Trip blanks
- MS/MSDs

10.0 CORRECTIVE ACTION

The entire sampling program will be under the direction of the QEP. The emphasis in this program is on preventing problems by identifying potential errors, discrepancies, and gaps in the data-collection-laboratory-analysis-interpretation process. Any problems identified will be promptly resolved. Likewise, follow-up corrective action is always an option in the event that preventative corrective actions are not totally effective.

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by other means in the Plan. Corrective actions are likely to be immediate in

nature and most often will be implemented by the contracted laboratory analyst or the Program Manager. The corrective action will usually involve recalculation, reanalysis, or resampling.

10.1. Immediate Corrective Action

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the Plan), or when sampling procedures and/or field analytical procedures require modification, etc. due to unexpected conditions. The field team may identify the need for corrective action. The Field Team Leader will approve the corrective action and notify the Program Manager. The Program Manager will approve the corrective measure. The Field Team Leader will ensure that the corrective measure is implemented by the field team.

Corrective actions will be implemented and documented in the field logbook. Documentation will include:

- A description of the circumstances that initiated the corrective action,
- The action taken in response,
- The final resolution, and
- Any necessary approvals

No staff member will initiate corrective action without prior communication of findings through the proper channels.

Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, omissions or discrepancies with chain-of-custody documentation, low/high pH readings, and potentially high concentration samples may be identified during sample log-in or just prior to analysis. Following consultation with laboratory analysts and Laboratory Section Leaders, it may be necessary for the Laboratory QA Manager to approve the implementation of corrective action. The laboratory SOPs specify some conditions during or after analysis that may automatically trigger corrective action or optional procedures. These conditions may include dilution of samples, additional sample extract cleanup, automatic reinjection/reanalysis when certain QC criteria are not met, loss of sample through breakage or spillage, etc.

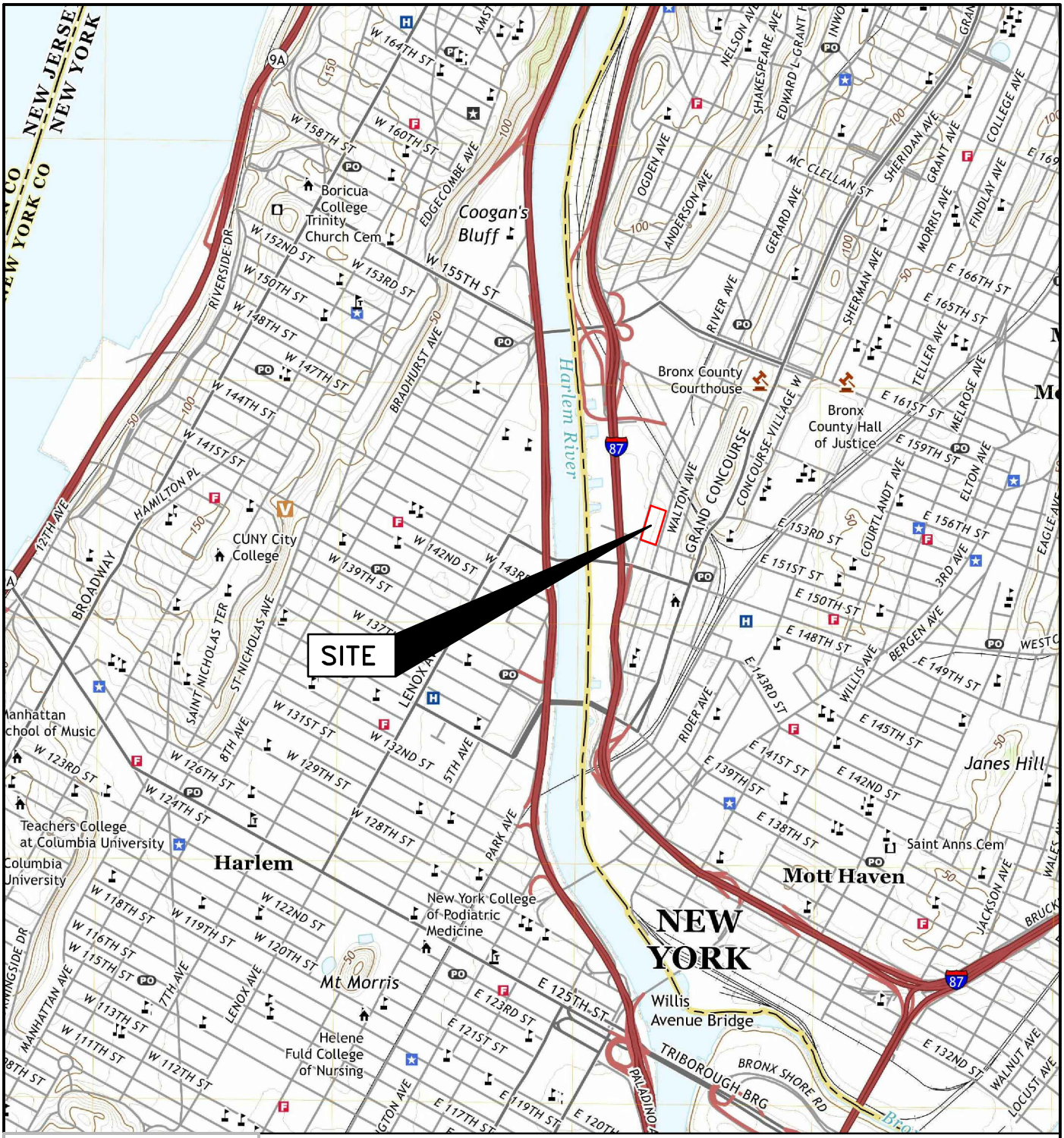
The analyst may identify the need for corrective action. The Laboratory Section Leader, in consultation with the staff, will approve the required corrective action to be implemented by the laboratory staff. The Laboratory QA Manager will ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be achieved, the QEP will be notified. The QEP will notify the Program Manager, who in turn will contact all levels of project management for concurrence with the proposed corrective action.

These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and the narrative data report

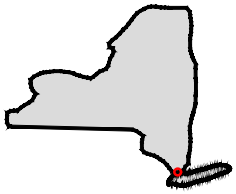
sent from the laboratory to the Program Manager. If the corrective action does not rectify the situation, the laboratory will contact the Program Manager, who will determine the action to be taken and inform the appropriate personnel.

If potential problems are not solved as an immediate corrective action, the contractor will apply formalized long-term corrective action, if necessary.

FIGURES



NEW YORK



QUADRANGLE LOCATION

SOURCE:

USGS TOPOGRAPHIC MAPS: CENTRAL PARK, NEW YORK, NEW JERSEY (2019). CONTOUR INTERVAL 10FT., NAVD-1988, ORIGINAL SCALE 1:24,000 (1IN.=2,000FT.).

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101 EAST 150TH STREET
BRONX, NEW YORK, 10451

PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

PREPARED FOR:
SUCCESS ACADEMY CHARTER SCHOOLS
95 PINE STREET, 6TH FLOOR
NEW YORK, NY 10005

SITE LOCATION MAP

PROJ MGR: RM	REVIEWED BY: SK	CHECKED BY: SK	FIGURE 1
DESIGNED BY: RM	DRAWN BY: JB	SCALE: 1"=2000'	
DATE: APRIL 2022	PROJECT NO. 41.0162951.10	REVISION NO. -	SHEET NO.

TABLES

Table 1 A
Soil Criteria Table
101 E. 150th Street
QAPP/FSP

Contaminant	Protection of Public Health					Protection of Ecological Resources[n]	Protection of Groundwater
	Unrestricted Use	Residential	Restricted-Residential	Commercial	Industrial		
All soil cleanup objectives (SCOs) are in parts per million (ppm); approximately equivalent to mg/kg.							
Metals							
Arsenic	13 [m]	16 [f]	17 [f]	18 [f]	19 [f]	13 [f]	16 [f]
Barium	350 [m]	350 [f]	400	400	10,000 [d]	433	820
Beryllium	7.2	14	72	590	2,700	10	47
Cadmium	2.5 [m]	2.5 [f]	4.3	9.3	60	4	7.5
Chromium, hexavalent [h]	1 [i]	22	110	400	800	1 [e]	19
Chromium, trivalent[h]	30 [m]	36	180	1,500	6,800	41	NS
Copper	50	270	270	270	10,000 [d]	50	1,720
Total Cyanide [h]	27	27	27	27	10,000 [d]	NS	40
Lead	63 [m]	400	400	1,000	3,900	63 [f]	450
Manganese	1600 [m]	2,000 [f]	2,000 [f]	10,000 [d]	10,000 [d]	1600 [f]	2,000 [f]
Total Mercury	0.18 [m]	0.81 [j]	0.81 [j]	2.8 [j]	5.7 [j]	0.18 [f]	0.73
Nickel	30	140	310	310	10,000 [d]	30	130
Selenium	3.9 [m]	36	180	1,500	6,800	3.9 [f]	4 [f]
Silver	2	36	180	1,500	6,800	2	8.3
Zinc	109 [m]	2200	10,000 [d]	10,000 [d]	10,000 [d]	109 [f]	2,480
PCBs/Pesticides							
2,4,5-TP Acid (Silvex)	3.8	58	100 [a]	500 [b]	1,000 [c]	NS	3.8
4,4'-DDE	0.0033 [l]	1.8	8.9	62	120	0.0033 [e]	17
4,4'-DDT	0.0033 [l]	1.7	7.9	47	94	0.0033 [e]	136
4,4'-DDD	0.0033 [l]	2.6	13	92	180	0.0033 [e]	14
Aldrin	0.005 [m]	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	0.02	0.097	0.48	3.4	6.8	0.04 [g]	0.02
beta-BHC	0.036	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	0.094	0.91	4.2	24	47	1.3	2.9
delta-BHC	0.04	100 [a]	100 [a]	500 [b]	1,000 [c]	0.04 [g]	0.25
Dibenzofuran	7	14	59	350	1,000 [c]	NS	210
Dieldrin	0.005 [m]	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	2.4	4.8 [i]	24 [i]	200 [i]	920 [i]	NS	102
Endosulfan II	2.4	4.8 [i]	24 [i]	200 [i]	920 [i]	NS	102
Endosulfan sulfate	2.4	4.8 [i]	24 [i]	200 [i]	920 [i]	NS	1,000 [c]
Endrin	0.014	2.2	11	89	410	0.014	0.06
Heptachlor	0.042	0.42	2.1	15	29	0.14	0.38
Lindane	0.1	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	0.1	1	1	1	25	1	3.2
Semivolatiles							
Acenaphthene	20	100 [a]	100 [a]	500 [b]	1,000 [c]	20	98
Acenapthylene	100 [k]	100 [a]	100 [a]	501 [b]	1,000 [c]	NS	107
Anthracene	100 [k]	100 [a]	100 [a]	502 [b]	1,000 [c]	NS	1,000 [c]
Benz(a)anthracene	1 [m]	1 [f]	1 [f]	5.6	11	NS	1 [f]
Benzo(a)pyrene	1 [m]	1 [f]	1 [f]	1 [f]	1.1	2.6	22
Benzo(b)fluoranthene	1 [m]	1 [f]	1 [f]	5.6	11	NS	1.7
Benzo(g,h,i)perylene	100	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]
Benzo(k)fluoranthene	0.8 [m]	1	3.9	56	110	NS	1.7
Chrysene	1 [m]	1 [f]	3.9	56	110	NS	1 [f]
Dibenz(a,h)anthracene	0.33 [l]	0.33 [e]	0.33 [e]	0.56	1.1	NS	1,000 [c]
Fluoranthene	100 [k]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]
Fluorene	30	100 [a]	100 [a]	500 [b]	1,000 [c]	30	386
Indeno(1,2,3-cd)pyrene	0.5 [m]	0.5 [f]	0.5 [f]	5.6	11	NS	8.2
m-Cresol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
Naphthalene	12	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	12
o-Cresol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
p-Cresol	0.33 [l]	34	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
Pentachlorophenol	0.8 [l]	2.4	6.7	6.7	55	0.8 [e]	0.8 [e]
Phenanthrene	100	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]
Phenol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	30	0.33 [e]
Pyrene	100	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]

Table 1 A
Soil Criteria Table
101 E. 150th Street
QAPP/FSP

Contaminant	Protection of Public Health					Protection of Ecological Resources[n]	Protection of Groundwater
	Unrestricted Use	Residential	Restricted-Residential	Commercial	Industrial		
All soil cleanup objectives (SCOs) are in parts per million (ppm); approximately equivalent to mg/kg.							
Volatiles							
1,1,1-Trichloroethane	0.68	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.68
1,1-Dichloroethane	0.27	19	26	240	480	NS	0.27
1,1-Dichloroethene	0.33	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.33
1,2-Dichlorobenzene	1.1	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1.1
1,2-Dichloroethane	0.02 [m]	2.3	3.1	30	60	10	0.02 [f]
cis-1,2-Dichloroethene	0.25	59	100 [a]	500 [b]	1,000 [c]	NS	0.25
trans-1,2-Dichloroethene	0.19	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.19
1,3-Dichlorobenzene	2.4	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	1.8	9.8	13	130	250	20	1.8
1,4-Dioxane	0.1 [l]	9.8	13	130	250	0.1 [e]	0.1 [e]
Acetone	0.05	100[a]	100[b]	500 [b]	1,000 [c]	2.2	0.05
Benzene	0.06	2.9	4.8	44	89	70	0.06
Butylbenzene	12	100[a]	100[a]	500 [b]	1,000 [c]	NS	12
Carbon tetrachloride	0.76	1.4	2.4	22	44	NS	0.76
Chlorobenzene	1.1	100[a]	100[a]	500 [b]	1,000 [c]	40	1.1
Chloroform	0.37	10	49	350	700	12	0.37
Ethylbenzene	1	30	41	390	780	NS	1
Hexachlorobenzene	0.33 [l]	0.33[e]	1.2	6	12	NS	3.2
Methyl ethyl ketone	0.12	100 [a]	100 [a]	500 [b]	1,000 [c]	100 [a]	0.12
Methyl tert-butyl ether	0.93	62	100 [a]	500 [b]	1,000 [c]	NS	0.93
Methylene chloride	0.05	51	100 [a]	500 [b]	1,000 [c]	12	0.05
n-Propylbenzene	3.9	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	3.9
sec-Butylbenzene	11	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	11
tert-Butylbenzene	5.9	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	5.9
Tetrachloroethene	1.3	5.5	19	150	300	2	1.3
Toluene	0.7	100 [a]	100 [a]	500 [b]	1,000 [c]	36	0.7
Trichloroethene	0.47	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	3.6	47	52	190	380	NS	3.6
1,3,5- Trimethylbenzene	8.4	47	52	190	380	NS	8.4
Vinyl chloride	0.02	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	0.26	100 [a]	100 [a]	500 [b]	1,000 [c]	0.26	1.6
Per-and Polyfluoroalkyl Substances (PFAs)[o]							
PFOA	0.00066	0.0066	0.033	0.5	0.6	NS	0.0011
PFOS	0.00088	0.0088	0.044	0.44	0.44	NS	0.0037

Notes:

[a] The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm.

[b] The SCOs for commercial use were capped at a maximum value of 500 ppm.

[c] The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm.

[d] The SCOs for metals were capped at a maximum value of 10,000 ppm.

[e] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

[f] For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.

[g] This SCO is derived from data on mixed isomers of BHC.

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

[i] This SCO is for the sum of endosulfan I, endosulfan II, and endosulfan sulfate.

[j] This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts).

[k] The SCOs for unrestricted use were capped at a maximum value of 100 ppm.

[l] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

[m] For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 1 SCO value for this use of the site.

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

[o] SCOs for PFAs are taken from the NYSDEC Sampling, Analysis, and Assessment of Per-and-Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs, dated June 2021.

Table 1B
Groundwater Criteria Table
101 E. 150th Street
QAPP/FSP

Contaminant	Aqueous Water Quality Standards[1], ug/L
Metals	
Antimony	3
Arsenic	---
Arsenic	25
Barium	1,000
Beryllium	3
Cadmium	5
Chromium, hexavalent	---
Chromium, trivalent	50
Copper	200
Cyanide	---
Iron	300
Lead	25
Magnesium	35,000
Manganese	300
Mercury	0.7
Nickel	100
Selenium	10
Silver	50
Sodium	20,000
Thallium	0.5
Zinc	2000
PCBs/Pesticides	
alpha-BHC	0.01
2,4,5-TP Acid (Silvex)	---
4,4'-DDD	0.3
4,4'-DDE	0.2
4,4'-DDT	0.2
Aldrin	---
beta-BHC	0.04
Chlordane (alpha)	---
Dibenzofuran	---
Dieldrin	0.004
Endosulfan I	0.12
Endosulfan II	0.12
Endosulfan sulfate	0.12
Endrin	---
Endrin aldehyde	5
Endrin ketone	5
gamma-BHC (Lindane)	0.05

Table 1B
Groundwater Criteria Table
101 E. 150th Street
QAPP/FSP

Contaminant	Aqueous Water Quality Standards[1], ug/L
PCBs/Pesticides, Con't.	
gamma-Chlordane	0.12
Heptachlor	0.04
Heptachlor epoxide	0.03
Lindane	---
Methoxychlor	35
Polychlorinated biphenyls	---
Toxaphene	0.06
Semivolatiles	
1,1'-Biphenyl	5
2,2'-oxybis(1-Chloropropane)	5
2,4,5-Trichlorophenol	1
2,4-Dichlorophenol	1
2,4-Dimethylphenol	50
2,4-Dinitrophenol	10
2,4-Dinitrotoluene	5
2,6-Dinitrotoluene	5
2-Chloronaphthalene	10
2-Chlorophenol	1
2-Methylnaphthalene	502
2-Methylphenol	1
2-Nitroaniline	5
2-Nitrophenol	1
3,3'-Dichlorobenzidine	5
3-Nitroaniline	5
4-Chloro-3-methylphenol	1
4-Chloroaniline	5
4-Methylphenol	1
4-Nitroaniline	5
4-Nitrophenol	1
Acenaphthene	20
Acenapthylene	202
Anthracene	50
Atrazine	7.5
Benz(a)anthracene	0.002
Benzo(a)pyrene	---
Benzo(b)fluoranthene	0.002
Benzo(g,h,i)perylene	52
Benzo(k)fluoranthene	0.002
bis(2-Chloroethoxy)methane	5

Table 1B
Groundwater Criteria Table
101 E. 150th Street
QAPP/FSP

Contaminant	Aqueous Water Quality Standards[1], ug/L
Semivolatiles, Con't.	
Bis(2-Chloroethyl)ether	1
bis(2-Ethylhexyl)phthalate	5
Butylbenzylphthalate	50
Chrysene	0.002
Dibenz(a,h)anthracene	502
Dibenzofuran	52
Diethylphthalate	50
Dimethylphthalate	50
Di-n-butylphthalate	50
Di-n-octylphthalate	50
Fluoranthene	50
Fluorene	50
Hexachlorobenzene	0.04
Hexachlorobutadiene	0.5
Hexachlorocyclopentadiene	5
Hexachloroethane	5
Indeno(1,2,3-cd)pyrene	0.002
Isophorone	50
m-Cresol	---
Naphthalene	10
Nitrobenzene	0.4
N-Nitrosodiphenylamine	50
o-Cresol	---
p-Cresol	---
Pentachlorophenol	1
Phenanthrene	50
Phenol	1
Pyrene	50
Volatiles	
1,1,1-Trichloroethane	5
1,1,2,2-Tetrachloroethane	5
1,1,2-Trichloro-1,2,2-trifluoroethane	5
1,1,2-Trichloroethane	1
1,1-Dichloroethane	5
1,1-Dichloroethene	5
1,1-Dichloroethylene	---
1,2,4-Trichlorobenzene	---

Table 1B
Groundwater Criteria Table
101 E. 150th Street
QAPP/FSP

Contaminant	Aqueous Water Quality Standards[1], ug/L
Volatiles, Con't.	
1,2,4-Trimethylbenzene	5
1,2-Dibromo-3-chloropropane	0.04
1,2-Dibromoethane	0.0006
1,2-Dichlorobenzene	3
1,2-Dichloroethane	0.6
1,2-Dichloropropane	1
1,3,5- Trimethylbenzene	---
1,3-Butadiene	---
1,3-Dichlorobenzene	3
1,3-Dichlorobenzene	---
1,4-Dichlorobenzene	3
1,4-Dichlorobenzene	---
1,4-Dioxane	1[2]
2-Butanone	50
2-Hexanone	50
4-Methyl-2-pentanone	502
Acetone	50
Benzene	1
Bromodichloromethane	50
Bromoform	50
Bromomethane	5
Butylbenzene	---
Carbon Disulfide	60
Carbon tetrachloride	5
Chlorobenzene	5
Chloroethane	5
Chloroform	7
Chloromethane	5
Cis- 1,3-Dichloropropene	0.4
cis-1,2-Dichloroethene	5
cis-1,2-Dichloroethylene	---
Cyclohexane	---
Dibromochloromethane	50
Dichlorodifluoromethane	5
Ethyl Acetate	---
Ethylbenzene	5
Freon 113	---
Hexachlorobenzene	---

Table 1B
Groundwater Criteria Table
101 E. 150th Street
QAPP/FSP

Contaminant	Aqueous Water Quality Standards[1], ug/L
Volatiles, Con't.	
Hexachlorobutadiene	---
Hexane	---
Isopropylbenzene	5
m,p-Xylene	---
m-Dichlorobenzene	---
Methyl Acetate	NS
Methyl ethyl ketone	---
Methyl Isobutyl Ketone	---
Methyl tert-butyl ether	10
Methylcyclohexane	---
Methylene chloride	5
n-Propylbenzene	---
o-Dichlorobenzene	---
o-Xylene	---
p-Dichlorobenzene	---
sec-Butylbenzene	---
Styrene	5
tert-Butylbenzene	---
Tertiary Butyl Alcohol	---
Tetrachloroethene	5
Toluene	5
trans-1,2-Dichloroethene	5
trans-l,3-Dichloropropene	0.4
Trichloroethene	5
Trichlorofluoromethane	5
Vinyl Acetate	---
Vinyl Chloride	2
Xylene (mixed)	5
Per- and Polyfluoroalkyl Substances (PFAS)	
PFOA	0.01[2]
PFOS	0.01[2]

Notes:

[1] - Division of Water Technical and Operational Guidance Values (TOGS) Ambient Water Quality Standards and Guidance Values (AWQS), ug/L

[2] - Guidance value for 1,4-Dioxane, PFOA, and PFOS is from the NYSDEC Guidance to Regulate PFOA, PFOS, and 1,4-Dioxane in State Waters, dated October 5, 2021

ug/L - micro gram per liter

Table 1C
Soil Vapor Criteria Table
101 E. 150th Street
QAPP/FSP

Volatile Organics in Air	CAS No.	NYSDOH Soil Vapor Intrusion Guidance Criteria				Toxicity	Decision Matrix
		1	2	3	4		I or II
1,1,1-Trichloroethane	71556	2.5	20.6	-	-	L	II
1,1,2,2-Tetrachloroethane	79345	0.4	-	-	-	M	TD
1,1,2-Trichloroethane	79005	0.4	<1.5	-	-	H	TD
1,1-Dichloroethane	75343	0.4	<0.7	-	-	L	TD
1,1-Dichloroethene	75354	0.4	<1.4	-	-	M	II
1,2,4-Trichlorobenzene	120821	0.5	<6.8	-	-	NA	TD
1,2,4-Trimethylbenzene	95636	9.8	9.5	-	-	NA	TD
1,2-Dibromoethane	106934	0.4	<1.5	-	-	H	TD
1,2-Dichlorobenzene	95501	0.5	<1.2	-	-	M	TD
1,2-Dichloroethane	107062	0.4	<0.9	-	-	H	TD
1,2-Dichloropropane	78875	0.4	<1.6	-	-	M	TD
1,3,5-Trimethybenzene	108678	3.9	3.7	-	-	M	TD
1,3-Butadiene	106990	-	<3.0	-	-	H	TD
1,3-Dichlorobenzene	541731	0.5	<2.4	-	-	M	TD
1,4-Dichlorobenzene	106467	1.2	5.5	344	-	M	TD
1,4-Dioxane	123911	-	-	-	-	M	TD
2,2,4-Trimethylpentane	540841	5	-	-	-	M	TD
2-Butanone	78933	16	12	-	-	M	TD
2-Hexanone	591786	-	-	-	-	NA	TD
3-Chloropropene	107051	-	-	-	-	M	TD
4-Ethyltoluene	622968	-	3.6	-	-	NA	TD
4-Methyl-2-pentanone	108101	1.9	6	-	-	M	TD
Acetone	67641	115	98.9	45.8	-	L	TD
Benzene	71432	13	9.4	10	-	H	TD
Benzyl chloride	100447	-	<6.8	-	-	H	TD
Bromodichloromethane	75274	-	-	-	-	M	TD
Bromoform	75252	-	-	-	-	M	TD
Bromomethane	74839	0.5	<1.7	-	-	M	TD
Carbon disulfide	75150	-	4.2	-	-	M	TD
Carbon tetrachloride	56235	1.3	<1.3	1.1	-	H	I
Chlorobenzene	108907	0.4	<0.9	-	-	M	TD
Chloroethane	75003	0.4	<1.1	-	-	L	TD
Chloroform	67663	1.2	1.1	6.34	-	H	TD
Chloromethane	74873	4.2	3.7	-	-	M	TD
cis-1,2-Dichloroethene	156592	0.4	<1.9	-	-	M	II
cis-1,3-Dichloropropene	10061015	0.4	<2.3	-	-	NA	TD
Cyclohexane	110827	6.3	-	-	-	L	TD

Table 1C
Soil Vapor Criteria Table
101 E. 150th Street
QAPP/FSP

Volatile Organics in Air	CAS No.	NYSDOH Soil Vapor Intrusion Guidance Criteria				Toxicity	Decision Matrix
		1	2	3	4		I or II
Dibromochloromethane	124481	-	-	-	-	NA	TD
Dichlorodifluoromethane	75718	10	16.5	-	-	NA	TD
Ethanol	64175	1300	210	-	-	L	TD
Ethyl Acetate	141786	-	5.4	-	-	M	TD
Ethylbenzene	100414	6.4	5.7	7.62	-	M	TD
Freon-113	76131	2.5	3.5	-	-	L	TD
Freon-114	76142	0.4	<6.8	-	-	NA	TD
Heptane	142825	18	-	-	-	M	TD
Hexachlorobutadiene	87683	0.5	<6.8	-	-	M	TD
Isopropanol	67630	-	-	-	-	M	TD
Methyl tert butyl ether	1634044	14	11.5	36	-	M	TD
Methylene chloride	75092	16	10	7.5	60	NA	TD
n-Hexane	110543	14	10.2	-	-	M	TD
o-Xylene	95476	7.1	7.9	7.24	-	M	TD
p/m-Xylene	179601231	11	22.2	22.2	-	M	TD
Styrene	100-42-5	1.4	1.9	5.13	-	M	TD
Tertiary butyl Alcohol	75-65-0	-	-	-	-	NA	TD
Tetrachloroethene (PCE)	127184	2.5	15.9	6.01	30	H	II
Tetrahydrofuran	109999	0.8	-	-	-	M	TD
Toluene	108883	57	43	39.8	-	L	TD
trans-1,2-Dichloroethene	156605	-	-	-	-	NA	TD
trans-1,3-Dichloropropene	10061026	NC	<1.3	-	-	NA	TD
Trichloroethene	79016	0.5	4.2	1.36	2	H	I
Trichlorofluoromethane	75694	12	18.1	-	-	L	TD
Vinyl bromide	593602	-	-	-	-	H	TD
Vinyl chloride	75014	0.4	<1.9	-	-	H	I

Notes

Decision Criteria used:

Martix I: Sub-Slab >5, Indoor Air >5

Martix II: Sub-Slab >100, Indoor Air >30

Toxicities from DAR-1 Appendix C/SCG/ACG

(H) HIGH Toxicity Contaminant.

(M) MODERATE Toxicity Contaminant.

(L) LOW Toxicity Contaminant.

ND - Non-detect

NA - Not applicable

NFA - No further action

TD - To be determined based on the NYSDOH VI Decision

easonable - Take reasonable/practical actions to identify source/reduce exposure

NYSDOH Soil Vapor Intrusion Guidance Criteria

1 - Table C-1 2003 Upper Fence Study of Volatile Organic Chemicals in air of Fuel Oil Heated Homes for Indoor Air

2 - Table C-2 2001 USEPA BASE 90th Percentile for Indoor Air

3 -Table C-5 2005 Health Effects Institute 95th Percentile for Indoor Air

4 -NYSDOH Air Guidance Value

NYSDOH Specific Compounds for Matrix Eval

Table 2
Typical Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements
101 E. 150th Street
QAPP/FSP

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4]
Soil	VOCs (TCL)	Discrete	74	SW-846 Method 8260C/5035	1 - Methanol, 2 - Water; Cool to 4° C; no headspace	14 days to analysis	(3) Vial
Soil	VOCs with Tentatively Identified Compounds (TICs) (TCL)	Discrete	8	SW-846 Method 8260C/5035	1 - Methanol, 2 - Water; Cool to 4° C; no headspace	14 days to analysis	(3) Vial
Soil	PCBs	Composite	52	SW-846 Method 8082A	Cool to 4^0 C	365 days to analysis	(1) 250 mL amber glass jar
Soil	Pesticides (TCL)	Composite	52	SW-846 Method 8081A	Cool to 4^0 C	14 days to extraction	(1) 250 mL amber glass jar
Soil	SVOCs (TCL)	Composite	74	SW-846 Method 8270D	Cool to 4° C	14 days to extraction	(1) 250 mL amber glass jar
Soil	SVOCs with TICs (TCL)	Composite	8	SW-846 Method 8270D	Cool to 4° C	14 days to extraction	(1) 250 mL amber glass jar
Soil	1,4-Dioxane	Composite	8	SW-846 Method 8270D	Cool to 4° C	7 days to extraction	(2) 250 mL amber glass jars
Soil	Metals (TAL)	Composite	82	SW-846 Method 6010DSeries	Cool to 4^0 C	180 days to analysis	(1) 60 mL glass jar
Soil	Mercury	Composite	52	SW-846 Method 7471B	Cool to 4^0 C	28 days to analysis	(1) 60 mL glass jar
Soil	Cyanide	Composite	52	SW-846 Method 9010C/9012B	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Soil	Herbicides	Composite	52	SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction	(1) 250 mL amber glass jar
Soil	PFAs	Composite	8	LCMSMS-Isotope Dilution	Cool to 4^0 C	14 Days	(1) 250 mL plastic container
Groundwater	VOCs (TCL)	Grab	5	SW-846 Method 8260C	HCl; Cool to 4^0 C; no headspace	14 days to analysis	(3) Vial
Groundwater	VOCs with TICs, including 1,4-Dioxane (TCL)	Grab	4	SW-846 Method 8260C	HCl; Cool to 4^0 C; no headspace	14 days to analysis	(3) Vial
Groundwater	1,4-Dioxane	Grab	4	SW-846 Method 8270D	Cool to 4^0 C	7 days to analysis	(2) 250 mL amber glass jar
Groundwater	SVOCs (TCL)	Grab	5	SW-846 Method 8270D	Cool to 4^0 C	7 days to extraction	(2) 250 mL amber glass jar
Groundwater	SVOCs with TICs (TCL)	Grab	4	SW-846 Method 8270D	Cool to 4^0 C	7 days to extraction	(2) 250 mL amber glass jar
Groundwater	Metals- total (TAL)	Grab	9	SW-846 Method 6020B/7470A Series	HNO_3; Cool to 4° C	28 days to analysis for Hg; 180 days to analysis for other	(1) 500 mL plastic container
Groundwater	Metals-dissolved (TAL)	Grab	9	SW-846 Method 6020B/7470A Series	HNO3; Cool to 4° C	28 days to analysis for Hg; 180 days to analysis for other metals	(1) 500 mL plastic container
Groundwater	Pesticides (TCL)	Grab	9	SW-846 Method 8081B	Cool to 4^0 C	7 days to extraction	(2) 120 mL amber glass jar
Groundwater	Herbicides (TCL)	Grab	9	SW-846 Method 8151A	Cool to 4^0 C	7 days to extraction	(2) 1000 mL amber glass jar
Groundwater	PCBs	Grab	9	SW-846 Method 8082A	Cool to 4^0 C	365 days to analysis	(1) 250 mL amber glass jar
Groundwater	Cyanide	Grab	9	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Groundwater	Mercury	Grab	9	SW-846 Method 7470 A	HNO3; Cool to 4° C	28 days to analysis	(1) 250 mL plastic container
Groundwater	PFAs	Grab	4	LCMSMS-Isotope Dilution	Cool to 4^0 C	14 Days	(1) 250 mL plastic container
Soil Gas	VOCs	Grab	6	EPA Method TO-15	None	14 days to analysis	(1) Evacuated 6-Liter SUMMA® canister

Notes:
[1] For soil samples, a six-inch sampling interval is the preferred sample size; however, sample volume recovery, analytical method requirements, and field conditions can affect the actual sample interval size. For these reasons, the actual sampling interval may change in order to obtain adequate volume.

[2] Actual number of samples may vary depending on field conditions, sample material availability, and field observations. See Remedial Work Plan for estimates.

[3] Holding times listed are method holding time calculated from time of collection and not NYSDEC ASP holding times.

[4] MS/MSDs require duplicate volume for all parameters for solid matrices; MS/MSDs require triplicate volume for organic parameters for aqueous matrices and duplicate volume for inorganic parameters for aqueous matrices

Table 3
Typical Laboratory Data Quality Objectives
Soil Samples
101 E. 150th Street
QAPP/FSP

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs (TCL)	SW-846 Methods 8260B/5035	Soil	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Dibromofluoromethane 70-130 Toluene-d8 70-130 2-Chloroethoxyethane 70-130 Matrix Spikes 30-151% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 30 per matrix type	Field Duplicates RPD <30 MS/MSDs (RPD) RPD <30	Field Duplicates: One per 20 per soils MS/MSDs: One per 30 per matrix type
VOCs with Tentatively Identified Compounds (TICs)	SW-846 Method 8260C	Soil	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Dibromofluoromethane 70-130 Toluene-d8 70-130 Matrix Spikes 36-162 % recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <30 MS/MSDs RPD RPD<30	Field Duplicates: One per 20 MS/MSDs: One per 20
PCBs	SW-846 Method 8082A	Soil	Surrogates % Rec. 2,4,5,6-Tetrachloro-m-xylene 30-150 Decachlorobiphenyl 30-150 Matrix Spikes 40-140% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
SVOCs	SW-846 Method 8270D	Soil	Surrogates % Rec. Phenol-d6 10-120 2-Fluorophenol 25-120 2,4,6-Tribromophenol 10-136 Nitrobenzene-d5 23-120 2-Fluorobiphenyl 30-120 4-Terphenyl-d14 18-120 Matrix Spikes 14-144% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 50 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD)	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
SVOCs with TICs	SW-846 Method 8270D	Soil	Surrogates % Rec. Phenol-d5 10-120 2-Fluorophenol 21-120 2,4,6-Tribromophenol 10-120 Nitrobenzene-d5 23-120 2-Fluorobiphenyl 15-120 4-Terphenyl-d14 41-149 Matrix Spikes 14-144%	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <50 MS/MSDs RPD RPD<50	Field Duplicates: One per 20 MS/MSDs: One per 20
1,4-Dioxane	SW-846 Method 8270D	Soil	Surrogates % Rec. 1,4-Dioxane-d8 15-110 Matrix Spikes 40-140% recovery	Surrogates: All samples, standards, QC samples	Field Duplicates RPD <30 MS/MSDs (RPD) RPD<30	Field Duplicates: One per 20 per soils MS/MSDs: One per 20
Pesticides (TCL)	SW-846 Method 8081A	Soil	Surrogates % Rec. Decachlorobiphenyl 30-150 Tetrachloro-m-xylene 30-150 Matrix Spikes 30-150% Recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Total Petroleum Hydrocarbons	SW-846 Method 8015B	Soil	Surrogates % Rec. o-Terphenyl 27-153 Tetracosane-d50 28-148 5α-androstane 27-148 TPH-DRO 10-149	Surrogates: All samples, standards, QC samples One per 20 per matrix type	Field Duplicates RPD <50 TPH-DRO 44	Field Duplicates: One per 20 per soils One per 20 per matrix type
Herbicides	SW-846 Method 8151A	Soil	Surrogates % Rec. 2,4-DCAA 30-150 Matrix Spikes 30-150% Recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Metals (TAL)	SW-846 Method 6010D	Soil	Surrogates % Rec. Matrix Spikes 75-125% recovery	Surrogates: Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <20 MS/MSDs (RPD) RPD <20	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type

Table 3
Typical Laboratory Data Quality Objectives
Soil Samples
101 E. 150th Street
QAPP/FSP

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
PFAs	LCMSMS- Isotope Dilution	Soil	Surrogates % Rec. Perfluoro[13C4]Butanoic Acid (MPFBA) 61-135 Perfluoro[13C4]Butanoic Acid (MPFBA) 58-132 Perfluoro[13C5]Pentanoic Acid (M5PFPEA) 62-163 Perfluoro[13C5]Pentanoic Acid (M5PFPEA) 58-150 Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS) 70-131 Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS) 74-139 Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA) 57-129 Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA) 66-128 Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA) 60-129 Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA) 71-129 Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS) 71-134 Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS) 78-139 Perfluoro[13C8]Octanoic Acid (M8PFOA) 62-129 Perfluoro[13C8]Octanoic Acid (M8PFOA) 75-130 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS) 14-147 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS) 20-154 Perfluoro[13C9]Nonanoic Acid (M9PFNA) 59-139 Perfluoro[13C9]Nonanoic Acid (M9PFNA) 72-140 Perfluoro[13C8]Octanesulfonic Acid (M8PFOS) 79-136 Perfluoro[13C8]Octanesulfonic Acid (M8PFOS) 69-131 Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA) 75-130 Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA) 62-124 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS) 19-175 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS) 10-162 N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA) 24-116 N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA) 31-134 Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) 61-155 Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) 55-137 Perfluoro[13C8]Octanesulfonamide (M8FOSA) 10-112 Perfluoro[13C8]Octanesulfonamide (M8FOSA) 10-117 N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA) 34-137 N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA) 27-126 Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA) 48-131 Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA) 54-150 Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA) 22-136 Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA) 24-159 Matrix Spikes 46-182% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <30 MS/MSDs (RPD) RPD <30	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Mercury	SW-846 Method 7471B	Soil	Surrogates % Rec. Matrix Spikes 80-125% recovery	Surrogates: Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <20 MS/MSDs (RPD) RPD <20	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Cyanide	SW-846 Method 9012A	Soil	Surrogates % Rec. Matrix Spikes 75-125% Recovery	Surrogates: Matrix Spikes: One per 35 per matrix type	Field Duplicates RPD <35 MS/MSDs (RPD) RPD <35	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type

Recovery criteria for laboratory control samples must be at least as stringent as MS/MSD criteria.
Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.

Table 4
Typical Laboratory Data Quality Objectives
Groundwater Samples
101 E. 150th Street
QAPP/FSP

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs (TCL)	SW-846 Method 8260C	Groundwater	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Dibromofluoromethane 70-130 Toluene-d8 70-130 Matrix Spikes 36-162 % recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <20 MS/MSDs RPD RPD <20	Field Duplicates: One per 20 MS/MSDs: One per 20
VOCs with Tentatively Identified Compounds (TICs)	SW-846 Method 8260C	Groundwater	Surrogates % Rec. 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Dibromofluoromethane 70-130 Toluene-d8 70-130 Matrix Spikes 36-162 % recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <20 MS/MSDs RPD RPD <20	Field Duplicates: One per 20 MS/MSDs: One per 20
SVOCs TCL	SW-846 Method 8270D	Groundwater	Surrogates % Rec. Phenol-d5 10-120 2-Fluorophenol 21-120 2,4,6-Tribromophenol 10-120 Nitrobenzene-d5 23-120 2-Fluorobiphenyl 15-120 4-Terphenyl-d14 41-149 Matrix Spikes 14-144%	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <50 MS/MSDs RPD RPD <50	Field Duplicates: One per 20 MS/MSDs: One per 20
SVOCs with TICs	SW-846 Method 8270D	Groundwater	Surrogates % Rec. Phenol-d5 10-120 2-Fluorophenol 21-120 2,4,6-Tribromophenol 10-120 Nitrobenzene-d5 23-120 2-Fluorobiphenyl 15-120 4-Terphenyl-d14 41-149 Matrix Spikes 14-144%	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates: RPD <50 MS/MSDs RPD RPD <50	Field Duplicates: One per 20 MS/MSDs: One per 20
1,4-Dioxane	SW-846 Method 8270D	Groundwater	Surrogates % Rec. 1,4-Dioxane-d8 15-110 Matrix Spikes 40-140% recovery	Surrogates: All samples, standards, QC samples	Field Duplicates RPD <30 Matrix Duplicates RPD<30	Field Duplicates: One per 20 per soils MS/MSDs: One per 20
Metals (Total and Dissolved)	SW-846 Methods 6020B	Groundwater	Matrix Spikes 75-125% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <20 Matrix Duplicates RPD <20	Field Duplicates: One per 20 MS/MSDs: One per 20
Mercury (Total and Dissolved)	SW-846 Methods 7470A	Groundwater	Matrix Spikes 75-125% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <35 (dissolved) RPD<20 (Total) Matrix Duplicates RPD <35 (dissolved) RPD<20 (Total)	Field Duplicates: One per 20 MS/MSDs: One per 20
PCBs	SW-846 Method 8082A	Groundwater	Surrogates % Rec. 2,4,5,6-Tetrachloro-m-xylene 30-150 Decachlorobiphenyl 30-150 Matrix Spikes 40-140% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 MS/MSDs: One per 20 per matrix type
Herbicides	SW-846 Method 8151A	Groundwater	Surrogates % Rec. 2,4-DCAA 30-150 Matrix Spikes 30-150% Recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates: RPD <50 MS/MSDs (RPD) RPD<50	Field Duplicates: One per 20 MS/MSDs: One per 20 per matrix type

Table 4
Typical Laboratory Data Quality Objectives
Groundwater Samples
101 E. 150th Street
QAPP/FSP

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
Pesticides (TCL)	SW-846 Method 8081B	Groundwater	Surrogates % Rec. Decachlorobiphenyl 15-142 2,4,5,6-Tetrachloro-m-xylene 36-126 Matrix Spikes 30-150% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20	Field Duplicates RPD <30 MS/MSDs RPD RPD <30	Field Duplicates: One per 20 MS/MSDs: One per 20
PFAs	LCMSMS-Isotope Dilution	Grounwater	Surrogates Perfluoro[13C4]Butanoic Acid (MPFBA) Perfluoro[13C4]Butanoic Acid (MPFBA) Perfluoro[13C5]Pentanoic Acid (M5PFPEA) Perfluoro[13C5]Pentanoic Acid (M5PFPEA) Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS) Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS) Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA) Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA) Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA) Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA) Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS) Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS) Perfluoro[13C8]Octanoic Acid (M8PFOA) Perfluoro[13C8]Octanoic Acid (M8PFOA) 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2- 1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2- Perfluoro[13C9]Nonanoic Acid (M9PFNA) Perfluoro[13C9]Nonanoic Acid (M9PFNA) Perfluoro[13C8]Octanesulfonic Acid (M8PFOS) Perfluoro[13C8]Octanesulfonic Acid (M8PFOS) Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA) Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA) 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2- 1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2- N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA) Perfluoro[13C8]Octanesulfonamide (M8FOSA) Perfluoro[13C8]Octanesulfonamide (M8FOSA) N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5- N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5- Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA) Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA) Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA) Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA) Matrix Spikes 46-182% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <30 MS/MSDs (RPD) RPD <30	Field Duplicates: One per 20 MS/MSDs: One per 20 per matrix
Cyanide	EPA Method 9012B	Groundwater	 Matrix Spikes 75-125% recovery	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 35	Field Duplicates RPD <35 Matrix Duplicates RPD <35	Field Duplicates: One per 20 Matrix Duplicates: One per 20

Recovery criteria for laboratory control samples must be at least as stringent as MS/MSD criteria.

Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.

Table 5
Typical Laboratory Data Quality Objectives
Soil Gas Samples
101 E. 150th Street
QAPP/FSP

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs	EPA Method TO-15	Soil Gas	Surrogates % Rec. 4-Bromofluorobenzene 78-124	Surrogates: All samples, standards, QC samples	Matrix Duplicates RPD £30	Matrix Duplicates One per 20

Table 6
QC Sample Preservation and Container Requirements
101 E. 150th Street
QAPP/FSP

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples	EPA Analytical Method	Sample Preservation	Holding Time[1]	Sample Container
Soil	VOCs (TCL)	Discrete	4	SW-846 Method 8260C/5035	1 - Methanol, 2 - Water; Cool to 4° C; no headspace	14 days to analysis	(3) Vial Preserved
Soil	VOCs with Tentatively Identified Compounds (TICs) (TCL)	Discrete	1	SW-846 Method 8260C/5035	1 - Methanol, 2 - Water; Cool to 4° C; no headspace	14 days to analysis	(3) Vial Preserved
Soil	PCBs	Composite	3	SW-846 Method 8082A	Cool to 4^0 C	365 days to analysis	(1) 250 mL amber glass jar
Soil	Pesticides (TCL)	Composite	3	SW-846 Method 8081A	Cool to 4^0 C	14 days to extraction	(1) 250 mL amber glass jar
Soil	SVOCs (TCL)	Composite	4	SW-846 Method 8270D	Cool to 4° C	14 days to extraction	(1) 250 mL amber glass jar
Soil	SVOCs with TICs (TCL)	Composite	1	SW-846 Method 8270D	Cool to 4° C	14 days to extraction	(1) 250 mL amber glass jar
Soil	1,4-Dioxane	Composite	1	SW-846 Method 8270D	Cool to 4° C	7 days to extraction	(2) 250 mL amber glass jars
Soil	Metals (TAL)	Composite	5	SW-846 Method 6010DSeries	Cool to 4^0 C	180 days to analysis	(1) 60 mL glass jar
Soil	Mercury	Composite	3	SW-846 Method 7471B	Cool to 4^0 C	28 days to analysis	(1) 60 mL glass jar
Soil	Cyanide	Composite	3	SW-846 Method 9010C/9012B	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Soil	Herbicides	Composite	3	SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction	(1) 250 mL amber glass jar
Soil	Pesticides	Composite	3	SW-846 Method 8141A[6]	Cool to 4^0 C	14 days to extraction	(1) 300 mL amber glass jar
Soil	PFAs	Composite	1	LCMSMS-Isotope Dilution	Cool to 4^0 C	14 Days	(1) 250 mL plastic container

Table 6
QC Sample Preservation and Container Requirements
101 E. 150th Street
QAPP/FSP

Groundwater	VOCs (TCL)	Grab	1	SW-846 Method 8260C	HCl; Cool to 4^0 C; no headspace	14 days to analysis	(3) Vial
Groundwater	VOCs with TICs, including 1,4-Dioxane (TCL)	Grab	1	SW-846 Method 8260C	HCl; Cool to 4^0 C; no headspace	14 days to analysis	(3) Vial
Groundwater	1,4-Dioxane	Grab	1	SW-846 Method 8270D	Cool to 4^0 C	7 days to analysis	(2) 250 mL amber glass jar
Groundwater	SVOCs (TCL)	Grab	1	SW-846 Method 8270D	Cool to 4^0 C	7 days to extraction	(2) 250 mL amber glass jar
Groundwater	SVOCs with TICs (TCL)	Grab	1	SW-846 Method 8270D	Cool to 4^0 C	7 days to extraction	(2) 250 mL amber glass jar
Groundwater	Metals- total (TAL)	Grab	1	SW-846 Method 6020B/7470A Series	HNO_3; Cool to 4° C	28 days to analysis for Hg; 180 days to analysis for other metals	(1) 500 mL plastic container
Groundwater	Metals-dissolved (TAL)	Grab	1	SW-846 Method 6020B/7470A Series	HNO3; Cool to 4° C	28 days to analysis for Hg; 180 days to analysis for other metals	(1) 500 mL plastic container
Groundwater	Pesticides (TCL)	Grab	1	SW-846 Method 8081B	Cool to 4^0 C	7 days to extraction	(2) 120 mL amber glass jar
Groundwater	Herbicides (TCL)	Grab	1	SW-846 Method 8151A	Cool to 4^0 C	7 days to extraction	(2) 1000 mL amber glass jar
Groundwater	PCBs	Grab	1	SW-846 Method 8082A	Cool to 4^0 C	365 days to analysis	(1) 250 mL amber glass jar
Groundwater	Cyanide	Grab	1	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 250 mL amber glass jar
Groundwater	Mercury	Grab	1	SW-846 Method 7470 A	HNO3; Cool to 4° C	28 days to analysis	(1) 250 mL plastic container
Groundwater	PFAs	Grab	1	LCMSMS-Isotope Dilution	Cool to 4^0 C	14 Days	(1) 250 mL plastic container
Soil Gas	VOCs	Grab	1	EPA Method TO-15	None	14 days to analysis	(1) Evacuated 6-Liter SUMMA® canister

Notes:
1 Holding times listed are method holding time calculated from time of collection and not NYSDEC ASP holding times.

ATTACHMENTS

RESUME

Chunhua Liu

Senior Technical Specialist

Summary of Experience

Dr. Liu is a senior chemist with more than 10 years of experience in analytical chemistry, data validation and management, and quality control and quality assurance for remedial investigations and remedial actions. Her experience includes laboratory chemical analysis, EPA Region I and Region II data validation and data usability evaluation, data usability evaluation for Massachusetts Contingency Plan (MCP), sampling and analysis plan development in accordance with the NYSDEC Analytical Service Protocol and Massachusetts Compendium of Quality Assurance and Quality Control Requirements (QA/QC) and Performance Standards for Selected Analytical Methods, and quality control and quality assurance for Superfund and MCP projects.

Dr. Liu majored in environmental chemistry and during her doctoral study at Harvard School of Public Health, she researched analytical methods for sediment and evaluated metal fate and transport in sediment. Dr. Liu worked at Parsons for over seven years and at Gradient for one year before joining GZA. At Parsons, Dr. Liu led the quality control and assurance and data management efforts from developing Quality Assurance Project Plan (QAPP) to assuring implementation of QA/QC requirements and from field sampling preparation and arrangement to chemical data management. Dr. Liu was responsible for the QA/QC and data validation and data usability evaluation for a 10,000-acre BRAC and Superfund NPL site in New York and assisted in the successful transfer of over 8,000 acres of land. Dr. Liu performed data usability evaluation for various Massachusetts Contingency Plan sites at Gradient and GZA.

Relevant Project Experience

Senior Technical Specialist - Leads GZA human health risk assessment efforts for federal and state level superfund and MCP projects. Dr. Liu is also responsible for data usability evaluation for various projects.

Technical Director - Directed preparation and submittal of the Site-Wide Sampling and Analysis Plan (SAP) and the Site-Wide Quality Assurance Project Plan (QAPP) for a 10,000-acre Superfund site in New York in accordance with the Department of Defense (DOD), NYSDEC ASP, EPA Region II and EPA guidance. Directed project field sampling and data management. Supervised data validation in accordance with EPA Region II SOPs and NYSDEC ASP based on the NYSDEC ASP Category B deliverables. Identified laboratories qualified for project chemical analyses and interfaced with various analytical laboratories to address analytical deficiencies. Submitted data summary report to EPA Region II on a quarterly basis.

Lead Chemist and Risk Assessor- Led data usability evaluation and supported the successful closure of a 125-acre Hingham Annex Guaranteed Fixed Price Remediation Project. Dr. Liu also led the risk assessment effort and the effort of evaluating pesticide fate and transport at the site and successfully demonstrated that the pesticide conditions at the site were related to the past normal use of pesticides and therefore were not associated with the release at the Site.

Technical Director - Directed preparation and submittal of the SAP and the QAPP for various Formerly Used Defense (FUD) Sites. Supervised field sampling and data validation in accordance with guidance from various EPA regions. Reviewed data validation and data usability report.

Education

B.E., 1992, Environmental Engineering, Tsinghua University, Beijing, China
M.E., 1995, Environmental Engineering, Tsinghua University, Beijing, China
M.S., 1998, Environmental Health, Harvard School of Public Health
D.S., 2000, Environmental Chemistry, Harvard School of Public Health

Affiliations

- Member, LSP Association
- Member, Society for Risk Analysis
- Certified EIT in Massachusetts

Areas of Specialization

- Human Health Risk Assessment
- Ecological Risk Assessment
- Data Usability Evaluation
- Project Quality Control and Assurance
- Fate and Transport Modeling

Chunhua Liu

Senior Technical Specialist

Technical Director – Directed data validation for various Superfund sites in EPA Region I and Region II in accordance with the EPA regional and state SOPs and the EPA Functional Guidelines. Led data validation for numerous MCP sites for various analytical analyses including metal, VOC, SVOC, pesticide, PCB, EPH, VPH, and TPH analyses.

Project Chemist – Evaluated different analytical methods for hexavalent chromium analysis. Compared analytical methods developed by NJDEP and EPA and identified the appropriate method for a CERCLA site in New Jersey.

Project Chemist – Evaluated quantitatively potential impacts to metal data usability by interference caused by common metals in environmental samples for a CERCLA site in New York.

Project Chemist – Performed data validation for indoor air samples for various CERCLA and MCP Sites to assist evaluation of potential vapor intrusion pathway.

Project Chemist – Performed Level IV data validation for a Superfund site in New York for various analytical analyses including metal, VOC, SVOC, pesticide, and PCB analyses. Reviewed TIC identification and quantitation and assessed chromatograms and mass spectrums for VOCs and SVOCs.

Project Chemist – Provided technical support, prepared QAPPs, established proper data quality objectives (DQOs) for various projects, maintained project quality control, trained junior scientists, coordinated project field sampling and laboratory analyses, addressed non-conformance issues associated with the data produced by the laboratory, conducted statistical analysis, and prepared data validation reports on numerous RCRA/CERCLA and MCP projects.

Publications

Liu, C., J. Jay, T. Ford. Evaluation of Environmental Effects on Metal Transport from Capped Contaminated Sediment under Conditions of Submarine Groundwater Discharge. Env. Sci. Tech. 2001 35: 4549-4555.

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Blanchet, R., Liu, C., Bowers, T. Estimation of Average Exposure Point Concentrations for Pesticides Assuming Accumulation and Degradation in the Environment. Abstract accepted at SEATEC Conference, November, 2001

Seeley, M.R., Schettler, S., Liu, C., Blanchet, R.J., Bowers, T.S. Assessing Cancer Risks Due to Use of Insecticides to Control the Mosquito-borne West Nile Virus: Use of the Margin of Exposure Approach. Abstract accepted at Society of Toxicology, 41st Annual Meeting, March 17-21, 2002.

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Chunhua Liu, Jennifer Jay, Timothy Ford. Evaluation of Environmental Effects on Metal Transport from Capped Contaminated Sediment Under Conditions of Submarine Groundwater Discharge. Poster presentation at Conference on Dredged Material Management: Options and Environmental Considerations. December 3-6, 2000

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Chunhua Liu, Ravi Ika, Tim Ford. 1998. Metal flux in near shore capping sites under conditions of submarine groundwater discharge. In: Fourth Marine & Estuarine Shallow Water Science & Management Conference. March 15-19, 1998

Wei Lin, Guowei Fu, Chunhua Liu. 1996. Study on allocating permissible pollutants discharge based on axioms system. Chin. J. Environ. Sci. 1996 17(3):35-37

Wei Lin, Chunhua Liu, Guowei Fu. 1995. Environmental conflict analysis and its application in environmental planning and management: siting of public facilities. Chin. J. Environ. Sci. 1995 16(6): 36-39

Chunhua Liu, Yongfeng Nie, Wei Lin. 1995. Application prospects of landfill gas utilization technique in China. Pollution Control Technology 1995 8(3): 143-145

Chunhua Liu. 1995. Evaluation of gas production from sanitary landfill. Master's thesis. Tsinghua University, Beijing, P.R.China

Wei Lin, Chunhua Liu. 1994. Rudimentary study on countermeasure to comprehensively control air pollution caused by motor vehicles in China. Pollution Control Technology 1994 7(4): 1-3

Xiurong Zhang, Chunhua Liu, Yanru Yang, Qingzhong Bai. 1993. Environmental impact report of wastewater treatment plant project

Chunhua Liu

Senior Technical Specialist

in Xuanhua City, China.

Chunhua Liu, Yongfeng Nie. 1993. Water balance evaluation in Hongmei hazardous waste landfill. In: Environmental Impact Assessment of Hongmei Hazardous Waste Landfill: 25-33

Chunhua Liu. 1992. Modeling landfill leachate production and migration. Bachelor Thesis. Tsinghua University, Beijing, P.R.China

Chunhua Liu. 1991. A discussion with the author of "clean water extraction from ocean water". Technology of Water Purification 1991(1): 39-41

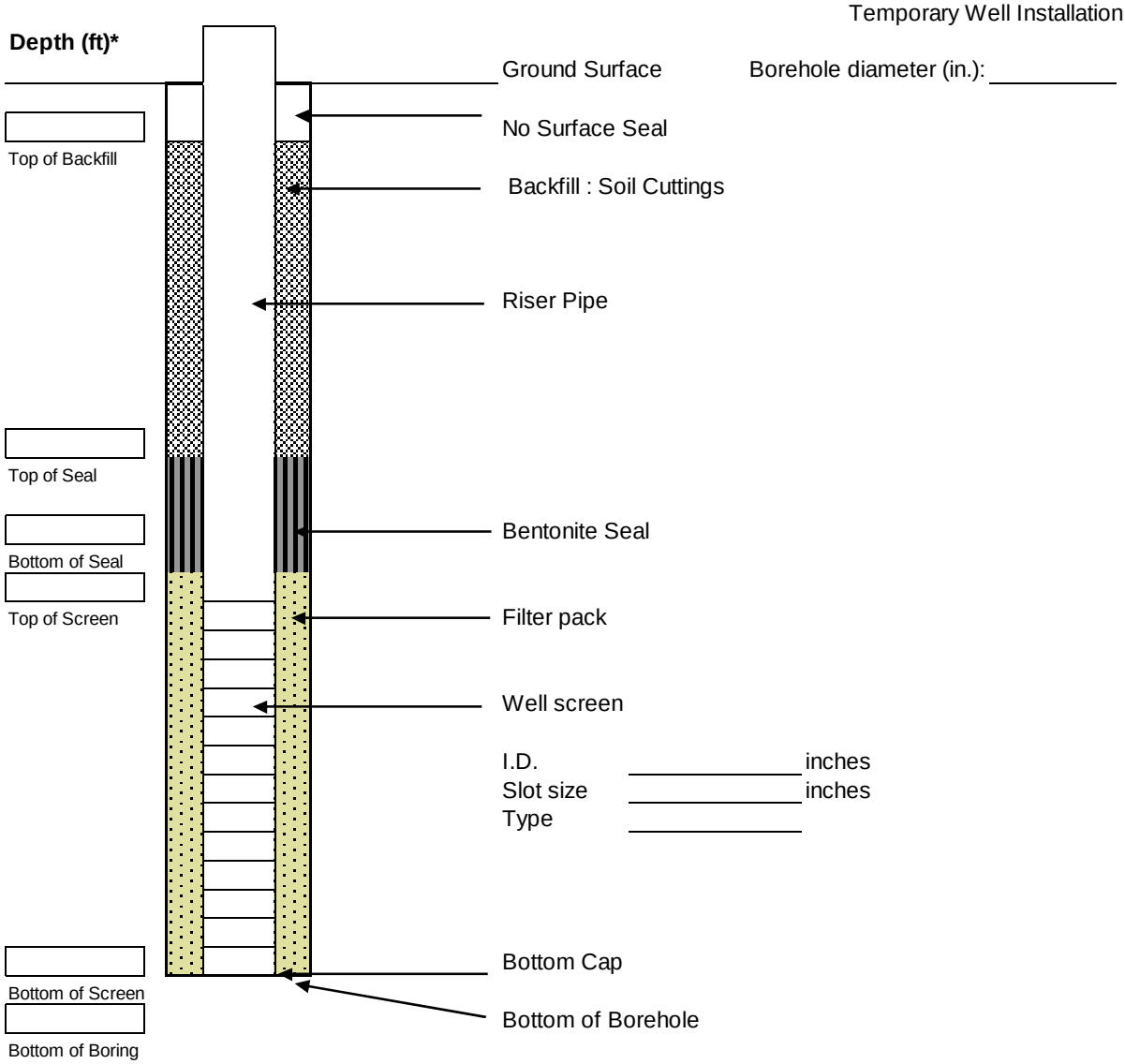
Appendix C – Field Forms

GZA GEOENVIRONMENTAL OF NEW YORK
Engineers and Scientists

Well No.

Project:		Page 1 of 1		
Project No.:	Contractor:	Water Levels		
Surface Elevation:	Driller:	Date	Time	Depth*
Top of PVC Casing Elevation:	GZA Rep:			
Datum:	Date of Completion:			

Temporary Well Installation



* measurement is relative to the ground surface not the stickup.

GZA GeoEnvironmental of New York *Engineers and Scientists* 104 West 29th St., 10th Fl. New York, NY 10001		Boring No. Sheet: File No.: Reviewed By:
Logged By: Drilling Co. : Foreman	Geoprobe Location: Ground Surface Elevation (ft.): Final Geoprobe Depth (ft.): Date : Start Finish	Horizontal Datum: Vertical Datum:
Type of Rig: Rig Model: Drilling Method:	Sampler Type: Sampler O.D. (in.): Sampler Length (in.) Rock Core Size	Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time

Macro No.	Macro Depth (ft.)	Pen. (in.)	Rec. (in.)		Sample Description Modified Burmister Classification	Remark	Depth (ft.)	Stratum Description	Elevation (ft.)

Field Screening performed with a photoionization detector (PID) with a 10.5 eV lamp span calibrated to 100 ppm via isobutylene gas.
See Log key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil types.
Actual transition maybe gradual. Water level readings ahave been made at the times and under conditions stated. Fluctuations of groundwater
may occur due to other factors than those present at the times the measurements were made

Boring No.

SOIL VAPOR SAMPLE FIELD LOG

PROJECT NAME: _____ DATE : _____

LOCATION: _____ FILE NO.: _____

GZA Engineer: _____ Contractor/Lab: _____

Weather: _____ Analytical Method: _____ Depth to Water: _____

Operator: _____ Ground Elevation: _____

Barometric Pressure: _____ PID Calibration: _____ Water Elevation: _____

Sample ID	Canister No.	Regulator No.	Sample Depth (ft)	Vacuum Pressure (in.Hg)		Purge Time			Sample Date	Sample Time		PID Reading (ppm)	Container Type	Surface Cover	Driving Effort	Remark
				Start	End	Purge Start	Purge Stop	Elapsed Time		Start	End					

ABBREVIATIONS:

ft. - feet

in.Hg- Inches of mercury
l./min. - liters per minute
cu. Ft. - cubic feet
ppm - parts per million
NA - not applicable

CONTAINER TYPE	SURFACE COVER	PROBE DRIVING EFFORT	SOIL MOISTURE CONTENT
TB -Tedlar Bag	SO - Soil	E - Easy	D- Dry
SC- Suma Canister	GIL - Grass/Loam	M - Moderate	M- Moderate
ST- Sorbant Tube	Asph - Asphalt	D - Difficult	W - Wet
	Cncrt - Concrete	R - Rellisal	S - Saturated

REMARKS:

WELL PURGE DATA SHEET

WELL ID: MW-

CLIENT: PROJECT NO:
SITE: DATE:
WEATHER: SAMPLER(S):

COLUMN OF WATER IN WELL:
T = Depth to Bottom (ft) - Static Water Level (ft)
= _____ - _____
Water Column (T) = _____ (ft)

GALLONS OF WATER PER WELL VOLUME:
Well Volume = Water Column (T) (ft) x Multiplier
= _____ x _____
Well Volume (V) = _____ (Gallons)

well diameter	multiplier
1	0.041
1.5	0.092
2	0.163
4	0.653
6	1.469

TOTAL VOLUME PURGED:
Design = _____ (gallons)
Actual = _____ [1] (gallons)

PURGE RATE: Variable (mL / min)
PURGE METHOD: Peristaltic Pump, Low Flow Sampling

SCREENED INTERVAL: approximately to ft bgs

WATER QUALITY:

Time	Elapsed Time (Mins)	Purged Volume (gal)	Depth to Water (ft)	pH (SU)	Specific Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/l)	Temp (^{0}C)	ORP	Notes
										Start

UNITS:
gal. - gallons
ft. - feet
SU - standard units
ORP - Oxygen Reduction Potential
mS/cm - millisiemens per centimeter
NTU -nephelometric turbidity units
mg/l -milligrams per liter
^{0}C - degrees Celsius
bgs - below ground surface
NA - not applicable

NOTES AND OBSERVATIONS:

1. Purged volume was estimated.

Appendix D – Health and Safety Plan

GZA SITE-SPECIFIC HEALTH, SAFETY & ACCIDENT PREVENTION STANDARD-PLAN

1. CLIENT/SITE/PROJECT INFORMATION		
Client: Success Academy Charter Schools		
Site Address: 101 E. 150th St., Bronx, NY		
Site Description (be sure to list pertinent site features, chemicals used at the facility, and other potential hazard sources): The property contains one 2-story warehouse building (approx. 118,000 gross square feet) and associated asphalt-paved parking spaces.		
Work Environment (active manufacturing, office, vacant site, undeveloped property, etc.): Commercial property and vacant lot		
Job/Project #: 41.0162951.10	Field Start Date: TBD	Field Finish Date: TBD
Site is Covered by the Following Regulations:	OSHA HAZWOPER Standard ☒	Mine Safety and Health Administration ☐
	OSHA Construction Regulations ☒	

2. EMERGENCY INFORMATION		
Hospital Name: Lincoln Medical Center		Hospital Phone: 718-579-5000
Hospital Address: 234 E 149th St., Bronx, NY		Directions and Street Map Attached: ☒ Yes
Local Fire #: 911	Local Ambulance #: 911	Local Police #: 911
WorkCare Incident Intervention Services:	**For non-emergencies, if an employee becomes hurt or sick call 888-449-7787**	
Other Emergency Contact(s): Reinbill Maniquez	Phone #'s: 347-443-1059	
Site-Specific Emergency Preparedness/Response Procedures/Concerns: See Site Access Safety Addendum (attached)		

- All EHS Events must be reported immediately to the Project Manager and to the GZA People-Based Safety mobile app.
- In the event of a chemical release greater than 5 gallons, site personnel will evacuate the affected area and relocate to an upwind location. The GZA Field Safety Officer and client site representative shall be contacted immediately.
- Site work shall not be conducted during severe weather, including high winds and lightning. In the event of severe weather, stop work, lower any equipment (drill rigs), and evacuate the affected area.

3. SCOPE OF WORK	
General project description, and phase(s) or work to which this H&S Plan applies.	Remedial Investigation, Field Sampling
Specific Tasks Performed by GZA:	Drilling Observation, soil sampling, groundwater sampling, soil vapor sampling, soil handling, and field logging
Concurrent Tasks to be Performed by GZA-hired Subcontractors (List Subcontractors by Name):	TBD
Concurrent Tasks to be Performed by Others:	Pedestrian usage, Site is an active storage facility and school.

Any OSHA PERMIT-REQUIRED CONFINED SPACE entry? ☐ YES ☒ NO IF YES, ADD CONFINED SPACE ENTRY PERMIT FOR THAT PORTION OF THE WORK	Any INDOOR fieldwork? ☒ YES ☐ NO IF YES, EXPLAIN: Eight boring locations are within the building interior. Indoor drilling, soil sampling, and soil vapor sampling will take place.

4. SUB-SURFACE WORK, UNDERGROUND UTILITY LOCATION				
Will subsurface explorations be conducted as part of this work (drilling or excavation)?	☒ Yes	☐ No		
Will GZA personnel be required to use a hand-auger as part of this work?	☐ Yes	☒ No		
Site property ownership where underground explorations will be conducted on: 580 Gerard LLC	Public Access Property	☐ Yes	☒ No	
	Private Property	☒ Yes	☐ No	
Have Necessary Underground Utility Notifications for Subsurface Work Been Made?	☒ Yes	☐ Yet to be conducted		
Specify Clearance Date & Time, Dig Safe Clearance I.D. #, And Other Relevant Information: Utility clearance already conducted directing Phase II ESI. GZA will review utility clearance with driller prior to field work.				
IMPORTANT! For subsurface work, prior to the initiation of ground penetrating activities, GZA personnel to assess whether the underground utility clearance (UUC) process has been completed in an manner that appears acceptable, based on participation/ confirmation by other responsible parties (utility companies, subcontractor, client, owner, etc.), for the following:				
Electric:	☒ Yes	☐ No	☐ NA	☐ Other_____
Fuel (gas, petroleum, steam):	☒ Yes	☐ No	☐ NA	☐ Other_____
Communication:	☒ Yes	☐ No	☐ NA	☐ Other_____
Water:	☒ Yes	☐ No	☐ NA	☐ Other_____
Sewer:	☒ Yes	☐ No	☐ NA	☐ Other_____
Other:_____	☐ Yes	☐ No	☐ NA	☐ Other_____
Comments: GZA to confirm mark outs prior to commencing work. Contractor to determine exact location of test boring.				

5. HAZARD ASSESSMENT (CHECK ALL THAT APPLY AND ADDRESS EACH HAZARD IN SECTION 6)

A. GENERAL FIELDWORK HAZARDS

☐ Confined Space Entry (Add Confined Space Entry Permit)	☒ Overhead Hazards (i.e. falling objects, overhead power lines)
☐ Abandoned or vacant building/Enclosed Spaces	☒ Portable Hand Tools or Power Tools
☒ Significant Slip/Trip/Fall Hazards	☒ Significant Lifting or Ergonomic Hazards
☐ Unsanitary/Infectious Hazards	☒ Electrical Hazards (i.e. Equipment 120 Volts or Greater, Work Inside Electrical Panels, or Maintenance of Electrical Equipment)
☐ Poisonous Plants	☐ Other Stored energy Hazards (i.e. Equipment with High Pressure or Stored Chemicals)
☐ Biting/Stinging Insects	☐ Fire and/or Explosion Hazard
☐ Feral Animal Hazards	☒ Elevated Noise Levels
☐ Water/Wetlands Hazards	☐ Excavations/Test Pits
☐ Remote Locations/Navigation/Orientation hazards	☐ Explosives or Unexploded Ordinance/MEC
☒ Heavy Traffic or Work Alongside a Roadway	☐ Long Distance or Overnight Travel
☒ Weather-Related Hazards	☐ Personal Security or High Crime Area Hazards
☒ Motor vehicle operation Hazards	☐ Working Alone
☒ Heavy Equipment Hazards	☐ Ionizing Radiation or Non-Ionizing Radiation
☐ Structural Hazards (i.e. unsafe floors/stairways/roof)	☒ Chemical/Exposure Hazards (See Part B for Details)
☐ Demolition/Renovation	☒ Other: COVID-19, Underground Utilities, Soil Handling
☒ Presence of Pedestrians or the General Public	

B. CHEMICAL/EXPOSURE HAZARDS (CONTAMINANTS ARE CONTAINED IN X SOIL, WATER, X GROUNDWATER)

☒ No chemical hazards anticipated	☐ Methane
☐ Hydrogen Sulfide (H2S)	☐ Chemicals Subject to OSHA Hazard Communication (attach Safety Data Sheet for each chemical GZA brings to the site)
☐ Cyanides, Hydrogen Cyanide (HCN)	☐ Containerized Waste, Chemicals in Piping & Process Equipment
☐ Carbon Monoxide	☐ Emissions from Gasoline-, Diesel-, Propane-fired Engine, Heater, Similar Equipment
☐ Herbicides, Pesticide, Fungicide, Animal Poisons	☐ General Work Site Airborne Dust Hazards
☒ Metals, Metal Compounds:	☐ Volatile Organic Compounds (VOCs), BTEX
☐ Corrosives, Acids, Caustics, Strong Irritants	☒ Chlorinated Organic Compounds
☐ Polychlorinated Biphenyls (PCBs)	☒ Fuel Oil, Gasoline, Petroleum Products, Waste Oil
☐ Polycyclic Aromatic Hydrocarbons (PAHs)	☐ Asbestos
☐ Compressed Gases	☐ Oxygen Deficiency, Asphyxiation Hazards
☐ Flammable/Combustible Liquids	☒ Other: Silica
☐ Radiation Hazards (i.e. radioactive sealed/open source, x-rays, ultra violet, infrared, radio-frequency, etc.)	

6. SITE-SPECIFIC OVERVIEW OF H&S HAZARDS/MITIGATIONS (NOTE: Based on Hazard Assessment, Section 5)	
Describe the major hazards expected to be present at the jobsite, and describe the safety measures to be implemented for worker protection (refer to items checked in Section 5 above). Use brief abstract statements or more detailed narrative as may be appropriate.	
ON-SITE HAZARDS:	**HAZARD MITIGATIONS:**
Task Hazard Analyses	Task 21.1 – General Outdoor Field Work Task 4.1 – Drilling Observations Task 4.5 – Soil-Gas Sampling Task 20.11 – Field Sampling COVID-19
Owning Zero	Ensure all GZA personnel on-site have downloaded the People Based Safety app to their mobile phones and are familiar with using it to report safety events. Prior to work each day, review Owning Zero rules with all onsite personnel during morning safety meeting.
COVID-19	Check-in daily to the GZA COVID-19 app. Observe social distancing, i.e. stay 6 feet away from others where possible. If exhibiting any symptoms (cough, fever, prolonged shortness of breath), please stay home. Notify PM (Dharmil S. Patel **646-929-8908**) for rescheduling site visits. Wash hands for 20 seconds after touching any shared equipment. The situation is rapidly developing, so keep up to date by checking guidelines from GZA's Pandemic Flu Response Team at: Notify PM for rescheduling site visits. See attached JHA and Follow Client specific work procedures related to Covid19 prevention if applicable
Slip, Trips, and Falls	Inspect work area prior to starting work. Mark out or remove any potential hazards. Be aware and inspect area for uneven surface. Wear sturdy shoes with ankle support and good tread. Look for potential natural depressions/holes/or other obstructions in the area of work and travel. Personnel will be wearing appropriate boots with good tread to prevent slips and falls. Maintain one free hand to break falls. Provide adequate space for each employee to work safely with sound footing. Watch for equipment on ground and slippery surfaces. Keep work area clean, no running, be mindful of changing weather conditions that may change footing conditions. Store any hand tools used for sampling in their proper storage location when not in use. Do not perform work if adequate lighting is not available. Maintain an exit pathway away from the rig at all times.
Heavy Traffic or Work Alongside a Roadway	All personnel must wear high visibility vests and provide safety cones as needed to block off the work area. Be cognizant of the position of vehicles and equipment when unloading in proximity to an active road and active parking lot. The proposed work area is located within parking lot and should be coned off to access from vehicles. The work proposed is being performed adjacent to existing roadways. At a minimum, set up cones and signs to delineate the work area. No vehicles or equipment shall be working or parked in the roadway or shoulder unless traffic control is in place that complies with the Manual on Uniform Traffic Control Devices (MUTCD). Consider the applicability of the MUTCD to the situation, and arrange for flaggers, warning signs and cones to delineate work area and warn vehicles of work ahead, if required. Maintain site control, do not allow access to unauthorized persons. Maintain safe distance from travel area and work outside the main traffice flow area whenever possible. Wear high visibility/reflective vest (Class III) at all times you are on and adjacent to roadway. Utilize flashing amber light on vehicle when vehicle is in or near traffic corridor and to access/egress the lane closure. Do not cross the road without approval from traffic control. Always face flow of traffic to maintain awareness. Access vehicle from opposite side of traffic.

Weather-Related Hazards	Weather conditions will be assessed prior to on-site work and forecast examined for anticipated period of work. If weather permits fieldwork, then workers will dress appropriately. Should inclement weather be encountered, the project scope may be reduced or rescheduled. Breaks will be taken to reduce exposure to the elements. If conditions change and lightning or thunder is observed, work will be suspended immediately, and workers will seek shelter. Work may resume if thunder and/or lightning cease for 30 minutes. In the case of cold weather, proper warm gear should be worn to minimize cold exposure. Hand warmers (e.g. "Hot Hands") should be used when appropriate to keep extremities warm and multiple breaks within a warm area (vehicle with heat) should be taken. Review the signs of heat stress and dehydration before the start of fieldwork. Water, sunscreen, hardhat, tinted safety sunglasses, rain gear (if necessary) and periodic breaks should all be planned for. Be sure to consume plenty of liquids on hot summer days and stay out of direct sunlight for extended periods of time to the extent possible. Use protective ointments such as sunscreen and chap stick, and consult the OSHA Heat Safety App daily.
Motor Vehicle Operation Hazard	Check blind spots before backing up. Use a spotter when maneuvering vehicle in tight locations. Obey speed limits and wear seatbelts. No active hand-held or hands-free cell phone use while driving.
Underground Utilities	Confirm that underground utility clearance procedures have been completed in accordance with GZA Policy # 04-0301 Responsibility for Utility Clearance of Exploration Locations for clearing utility locations prior to breaking ground. Hand clear as necessary prior to commencement of drilling activities.
Heavy Equipment Hazards	All personnel working in proximity to heavy equipment will be familiarized with the locations and operations of emergency kill switches prior to equipment start-up. A first-aid kit and fire extinguisher (10 # Class B/C, minimum) will be available at all times. No loose clothing, jewelry, or unsecured long hair is permitted near the rig. Keep hands and feet away from all moving parts while drilling is in-progress. Persons shall not pass under or over a moving drill tools. Watch for moving vehicles and equipment. Stay out of equipment radius while drilling and excavation is in-progress. Maintain visibility and eye contact with operators when walking around trucks and excavators. Wear reflective vests to enhance visibility. Stay clear of drill rig or excavator (minimum of 6 feet) while operating and do not approach unless equipment has been stopped and eye contact/coordination is made with equipment operator for personnel to approach rig to make observations or collect samples. GZA personnel shall not climb onto or approach rig or excavator while operating or while drill rods are being attached or removed. GZA staff should verify that the onsite equipment has been routinely inspected. GZA staff should also maintain a safe working distance from the equipment while it is maneuvering around the site. GZA staff are not authorized to operate the drill rig or excavator, however, they should be familiar with the location and operation of the emergency shutoff in the event the main operator is unable to operate this control in the event of an emergency. Personnel are not allowed on a mast while drilling is in operation. While a drill rig or excavator is moved from one location to another, drill steel, tools, and other equipment shall be secured and the mast placed in a safe position. All borings and test pits will be adequately covered and/or barricaded if left unattended for any period of time to prevent injury. Working around heavy equipment, personnel shall be aware of pinch points, rotating equipment, and winch operated equipment. Maintain safe working distance and never walk underneath overhead projection of the equipment. Always maintain eye contact and communication with the operator. Follow GZA safe drilling and field work procedures.
Struck by, caught by, run over by equipment	Do not stand near or where equipment operators cannot see you. Always be in line of sight. Do not make sudden moves and always let the operator know of your intentions. Wear high-visibility safety vest, hard hat, eye protection, steel toe boots and use common sense and good housekeeping practices to avoid injury. Stay within sight of

	rig/excavator operator but at least 6-10 feet away from rig and excavator swing area. Maintain clear lines of communication (verbal and/or visual) with the operator. Stand clear of exhaust from operating equipment and stay out of the swing radius of heavy equipment. Be aware of overhead equipment and potential for falling objects (i.e. tree branches). Avoid any "pinch points" where one could become trapped between the equipment and other objects. Maintain awareness of general rig movement/operation and communication with drill crew. Do not conduct soil classification/sampling directly adjacent to the drill rig. Hearing protection shall be worn when working near operating equipment. Equipment should be situated so that at full extension of bucket arm, the equipment is at least 10 feet away from overhead lines.
Presence of Pedestrians or General Public	Cone off work area and do not allow Pedestrians/General Public to access work area. Establish warning signs and cones to delineate work area and warn pedestrians of work ahead. Maintain site control and do not allow access to unauthorized persons. Wear high visibility vest or clothing at all times when working in the roadway or near a sidewalk. Always be aware of pedestrians walking near the exclusion zone. If a pedestrian approaches the job site, work will cease until the pedestrian leaves the area. The proposed work area is located within paved parking lot and should be coned off to access from the general public.
Overhead Hazards (i.e. Falling Objects, Overhead Power Lines)	Mechanical raising and falling weights and equipment are typical around drill rig. Stand clear of drill rig when possible. Observe proposed exploration locations for possible overhead utility lines/tree branches and avoid these if applicable. Check for overhead lines at each work location and between locations and keep equipment at least 25 feet from overhead utilities. Wear steel toed boots, hardhat and safety glasses/goggles. If stacked materials appear unstable inform the site representative. Be aware while equipment is advancing into soil / sediment. Do not stand directly in immediate vicinity of equipment in case equipment malfunction occurs. Maintain safe working distance and maintain eye contact and communication with operator. Never stand under elevated loads or equipment.
Significant Lifting or Ergonomic Hazards	Proper lifting techniques (lifting with the legs, carrying the load at a reasonable height to allow for proper posture during the carry, and avoiding twisting while carrying loads) should be followed at all times. Caution should be used when lifting equipment. Be aware of hand position during all stages of the lift, transport and placement of equipment. Review equipment to be moved prior to lifting to prevent moving parts from crushing fingers or otherwise pinching skin. Do not stack items prior to carrying, but rather transport one item at a time to prevent shifting during carrying. Follow GZA Safe Lifting SOP.
Elevated Noise Levels	Always use ear protection when drill rig is in operation. In accordance with 29 CFR 1910.95(b)(1) When employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table G-16, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table. TABLE G-16 - PERMISSIBLE NOISE EXPOSURES (1) Duration per day (hours) | Sound level dBA slow response 8..... | 90 6.....| 92 4.....| 95 3.....| 97 2.....| 100 1 1/2 .....| 102 1.....| 105 1/2 .....| 110 1/4 or less.....| 115 Hearing protection in the form of disposable ear plugs will be worn during field work with sound levels anticpated above those listed in Table G-16. Use sound meter app on phone to assess required PPE. Be aware that hearing protection can diminish

	warning sounds - do not stand with back to operating equipment and be alert for changing conditions.
Soil Handling	Be aware that soil jars may have been broken during transport and properly cushion sample jars to prevent breakage. Do not eat, smoke or apply cosmetics (e.g. Chapstick, sunscreen) in the work area. Wear nitrile gloves during sampling to avoid common hazards associated with soil handling. Do not have skin contact with/ingest soils. Wash hands and face before eating or drinking.
Portable Hand Tools	Appropriate personal protective equipment (i.e.: safety glasses, face shield, safety goggles, gloves, etc.) shall be worn to protect from hazards that may be encountered while using portable power tools and hand tools
Silica Dust	Primary health effects of silica exposure include silicosis. raining will be provided to employees potentially exposed over the PEL for silica prior to them beginning work with silica, and will be updated on a regular basis. Depending on the levels of total and/or respirable dust in the employee's breathing zone, air monitoring will be performed for particulates. Ample ventilation will be provided to GZA workers.

7. AIR MONITORING ACTION LEVELS – Make sure air monitoring instruments are in working order, calibrated before use, and 'bump-checked' periodically throughout the day and/or over multiple days of use

Is air monitoring to be performed for this project? Yes ☒ No ☐

ACTION LEVELS FOR OXYGEN DEFICIENCY AND EXPLOSIVE ATMOSPHERIC HAZARDS (Action levels apply to occupied work space in general work area)

☐ Applicable, See Below. ☒ Not Applicable

Parameter	Response Actions for Elevated Airborne Hazards
Oxygen	At 19.5% or below – Exit area, provide adequate ventilation, or proceed to Level B, or discontinue activities Verify presence of adequate oxygen (approx. 12% or more) before taking readings with LEL meter. Note: If oxygen levels are below 12%, LEL meter readings are not valid.
LEL	Less than 10% LEL – Continue working, continue to monitor LEL levels Greater than or Equal to 10% LEL – Discontinue work operations and immediately withdraw from area. Resume work activities ONLY after LEL readings have been reduced to less than 10% through passive dissipation, or through active vapor control measures.

ACTION LEVELS FOR INHALATION OF TOXIC/HAZARDOUS SUBSTANCES (Action levels are for sustained breathing zone concentrations)

☒ Applicable, See Below. ☐ Not Applicable

Air Quality Parameters (Check all that apply)	Remain in Level D or Modified D	Response Actions for Elevated Airborne Hazards
☒ VOCs	0 to 5 ppm	From 5 ppm to 10 ppm: Proceed to Level C, or Ventilate, or Discontinue Activities If greater than 5 ppm: Discontinue Activities and consult EHS Team
☐ Carbon Monoxide	0 to 35 ppm	At greater than 35 ppm, exit area, provide adequate ventilation, proceed to Level B, or discontinue activities.
☐ Hydrogen Sulfide	0 to 10 ppm	At greater than 10 ppm, exit area, provide adequate ventilation, proceed to Level B, or discontinue activities
☐ Dust	0 to mg/m^3	
☐	0 to	

SPECIAL INSTRUCTIONS/COMMENTS REGARDING AIR MONITORING (IF APPLICABLE)

WET AREAS OF VISIBLE DUST IN INDOOR SPACES.

8. HEALTH AND SAFETY EQUIPMENT AND CONTROLS

AIR MONITORING INSTRUMENTS

- ☒ PID Type: Lamp Energy: 10.6 eV
- ☐ FID Type:
- ☐ Carbon Monoxide Meter
- ☐ Hydrogen Sulfide Meter
- ☐ O_2/LEL Meter
- ☐ Particulate (Dust) Meter
- ☒ Calibration Gas Type - Isobutylene
- ☐ Others:

OTHER H&S EQUIPMENT & GEAR

- ☒ Fire Extinguisher
- ☒ Caution Tape
- ☒ Traffic Cones or Stanchions
- ☐ Warning Signs or Placards
- ☐ Decon Buckets, Brushes, etc.
- ☐ Portable Ground Fault Interrupter (GFI)
- ☐ Lockout/Tagout Equipment
- ☐ Ventilation Equipment
- ☒ Others: First Aid Kit, Cell Phone, Water, Soap

PERSONAL PROTECTIVE EQUIPMENT

- ☐ Respirator – Type
- ☐ Respirator - Cartridge Type:
- ☒ Hardhat
- ☒ Outer Gloves Type: Nitrile
- ☒ Inner Gloves Type: nitrile
- ☒ Steel-toed boots/shoes
- ☐ Coveralls – Type
- ☐ Outer Boots – Type
- ☒ Eye Protection with side shields
- ☐ Face Shield
- ☒ Traffic Vest
- ☐ Personal Flotation Device (PFD)
- ☐ Fire Retardant Clothing
- ☐ EH (Electrical Hazard) Rated Boots, Gloves, etc.
- ☒ Noise/Hearing Protection
- ☒ Others: Face Covering (COVID—19)

Discuss/Clarify, as Appropriate: face mask covering when social distancing cannot be readiliy practiced

9. H&S TRAINING/QUALIFICATIONS FOR FIELD PERSONNEL

- ☒ Project-Specific H&S Orientation (Required for All Projects/Staff)
- ☒ OSHA 40-Hour HAZWOPER/8 Hour Refreshers
- ☐ Hazard Communication (for project-specific chemical products)
- ☒ First Aid/CPR (required for HAZWOPER for at least one individual on site)
- ☐ Current Medical Clearance Letter (required for HAZWOPER)
- ☒ OSHA 10-hour Construction Safety Training
- ☐ Fall Protection Training
- ☐ Trenching & Excavation
- ☐ Lockout/Tagout Training
- ☐ Electrical Safety Training
- ☐ Bloodborne Pathogen Training
- ☒ Safe Drilling SOP
- ☐
- ☐
- ☐
- ☐

Discuss/Clarify, as needed:

10. PERSONNEL AND EQUIPMENT DECONTAMINATION (SECTION ONLY REQUIRED FOR HAZWOPER SITES)

Describe personnel decontamination procedures for the project site, including "dry decon" (simple removal of PPE)	Dry Decon, wash hands and other exposed skin before taking breaks or leaving site. Change PPE before leaving site.

11. PROJECT PERSONNEL - ROLES AND RESPONSIBILITIES

GZA ON-SITE PERSONNEL:

Name(s)	Project Title/Assigned Role	Telephone Numbers
Reinbill Maniquez	Site Supervisor	Work: 212-594-8140 Cell: 347-443-1059
TBD	Field Safety Officer	Work: 212-594-8140 Cell:
TBD	First Aid Personnel	Work: 212-594-8140 Cell:
TBD	GZA Project Team Members	Work: 212-594-8140 Cell:

Site Supervisors and Project Managers (SS/PM): Responsibility for compliance with GZA Health and Safety programs, policies, procedures and applicable laws and regulations is shared by all GZA management and supervisory personnel. This includes the need for effective oversight and supervision of project staff necessary to control the Health and Safety aspects of GZA on-site activities.

Field Safety Officer (FSO): The FSO is responsible for implementation of the Site Specific Health and Safety Plan.

First Aid Personnel: At least one individual designated by GZA who has current training and certification in basic first aid and cardiopulmonary resuscitation (CPR) must be present during on-site activities involving multiple GZA personnel at HAZWOPER sites.

GZA Project Team: Follow instructions relayed by the HASP and GZA manager on-site.

OTHER PROJECT PERSONNEL:

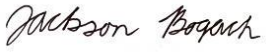
Name	Project Title/Assigned Role	Telephone Numbers
Stephen Kline	Principal-in-Charge	Work: (212) 594-8140 Cell: (347) 242-7109
Reinbill Maniquez	Project Manager	Work: (212) 594-8140 Cell: (347) 443-1059
Reinbill Maniquez	Office Safety Coordinator	Work: (212) 594-8140 Cell: (347) 443-1059
Richard Ecord	GZA EHS Director	Work: 781-278-3809 Cell: 404-234-2834

Principal-in-Charge: Responsible of overall project oversight, including responsibility for Health and Safety.

Project Manager: Responsible for day-to-day project management, including Health and Safety.

Health and Safety Coordinator: General Health and Safety guidance and assistance.

GZA EHS Director: H &S technical and regulatory guidance, assistance regarding GZA H&S policies and procedures.

12. PLAN ACKNOWLEDGEMENT AND APPROVALS		
GZA Project Site Worker Plan Acknowledgement		
I have read, understood, and agree to abide by the information set forth in this Safety and Accident Prevention Plan. I will follow guidance in this plan and in the GZA Health and Safety Program Manual. I understand the training and medical monitoring requirements covered by the work outlined in this plan and have met those requirements.		
GZA Employee Name	GZA Employee Signature	Date
Subcontractor Site Worker Plan Acknowledgement		
GZA has prepared this plan solely for the purpose of protecting the health and safety of GZA employees. Subcontractors, visitors, and others at the site must refer to their organization's health and safety program or site-specific HASP for their protection. Subcontractor employees may use this plan for general informational purposes only. Subcontractor firms are obligated to comply with safety regulations applicable to their work, and understand this plan covers GZA activities only.		
Subcontractor Employee Name	Subcontractor Employee Signatures	Date
GZA HASP Approval Signatures		
The following individuals indicate their acknowledgement and/or approval of the contents of this Site Specific H&S Plan based on their understanding of project work activities, associated hazards and the appropriateness of health and safety measures to be implemented. A signed copy of this document must be present at the project site at all times work is being performed.		
GZA Author/Reviewer Role	Signature	Date
Jackson Bogach **HASP Preparer**		**04/21/2022**
Todd Bown **EHS Reviewer**		**4/21/2022**
Stephen M. Kline **Principal in Charge**		**5/2/2022**

ATTACHMENTS

ATTACHMENT - A	HEALTH AND SAFETY BRIEFING/SITE ORIENTATION RECORD
ATTACHMENT - B	DIRECTIONS TO HOSPITAL
ATTACHMENT - C	JOB HAZARD ANALYSES
ATTACHMENT - D	ACCIDENT AND INJURY REPORT FORM

ATTACHMENT - A
HEALTH AND SAFETY BRIEFING

Health and Safety Briefing/Site Orientation Record/Hazard Communication

This is to verify that I, the undersigned, have been provided with a site (orientation) briefing, including hazard communication, regarding the safety and health considerations at the 1701 Purdy Street, Bronx, New York (Site). I agree to abide by my employer's Site-specific safety and health plan and other safety or health requirements applicable to the Site.

Name (Print)	Signature	Company	Date

Site (orientation) briefing conducted by: _____

Date:_____

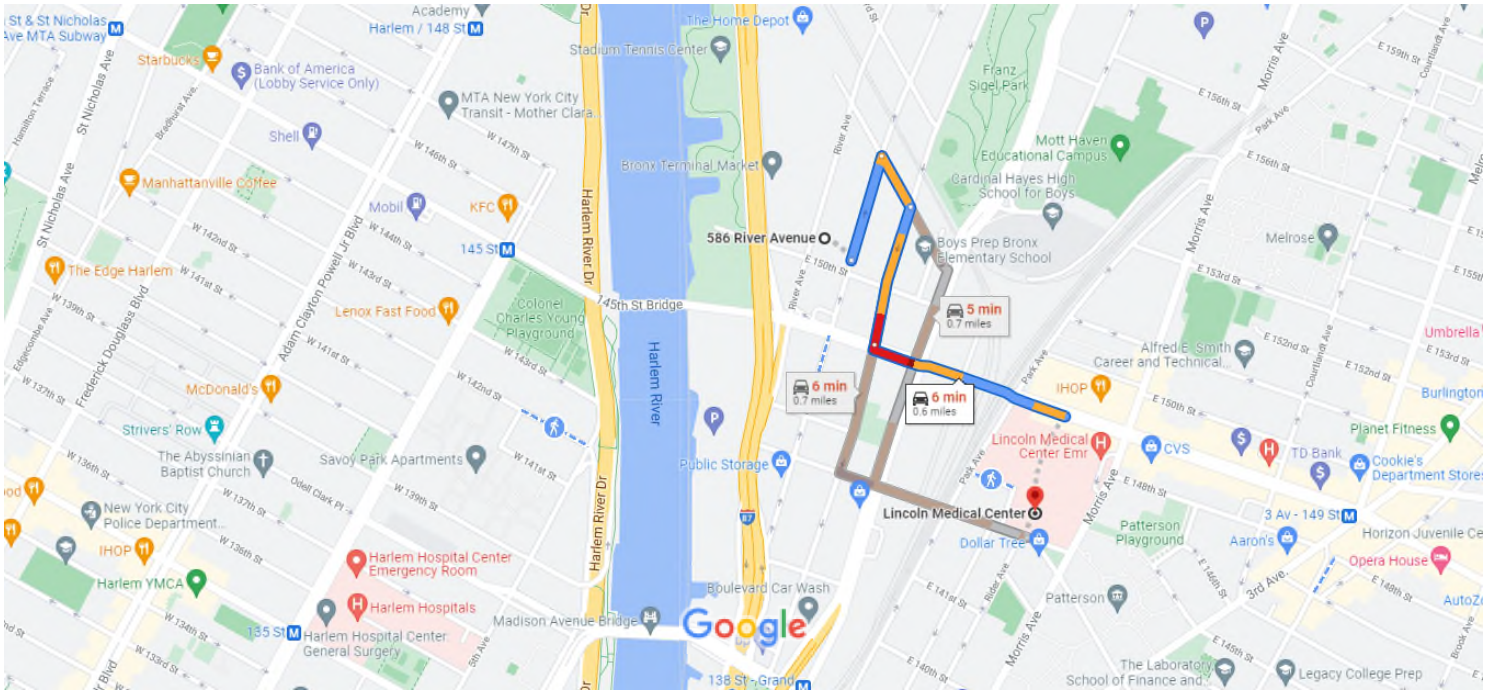
Health and Safety Briefing/Site Orientation Record

ATTACHMENT - B
ROUTE TO HOSPITAL

Google Maps

586 River Ave, Bronx, NY 10451 to Lincoln Medical Center, 234 E 149th St, Bronx, NY 10451

Drive 0.6 mile, 6 min



Map data ©2021 Google 500 ft

via Walton Ave and E 149th St — 6 min
Best route, despite the usual traffic — 0.6 mile

via Grand Concourse and E 144th St — 5 min
Heavy traffic, as usual — 0.7 mile

via Walton Ave and E 144th St — 6 min
Heavy traffic, as usual — 0.7 mile

Explore Lincoln Medical Center

Restaurants Hotels Gas stations Parking Lots More

ATTACHMENT - C
JOB HAZARD ANALYSES

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 – General Outdoor Field Work		
Observation of Deploying of Traffic Protection Equipment by Drilling Contractor (e.g., cones, signs, etc.)	Personal injury due to vehicle traffic, Collisions, injuries	Wear high visibility vest at all times when out of vehicle.
		Park in designated parking locations or select off-road areas that are firm and free of hazards. Directly inspect parking location on foot if necessary.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking personal or GZA vehicle and/or equipment.
		If parking outside of a designated parking area, demarcate vehicle with traffic cones or equivalent.
		Use emergency flashers or other appropriate vehicle warning system when placing equipment.
		Observe if police detail or other required traffic control system (if necessary) is in place.
		Stay within the confines of the work area and do not venture outside of the demarcated work area into traffic.
		If you observe that contractor may back into structures, vehicles, fences, etc., notify contractor immediately with pre-determined signals. Do not cross the path of the heavy equipment.
		Stand clear of moving Drill Rig.
Observation of Mobilizing Drill Rig To Job Site and positioning at borehole by Drilling Contractor	Struck by drill rig	Before drilling begins, confirm that drill rig has been parked properly and securely by the drilling contractor.
		Wear high visibility vests. Make sure that the driver can see you and is aware of your location at all times.
		Inform the driller if it is observed that the rig is being moved with the mast raised and/or tools and other equipment on the rig are not secured and can fall over and potentially hurt personnel.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
	Overhead utility	Look overhead to assess if any utilities are present and confirm with driller that they are aware of the overhead utility location and to take appropriate actions to prevent contact with the overhead utilities and to minimize any arc flash hazards. Review GZA's Electrical Safe Work Practices Program 03-3003.
Observation of drilling operations and monitoring well installations	Underground utilities	Confirm that underground utility clearance procedures have been completed in accordance with GZA Policy # 04-0301 *Responsibility for Utility Clearance of Exploration Locations* for clearing utility locations prior
	Moving machinery, rotating parts, cables, ropes, etc.	Do not wear loose fitting clothing.
		All GZA personnel working in proximity to a drill rig will be familiarized with the location and operation of emergency kill switches prior to equipment start-up. Maintain safe distance from rotating auger, drill casing, rods and cathead at all times. Observe operations from a safe distance. Persons shall not pass under or over a moving stem or auger Check that "kill" switches are present and working. Confirm with driller that daily inspection of rig has been performed prior to commencing work and no conditions were noted with the rig that would affect its proper operation.
		Do not touch or operate or assist with any rig operations and maintenance work.
		Make eye contact with operator before approaching equipment.
		Be alert and take proper precautions regarding slippery ground surfaces and similar hazards near rotating auger.
		Do not engage the driller or helper when drill is in operation. Work out prearranged signals to get their attention before approaching them.
		Confirm prior to drilling operations that driller and helper communicate and coordinate their actions and movements.
		GZA personnel are not allowed to be on the drill rig or operate a rig.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear steel toed boots, hardhat and side-shielding safety glasses/goggles.
	Falling objects, debris	Stand clear of stacked drill rods. If stack appears unstable inform driller.
	Noise	Wear appropriate hearing protection.
	Roadway/traffic hazards	Be alert at all times; never step outside traffic cones.
		Wear high visibility vests at all times.
		Be familiar with escape routes at each location.
		Follow project Traffic Control Plan. Be alert at all times and never step outside the traffic cones. Use a Police detail when necessary.
	Slips, trips and falls	Maintain clean and sanitary work area free of tripping/slipping hazards.
		All borings, excavations, or partially completed groundwater monitoring wells will be adequately covered and/or barricaded if left unattended for any period of time to prevent injury.
		Store any hand tools used for sampling in their proper storage location when not in use.
		Provide adequate space for each employee to work safely with sound footing.
		Do not perform work if adequate lighting is not available.
		Maintain an exit pathway away from the rig at all times.
	Cuts, bruises, shocks, lacerations, sprains and strains during tool use	When working with a driller, do not assist the drilling crew with their work.
		Use properly maintained tools; do not use damaged tools.
		Wear the proper Personal Protective Equipment based on the task being performed.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Do not use electrical tools with damaged cords or other electrical components.
		Observe proper electrical safety practices. Do not use electrical tools in wet areas.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Coordinate activities with driller. Allow driller to open sampling equipment (i.e., split spoons, Geoprobe sleeves, etc.)
	Fire hazards	Be familiar with emergency procedures and where fire extinguishers are present on site.
		Inform GZA subcontractor if you observe improper storage of used rags and unsafe storage of flammable/combustible liquids brought on site.
		GZA and its subcontractors, suppliers and vendors shall not smoke in the work area in GZA project sites. Smoking can only be in designated smoking areas away from work areas and potential fire hazard locations.
		Confirm with driller that a fire extinguisher present with rig and will be available at all times and that inspection tag is not expired.
		If driller is welding or cutting on site confirm there are no flammables or combustible materials near the vicinity of welding machines or torches (such as debris, fuels, grass/weeds, etc.). Review Site requirements for obtaining “Hot Work Permit”.
		Stand well clear of welding/cutting/burning areas.
		When drilling activities encounter the presence of gas or electric, the drill crew shall immediately curtail drilling activity, shut down the drill rig and contact the Project Manager.
	Exposure to Hazardous Substances/Chemicals	Become familiar with hazards associated with hazardous commercial products used in drilling (fuels, silica sand, grout, cement, bentonite, etc.). Review Safety Data Sheets (SDSs) for such products and participate in daily safety tailgate meetings.
		Do not handle drilling chemicals.
		Wear appropriate personal protective equipment.
		Review hazards of chemicals that may have been used or currently are being used on site.
		Refer to the site specific HASP for chemical hazards and the necessary precautions required for sampling.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Be alert for hazardous site contaminants (as indicated by odor, visual characteristics, location, and site history). Assess whether procedures and contingencies are in place for characterizing hazards and protecting workers by use of appropriate air monitoring, personal protective clothing and respiratory protection, as needed. If contamination is identified at the Site only personnel trained and medically qualified to work on hazardous sites will be permitted to proceed with the work.
Sampling Soil	Exposure to chemicals	Refer to the site specific HASP for chemical hazards and the necessary precautions required for sampling.
		Understand potential hazards associated with handling sample collection preservatives.
		Review and have SDS available for chemicals being brought on site, including that of sample preservatives.
		Wear appropriate PPE identified in the HASP
		Wash hands before eating and drinking. Eating and drinking are prohibited in areas of soil contamination/work area.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 – General Outdoor Field Work		
Observation of Deploying of Traffic Protection Equipment by Drilling Contractor (e.g., cones, signs, etc.)	Personal injury due to vehicle traffic, Collisions, injuries	Wear high visibility vest at all times when out of vehicle.
		Park in designated parking locations or select off-road areas that are firm and free of hazards. Directly inspect parking location on foot if necessary.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking personal or GZA vehicle and/or equipment.
		If parking outside of a designated parking area, demarcate vehicle with traffic cones or equivalent.
		Use emergency flashers or other appropriate vehicle warning system when placing equipment.
		Observe if police detail or other required traffic control system (if necessary) is in place.
		Stay within the confines of the work area and do not venture outside of the demarcated work area into traffic.
		If you observe that contractor may back into structures, vehicles, fences, etc., notify contractor immediately with pre-determined signals. Do not cross the path of the heavy equipment.
		Stand clear of moving Drill Rig.
Observation of Mobilizing Drill Rig To Job Site and positioning at borehole by Drilling Contractor	Struck by drill rig	Before drilling begins, confirm that drill rig has been parked properly and securely by the drilling contractor.
		Wear high visibility vests. Make sure that the driver can see you and is aware of your location at all times.
		Inform the driller if it is observed that the rig is being moved with the mast raised and/or tools and other equipment on the rig are not secured and can fall over and potentially hurt personnel.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
	Overhead utility	Look overhead to assess if any utilities are present and confirm with driller that they are aware of the overhead utility location and to take appropriate actions to prevent contact with the overhead utilities and to minimize any arc flash hazards. Review GZA's Electrical Safe Work Practices Program 03-3003.
Observation of drilling operations and monitoring well installations	Underground utilities	Confirm that underground utility clearance procedures have been completed in accordance with GZA Policy # 04-0301 *Responsibility for Utility Clearance of Exploration Locations* for clearing utility locations prior
	Moving machinery, rotating parts, cables, ropes, etc.	Do not wear loose fitting clothing.
		All GZA personnel working in proximity to a drill rig will be familiarized with the location and operation of emergency kill switches prior to equipment start-up. Maintain safe distance from rotating auger, drill casing, rods and cathead at all times. Observe operations from a safe distance. Persons shall not pass under or over a moving stem or auger Check that "kill" switches are present and working. Confirm with driller that daily inspection of rig has been performed prior to commencing work and no conditions were noted with the rig that would affect its proper operation.
		Do not touch or operate or assist with any rig operations and maintenance work.
		Make eye contact with operator before approaching equipment.
		Be alert and take proper precautions regarding slippery ground surfaces and similar hazards near rotating auger.
		Do not engage the driller or helper when drill is in operation. Work out prearranged signals to get their attention before approaching them.
		Confirm prior to drilling operations that driller and helper communicate and coordinate their actions and movements.
		GZA personnel are not allowed to be on the drill rig or operate a rig.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
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Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear steel toed boots, hardhat and side-shielding safety glasses/goggles.
	Falling objects, debris	Stand clear of stacked drill rods. If stack appears unstable inform driller.
	Noise	Wear appropriate hearing protection.
	Roadway/traffic hazards	Be alert at all times; never step outside traffic cones.
		Wear high visibility vests at all times.
		Be familiar with escape routes at each location.
		Follow project Traffic Control Plan. Be alert at all times and never step outside the traffic cones. Use a Police detail when necessary.
	Slips, trips and falls	Maintain clean and sanitary work area free of tripping/slipping hazards.
		All borings, excavations, or partially completed groundwater monitoring wells will be adequately covered and/or barricaded if left unattended for any period of time to prevent injury.
		Store any hand tools used for sampling in their proper storage location when not in use.
		Provide adequate space for each employee to work safely with sound footing.
		Do not perform work if adequate lighting is not available.
		Maintain an exit pathway away from the rig at all times.
	Cuts, bruises, shocks, lacerations, sprains and strains during tool use	When working with a driller, do not assist the drilling crew with their work.
		Use properly maintained tools; do not use damaged tools.
		Wear the proper Personal Protective Equipment based on the task being performed.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Do not use electrical tools with damaged cords or other electrical components.
		Observe proper electrical safety practices. Do not use electrical tools in wet areas.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Coordinate activities with driller. Allow driller to open sampling equipment (i.e., split spoons, Geoprobe sleeves, etc.)
	Fire hazards	Be familiar with emergency procedures and where fire extinguishers are present on site.
		Inform GZA subcontractor if you observe improper storage of used rags and unsafe storage of flammable/combustible liquids brought on site.
		GZA and its subcontractors, suppliers and vendors shall not smoke in the work area in GZA project sites. Smoking can only be in designated smoking areas away from work areas and potential fire hazard locations.
		Confirm with driller that a fire extinguisher present with rig and will be available at all times and that inspection tag is not expired.
		If driller is welding or cutting on site confirm there are no flammables or combustible materials near the vicinity of welding machines or torches (such as debris, fuels, grass/weeds, etc.). Review Site requirements for obtaining “Hot Work Permit”.
		Stand well clear of welding/cutting/burning areas.
		When drilling activities encounter the presence of gas or electric, the drill crew shall immediately curtail drilling activity, shut down the drill rig and contact the Project Manager.
	Exposure to Hazardous Substances/Chemicals	Become familiar with hazards associated with hazardous commercial products used in drilling (fuels, silica sand, grout, cement, bentonite, etc.). Review Safety Data Sheets (SDSs) for such products and participate in daily safety tailgate meetings.
		Do not handle drilling chemicals.
		Wear appropriate personal protective equipment.
		Review hazards of chemicals that may have been used or currently are being used on site.
		Refer to the site specific HASP for chemical hazards and the necessary precautions required for sampling.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Be alert for hazardous site contaminants (as indicated by odor, visual characteristics, location, and site history). Assess whether procedures and contingencies are in place for characterizing hazards and protecting workers by use of appropriate air monitoring, personal protective clothing and respiratory protection, as needed. If contamination is identified at the Site only personnel trained and medically qualified to work on hazardous sites will be permitted to proceed with the work.
Sampling Soil	Exposure to chemicals	Refer to the site specific HASP for chemical hazards and the necessary precautions required for sampling.
		Understand potential hazards associated with handling sample collection preservatives.
		Review and have SDS available for chemicals being brought on site, including that of sample preservatives.
		Wear appropriate PPE identified in the HASP
		Wash hands before eating and drinking. Eating and drinking are prohibited in areas of soil contamination/work area.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Soil-Gas Sampling		
Analysis By: Joseph DiAntonio	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 30, 2011 **Revised: June 22, 2012**	**Date: June 22, 2012**	**Date: June 26, 2012**

Task 4.5
Soil-Gas Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 – General Outdoor Field Work		
Collection of Soil-Gas for Sampling	Exposure to Hazardous Substances	Become familiar with hazards through review of Task Hazard Analysis and participate in daily safety tailgate meetings.
		Communicate Task Hazard Analysis and Lessons Learned information to GZA field crew prior to initiating work and throughout the project as needed.
		Be alert for hazardous site contaminants (as indicated by odor, visual characteristics, location, and site history).
		Wear appropriate safety equipment as required by the Site Specific Health and Safety Plan (HASP) work area (hard hat, steel toe boots, work clothes, high visibility vest, eye and hearing protection, etc.). Implement work practices identified in the HASP.
		Be familiar with hazards associated with products used where samples will be collected and potential compounds of concern during the remedial investigation.
		Review and have Safety Data Sheets (SDSs) available on site for chemicals being used on site.
	Slips, Trips, and Falls	Become familiar with physical site specifics to reduce or eliminate slips, trips and falls due to uneven surfaces, onsite equipment, discarded materials, or working at height.
	Underground Utilities	Proper utility locations/clearance must be performed and the area checked for evidence of underground features prior to breaking ground. Review and comply with GZA Policy 04-0301 *Responsibility for Utility Clearance of Exploration Locations* .
	Electrical Conductor Hazards	Identify location of electrical conductors and maintain minimum approach distance of 25 feet.
	Poor visibility	Provide additional portable lighting if natural lighting is not adequate for performing the work safely.
	Manual Lifting, Equipment Handling	Use proper lifting techniques when lifting/moving objects or equipment to gain access into survey areas. Seek assistance with heavy loads.
		Use work gloves where appropriate to prevent hand injuries.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Soil-Gas Sampling		
Analysis By: Joseph DiAntonio	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 30, 2011 **Revised: June 22, 2012**	**Date: June 22, 2012**	**Date: June 26, 2012**

Task 4.5
Soil-Gas Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear steel-toed work shoes.
	Personnel Decontamination	All personnel, clothing, and equipment leaving the contaminated area of the site must be decontaminated to remove any harmful chemicals or properly disposed.
Sampling Near or In Roadways:	Personal Injury Due to Vehicular Traffic	Wear high visibility safety vest when out of vehicle and in areas with vehicular traffic.
		Park vehicle in designated parking locations, or select off-road area that is firm, and without hazards. Directly inspect parking location on foot if necessary.
		If parking outside of a designated parking area, demarcate vehicle with traffic cones or equivalent.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking vehicle.
		Use police detail (if necessary) to direct traffic while
Manual Installation of Sample Points	Cuts, Bruises, Shocks, Lacerations, Sprains and Strains	Observe proper electrical safety practices. Do not use electrical tools with damaged cords or other electrical components.
		Tools must be properly maintained; do not use damaged tools.
		Wear proper Personal Protective Equipment.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Unplug tools or remove batteries when servicing or changing bit, blades, abrasive wheels or other components.
		Protect your “off hand” from gouges, hammer blows, cutting tools, etc. Position your “off hand” to prevent injury in case of slip of the tool.
Generator Use	Fire / Burn Hazards from Generator Used to Power Drill,	All flammable/combustible liquids must be stored in proper containers.
		A fire extinguisher (10 # class B/C, minimum) must be present on site.
		Generator must be placed on level, stable ground. Keep exhaust port/pipe away from potential flammable materials (i.e., dry brush, oily rags, etc).
		Use care when working around hot exhaust port/pipe.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Soil-Gas Sampling		
Analysis By: Joseph DiAntonio	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 30, 2011 **Revised: June 22, 2012**	**Date: June 22, 2012**	**Date: June 26, 2012**

Task 4.5
Soil-Gas Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		If a fuel powered generator is being used take precautions to prevent carbon monoxide and other exhaust fume build up on the work area and other potential areas occupied by personnel.
		Vent outside of the work area away from other personnel/occupants. Where necessary have CO detector available to warn of hazardous concentrations.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Field Sampling

Analysis By: Christie Wagner	**Reviewed By: Jayanti Chatterjee, CIH**	**Approved By: Jayanti Chatterjee, CIH**
Date: November 4, 2011 **Revised: July 12, 2012**	**Date: July 12, 2012**	**Date: July 12, 2012**

Task 20.11
Field Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 General Outdoor Field Work		
Pre work task for site visit	Adverse Weather Conditions	Assess weather conditions prior to on-site work and examine forecast for anticipated period of work.
		Dress appropriately for weather conditions (e.g., precipitation, temperature ranges over anticipated duration of field work).
		Use protective ointments such as sunscreen and chap stick, as appropriate to the field conditions.
		Be aware of the anticipated weather conditions prior to mobilization to the site. Unacceptable field work conditions are not precise, but may include site specific conditions, general location, extreme weather conditions (e.g., icing, lightening, excessive cold or wind), travel conditions, and other factors. Professional judgment is required, and personal assessment of safety must always be individually assessed.
Conduct visual inspection of site	Dangerous Terrain	Be aware of the site terrain, watch for holes and rocks that can be tripping hazards
		Learn to identify and watch for plants such as thorn bushes and poision ivy that can either scratch you or give you a rash.
Collecting sample	Muscle strain from lifting heavy objects	Use proper lifting techniques. Use appropriate mechanical assistance and tools when possible. Wear work gloves and steel toed boots.
	Exposure to unknown sample	Be sure to treat effluent samples as unknowns and wear the proper PPE.
		If there are any unusual odors/fumes coming from a sample, especially those that cause reactions in the eyes or nose, leave the area and inform a supervisor immediately.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Pre-work preparation	Overlooking of potential hazards	Become familiar with project area and job site by reviewing available on-line mapping (USGS Topographic, NWI Wetland, NRCS Soil, etc.; and aerial photographs before visiting site. Understand related hazards through review of this and other Task Hazard Analyses and participate in daily safety tailgate meetings (where applicable).
		Communicate Task Hazard Analysis and Lessons Learned information to operator(s) prior to initiating work and throughout the project as needed.
Driving to site	Vehicle accidents/collisions/injuries	Perform pre-operation check of vehicle, verifying service brakes, parking brake, steering, lights, tires, horn, wipers mirrors and glass are in good condition. verify that the rig is roadworthy.
		Wear seat belts always when driving even on site.
		Secure loose materials in cab or bed of vehicle.
		Keep windshields, windows and lights cleans.
		Abide by safe driving procedures.
	Backing collisions	If possible avoid backing by using a route that allows you to pull through.
		If backing up from a parked area do a quality 360 walker.
Working within transportation corridors or active construction sites	Collisions injuries	Wear high visibility safety vest on site when out of personal or GZA vehicle.
		Park vehicle in designated parking locations, or select off-road area that is firm, and without hazards. Directly inspect parking location on foot if necessary.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking vehicle.
		Use emergency flashers or other appropriate vehicle warning system when parking outside of standard parking spaces, or to stop in right-of-
		Be alert at all times; never step outside traffic cones.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Stand clear of moving heavy equipment and away from any overhead utility lines until equipment is safely in position and parked properly and securely by the contractor.
		Do not wear headphones or earbuds, or listen to music or talk on the phone, which may distract from work hazards.
	Crossing Automobile traffic lanes	Wear high visibility safety vests at all times when out of vehicle and working within or adjacent to the roadway.
	Crossing Airport Movement Areas (e.g., Runways, taxiways, approaches)	Learn, know, and conform to project site Airport's, Airfield's, or Airbase's protocol for crossing movement areas (whether on foot or in vehicle).
		Work within airport movement areas or safety zones must be coordinated with the Air Traffic Control Tower.
		Vehicles to have blinking or flashing lights or beacons; pedestrians to wear high visibility safety vests.
		Using protocol, maintain communication with airport security and air traffic controllers.
	Crossing Railways	Work within active railroad ROWs requires railroad safety training. No work can be done within the railroad traffic envelope without the permission of a railroad flagman.
		No equipment or vehicles can cross without the permission of a railroad flagman.
		Expect any train on any track coming from either direction at any time.
Working in Natural or Remote Areas	Slips, trips, fall	Be aware of loose ground materials such as talus, unconsolidated rock, soil, sediment, ice and other media that could cause slips, trips or falls.
		Be careful when walking in heavily vegetated areas. Mind tangles of vines, thorny branches, and slippery logs and rock surfaces. Dense vegetation and especially entangled vines present trip hazards, or can mask voids, sharp objects, or other hazards beneath.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Be vigilant for signs of cracking, shifting, fracturing, and evidence of past movement.
		Use wood mats or other stabilizing materials for equipment if soft ground conditions are present.
		Use walking stick, auger, or ski poles to steady yourself when traversing loose material or slopes.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear proper footwear for conditions.
		Store tools in their proper storage location when not in use.
		Provide adequate lighting when necessary.
	Falls into excavations/ voids	Stand away from edges of excavations and voids. Do not attempt access without proper equipment / training. Remember that some excavations or voids may constitute a confined space and may present structural stability issues.
	Cave-ins and engulfment	DO NOT enter caves, sinkholes, excavations, and other voids or concavities that are not sloped or shored properly and have not been evaluated by a competent person to be safe.
		Stand away from edges of excavations, cliffs, dug wells, and other voids.
		Watch for cracks/fissures in the ground surface in the immediate vicinity of a pit or void, which indicate imminent sidewall failure/cave-in.
		Assess if confined space entry procedures need to be implemented.
		Before entering void (if required to do so and with proper training) be aware of any hazards at the surface (boulders, equipment) which may fall into the void.
Working among hazardous biota	Plant toxins Incidental contact	Know the appearance of poison ivy and poison sumac in all seasons, and if sensitive to these toxins, carry and use special cleaning soaps/solutions when thought to be exposed. Stock first aid kit with poison ivy/sumac cleaning soaps/solutions.
	Ticks	Ticks carry risk of Lyme's and other Diseases. Tick season is basically any field day above 40 degrees F.
		Tuck pants into long socks.
		The application of DEET (or permethrin pre-treatment) to clothing in season to control exposure to ticks is recommended.
		Check clothing for ticks frequently.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Check whole body immediately upon returning from field and shower.
	Mosquitoes	Be aware of intermittent seasonal reports of mosquito borne diseases, such as West Nile disease and Eastern Equine Encephalitis (EEE), and their locations relative to your field site. Use of DEET or other mosquito repellant is recommended.
	Stinging bees and wasps	Be aware of potential cavity, suspended or ground nesting bee/wasp/hornet nests. Avoid undue disturbance or approach with appropriate safety clothing, protection and netting.
		Take appropriate precautions if allergic to bees. Carry at least two epi-pens in first aid kit as well as anti-histamines (oral and inhalers).
		Avoid areas of heavy bee activity if allergic. Avoid perfumed soaps, shampoos, deodorants, colognes, etc. that may attract bees.
	Poisonous Snakes	Be aware of terrain likelihood of harboring poisonous snakes in your work zone. Avoid reaching or stepping into hidden areas (such as into wood pile, rock pile, debris pile, stone wall, etc.) without pre-inspection.
		Coordinate with local hospitals to verify they have proper anti-venom in stock.
		Learn first aid procedures in case of poisonous snake bite.
		Devise an action plan and include in the site-specific HASP.
	Wild Animals	Do NOT handle wildlife unless properly trained to do so.
		Beware of any wild animal that shows no sign of wariness of humans.
		Do NOT attempt to feed wild animals or to help apparently injured wild animals.
		Be aware of domestic animals that may also pose a threat such as dogs off leash, bulls out to pasture, etc.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Working in Adverse Weather Conditions	Heat / cold stress and other weather related hazards	Assess weather conditions prior to on-site work and examine forecast for anticipated period of work.
		Dress appropriately for weather conditions (e.g., precipitation, temperature ranges over anticipated duration of field work). Include clothing and the presence / absence of shade when calculating a heat index.
		Schedule work day to avoid working during hottest or coldest parts of the day, to the extent practicable.
		Keep exposed skin covered in extremely cold weather.
		Recognize signs of frostbite; use warming packs and layer clothing to maintain warmth.
		Use a wicking layer of clothing against your body to keep moisture away from skin.
		Wool clothing will continue to keep you warm after it becomes wet; cotton will not.
		Use protective ointments such as sunscreen and chap stick, as appropriate to the field conditions.
		Stay hydrated in hot weather; drink fluids regularly throughout the day, even if not thirsty.
		Recognize signs of heat stress; take frequent breaks in shade when working in direct sunlight for prolonged periods.
		Be familiar with Heat index chart - add 20 degrees to chart if fully clothed and if working in direct sunlight.
		NOTE: Unacceptable field work conditions are not precise, but may include site specific conditions, general location, extreme weather conditions (e.g., icing, lightning, excessive cold or wind), travel conditions, and other factors. Professional judgment is required, and personal assessment of safety must always be individually assessed.
	Working on Ice	Assess relative load bearing capacity of ice on lakes, ponds and other waterways. If unsure do not venture onto the ice.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear proper footwear modified for traction on ice.
	Electrical storms	If lightning is observed during drilling activities, work shall be suspended immediately and employees shall find suitable shelter (building or vehicle at minimum). Work will commence no sooner than 30 minutes after the last indications of lightning have been observed
		Seek shelter inside a walled building or your vehicle.
		Open picnic pavilions and under trees are not adequate shelters.
		Assess vulnerability to lightning strikes as soon as thunder is heard on the horizon. Open areas and higher elevations are more susceptible to strikes.
		Tall objects such as metal towers and flag poles may attract lightning.
		Consult internet weather radar tracking devices to learn of impending storm patterns proximal to your work area.
	High Winds	Avoid working at high elevations, elevated platforms, and other exposed areas during high wind conditions.
		Assess work area for equipment that may be blown down, over, or carried aloft by high winds.
Working in areas without sanitary facilities	Hygiene related hazards	Provide hand washing kits (e.g., baby wipes, hand sanitizers, paper towels, bottled water, etc.) to be used prior to eating and drinking.
		Have garbage bags handy to collect trash.
Working in remote areas	Emergency Conditions	Be familiar with onsite emergency procedures and route to nearest hospital.
		Have a first aid kit available; know its contents and how to use them.
		Carry a cell phone during all field work for emergency purposes, and confirm the nearest location of cell phone signal on site prior to start of worksite.
	Disorientation	Plan your route and anticipated progress prior to field work.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Have multiple navigation aids (e.g., USGS Map, compass, GPS, etc.) and know how to use them before entering field. Remember to have charged batteries and battery back-ups for electronic devices.
		Share your progress plan with office staff prior to entering the field.
		Check in with office personnel periodically to update progress.
		Review and comply with GZA's Working Alone Policy 03-1009 in advance of working alone on a project site.
	Hunting	Be familiar with the various game hunting seasons. Follow rules and guidelines for remaining visible to hunters.
		Try to plan work around active hunting seasons or daily peak hunting hours as warranted.

Job Hazard Analysis

Job Task Name: COVID-19 on Field Projects	**Analysis Date:** 9/1/2020 (initial review 3/19/2020)
Work Area(s): ALL	**Analysis Type:** Revision 1
Company Location: Field Projects	**Hazard Risk Rating:** 3 - High
JHA Performed by: GZA Core Safety Team	**Next Review Date:** 10/30/2020

Task Description: This JHA details protective measures GZA fieldworkers should take to protect against being exposed to the SARS-CoV-2 virus or become ill with COVID-19. Provisions of this document shall be integrated into all field tasks on GZA project sites. This document should be sent to GZA subcontractors prior to onsite work starting to establish the minimum requirements for COVID-19 protection on the project site.

Required PPE: Nitrile gloves, Disinfectant Wipes (Lysol), Safety glasses, Hand sanitizer, Soap and Water, Nitrile Gloves, Respirator or face covering (if required to be within 6 feet of others for limited times doing limited tasks)

Task Step	Step Description	Hazard Classification	Hazard Description	Safety Procedures
1	Commuting with others to project sites	Illness due to viral exposure	Illness due to SARS-CoV-2 exposure Main symptoms include: • Dry cough • Fever above 100°F • Shortness of breath Symptoms typically do not include: • Sneezing • Runny nose	1. Designate the GZA Field Safety Officer as the onsite GZA COVID-19 Safety Officer in the HASP 2. Ensure the GZA Fieldworker Guide to COVID-19 is included in the HASP and available onsite (access the document here). 3. Spend necessary time to think through tasks and develop ways to allow social distancing (staying 6 feet away from others) 4. For any tasks where you are unable to maintain social distancing, pause work and discuss with others how to do the task outside and in as short an amount of time as possible (under 10 minutes) 5. If a task will require working within 6 feet of others for more than 10 minutes or in an enclosed space, STOP work, determine how to do the work safely, and ensure all have the required PPE (gloves and respirator or face covering) 6. Limit travel on public transit, when possible, and avoid crowds of more than 5 people. 7. Take separate vehicles if at all possible. 8. Ask colleagues in personal / work vehicles “Are you feeling well today?” 9. Don’t ride in the same vehicle as someone who is displaying symptoms of COVID-19. 10. Bring soap, water, hand sanitizer, disinfectant wipes, and nitrile gloves with you. 11. Wash your hands before entering a vehicle and after exiting the vehicle. 12. Before entering a vehicle, make sure it is clean and sanitized To clean and sanitize a vehicle: 1. Wash your hands before entering and exiting the vehicle 2. Sars-CoV-2 is not likely to be present on hard surfaces if the vehicle has been unoccupied for 3 days or more 3. Don nitrile gloves and safety glasses to clean the vehicle 4. Use disinfectant wipes or soapy rags to wipe all accessible surfaces (don’t forget exterior door handles, cell phones, and keys) 5. If available, spray seats, carpets, and interior spaces with disinfectant (Lysol)

Job Hazard Analysis

Job Task Name: COVID-19 on Field Projects	**Analysis Date:** 9/1/2020 (initial review 3/19/2020)
Work Area(s): ALL	**Analysis Type:** Revision 1
Company Location: Field Projects	**Hazard Risk Rating:** 3 - High
JHA Performed by: GZA Core Safety Team	**Next Review Date:** 10/30/2020

Task Description: This JHA details protective measures GZA fieldworkers should take to protect against being exposed to the SARS-CoV-2 virus or become ill with COVID-19. Provisions of this document shall be integrated into all field tasks on GZA project sites. This document should be sent to GZA subcontractors prior to onsite work starting to establish the minimum requirements for COVID-19 protection on the project site.

Required PPE: Nitrile gloves, Disinfectant Wipes (Lysol), Safety glasses, Hand sanitizer, Soap and Water, Nitrile Gloves, Respirator or face covering (if required to be within 6 feet of others for limited times doing limited tasks)

Task Step	Step Description	Hazard Classification	Hazard Description	Safety Procedures
2	Preparing to start fieldwork	Different understanding level of work crews	Illness due to SARS-CoV-2 exposure	1. Begin each day by gathering everyone under GZA control together for a safety meeting, led by the GZA COVID-19 Safety Officer 2. Ask the following questions, and send any workers answering yes to any question below home: a. Have you traveled outside the US recently? b. Have you been in close contact with someone who has traveled outside the US recently? c. Have you been in close contact in the last 14 days with someone who has any of the symptoms of COVID-19? (persistent dry cough, fever, shortness of breath) d. Have you had symptoms of COVID-19 in the past 14 days? e. Do you well and fit to work today? 3. Establish the following good ground rules with everyone under GZA control during the meeting at a minimum: a. No one should work if they don't feel well b. If you start to feel unwell during the day, let someone know via phone and leave the site c. If you are unwell and can't leave the site immediately isolate yourself from all others until your transportation arrives d. We are not going to share pens or other equipment onsite as much as possible, and any shared equipment will be cleaned thoroughly before sharing e. We are going to stay at least 6 feet away from all others onsite and not go into enclosed spaces with others f. That means we will not be shaking hands, doing elbow bumps, knocking feet together, etc. g. We are going to wash our hands for at least 20 seconds with soap and water many times during the day, and at a minimum every time we remove our gloves h. If anyone becomes anxious or believes someone is onsite that is showing symptoms of COVID-19 you will let me know

Job Hazard Analysis

Job Task Name: COVID-19 on Field Projects	**Analysis Date:** 9/1/2020 (initial review 3/19/2020)
Work Area(s): ALL	**Analysis Type:** Revision 1
Company Location: Field Projects	**Hazard Risk Rating:** 3 - High
JHA Performed by: GZA Core Safety Team	**Next Review Date:** 10/30/2020

Task Description: This JHA details protective measures GZA fieldworkers should take to protect against being exposed to the SARS-CoV-2 virus or become ill with COVID-19. Provisions of this document shall be integrated into all field tasks on GZA project sites. This document should be sent to GZA subcontractors prior to onsite work starting to establish the minimum requirements for COVID-19 protection on the project site.

Required PPE: Nitrile gloves, Disinfectant Wipes (Lysol), Safety glasses, Hand sanitizer, Soap and Water, Nitrile Gloves, Respirator or face covering (if required to be within 6 feet of others for limited times doing limited tasks)

Task Step	Step Description	Hazard Classification	Hazard Description	Safety Procedures
3	Working in proximity to others	Illness due to viral exposure	Working within 6 feet of others, and touching others, items others have handled, or surfaces others may have coughed or sneezed around may expose you to the virus.	4. Stay 6 feet from other people, or if that is not possible for certain tasks wear respiratory protection and gloves, and wash hands immediately before and after 5. If you must be closer than 6 feet to another person, pause work and don gloves and a respirator or face covering, and limit the task time period to less than 10 minutes and only do so outside 6. Hold meetings outside and over the phone 7. Wash your hands frequently for 20 seconds with warm water and soap, getting in between fingers and including fingertips 8. Alcohol-containing hand sanitizer (Purell, for example) can be used if soap is not available but wash with soap and water once available 9. Resist touching your face 10. Clean surfaces with soap and water, Lysol wipes, or dilute bleach solution including equipment (cells phones, pens, keys, etc.) work surfaces and bathrooms
4	Fieldwork	Illness due to viral exposure	Working with 6 feet of others, and touching others, items others have handled, or surfaces others may have coughed or sneezed around may expose you to the virus.	1. If you have symptoms of COVID-19, do not go to the site. Stay home and call your doctor. 2. Stay 6 feet away from other site workers 3. No handshakes, elbow bumps, or other personal contact 4. Hold frequent safety meetings 5. Don't share pens for sign-in sheets 6. Verbally verify from each site worker that they feel well, have not traveled out of the country, and have not been in contact with people with confirmed COVID-19 infection 7. If you start feeling unwell, leave the site. Isolate anyone who cannot immediately leave or is too ill to drive themselves and is waiting for a ride. 8. Avoid sharing equipment, as possible, and wipe down these items with disinfectant between use 9. Enforce frequent hand washing and other good personal hygiene protocols 10. Pause work and reassess if someone is feeling overwhelmed

Job Hazard Analysis

Job Task Name: COVID-19 on Field Projects	**Analysis Date:** 9/1/2020 (initial review 3/19/2020)
Work Area(s): ALL	**Analysis Type:** Revision 1
Company Location: Field Projects	**Hazard Risk Rating:** 3 - High
JHA Performed by: GZA Core Safety Team	**Next Review Date:** 10/30/2020

Task Description: This JHA details protective measures GZA fieldworkers should take to protect against being exposed to the SARS-CoV-2 virus or become ill with COVID-19. Provisions of this document shall be integrated into all field tasks on GZA project sites. This document should be sent to GZA subcontractors prior to onsite work starting to establish the minimum requirements for COVID-19 protection on the project site.

Required PPE: Nitrile gloves, Disinfectant Wipes (Lysol), Safety glasses, Hand sanitizer, Soap and Water, Nitrile Gloves, Respirator or face covering (if required to be within 6 feet of others for limited times doing limited tasks)

Task Step	Step Description	Hazard Classification	Hazard Description	Safety Procedures
5	Unique Situations	Illness due to viral exposure	Potential exposure to the virus.	<u>If someone onsite is Diagnosed with Covid-19</u>: 1. Do not share the name or any personal details - OK to talk about otherwise 2. Self-assess whether you've been in close contact with the person 3. Close Contact means - within 6 ft of another person for more than 10 minutes 4. Self-quarantine and consult your personal doctor if in close contact with infected person 5. Call Rick Ecord to discuss (781-278-3809 or 404-234-2834) <u>If someone onsite reports secondary contact (close contact with someone who has had contact with someone confirmed with Covid-19)</u>: 1. Do not share the name or any personal details - OK to talk about otherwise 2. Self-assess whether you've been in close contact with secondary contact 3. Close Contact means being within 6 ft of another person for more than 10 minutes 4. Self-quarantine and consult your personal doctor if in close contact with infected person 5. Call Rick Ecord to discuss <u>If someone at the site develops symptoms of COVID-19</u>: 1. The individual at my work site should arrange to leave immediately 2. Isolate the person until they can leave the site 3. Self-assess whether you've been in close contact with the person 4. Call Rick Ecord to discuss

ATTACHMENT - D
ACCIDENT AND INJURY REPORT FORM

SUPERVISOR'S ACCIDENT INVESTIGATION REPORT

Injured Employee _____ Job Title _____

Home Office _____ Division/Department _____

Date/Time of Accident _____

Location of Accident _____

Witnesses to the Accident _____

Injury Incurred? _____ Nature of Injury _____

_____

Engaged in What Task When Injured? _____

_____

Will Lost Time Occur? ____ How Long? _____ Date Lost Time Began _____

Were Other Persons Involved/Injured? _____

_____

How Did the Accident Occur? _____

_____

_____

_____

_____

What Could Be Done to Prevent Recurrence of the Accident? _____

_____

_____

What Actions Have You Taken Thus Far to Prevent Recurrence? _____

_____

_____

Supervisor's Signature _____ Title _____ Date _____

Reviewer's Signature _____ Title _____ Date _____

Note: If the space provided on this form is insufficient, provide additional information on a separate page and attach. The completed accident investigation report must be submitted to the Health and Safety Manager within two days of the occurrence of the accident.

GZA GeoEnvironmental of New York.

Appendix E – Community Air Monitoring Program (CAMP)

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New York, NY 10001
T: 212.594.8140
F: 212.279.8180
www.gza.com

Appendix E
New York State Department of Health
Generic Community Air Monitoring Plan
Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require

particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. A periodic monitoring during sample collection might reasonably 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. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required 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.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued.

After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m_3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m_3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Appendix F – Personnel Qualifications

Stephen M. Kline, P.E.

Associate Principal

Summary of Experience

Mr. Kline is a registered Professional Engineer (P.E.) with over 29 years of environmental consulting and managerial experience. Mr. Kline possesses strong management, communication, and analytical skills, which make him an asset to any environmental investigation or design team. Mr. Kline routinely leads due diligence and remedial investigations for redevelopment projects on environmental impacted properties within, city, state and federal brownfields and voluntary cleanup programs. During these projects, he has developed remedial action work plans to perform geohydrologic testing, geophysical testing, in-situ chemical oxidation, installation of recovery wells, soil vapor extraction systems, groundwater pump and treatment systems, and sub-slab depressurization systems. Mr. Kline manages projects involving the regulatory compliance and soil management during the construction, power plants, schools, hospitals, transit projects, residential buildings, and retail centers on urban and otherwise environmentally impacted properties. He is the remedial engineer and principal author of project deliverables; including work plans and reports, feasibility studies, remedial action reports, construction completion reports, final engineering reports, site management plans, periodic review reports, site specific health and safety plans, quality assurance project plans, and contractor plans and specifications.

Education

M.B.A., Executive Management,
St. John's University, Tobin College of Business, 2014
B.S., Environmental Systems Engineering, Cornell University, 1992

Licenses & Registrations

Professional Engineer:
New Jersey #24GE04468900
New York #80431
Pennsylvania #60796 (Dormant)
Rhode Island #6991 (Dormant)

Certifications & Specialized Training

- 40-Hour OSHA Hazardous Waste Operations and Emergency Response
- 8-hour OSHA Supervisor
- 10-hour OSHA Construction Safety
- Track Safety Trained for Long Island Railroad and Metropolitan Transportation Authority (MTA)
- Transportation Worker Identification Credential

Areas of Specialization

- Environmental Site Investigation and Remediation
- Environmental Construction Support and Dewatering
- Regulatory Compliance Planning and Permitting
- Hazardous Materials Assessment and Abatement
- Landfill Engineering and Monitoring

Relevant Project Experience

Program Manager, New York City School Construction Authority (NYC SCA), Environmental Consulting Term Contract, Various New York City locations. Mr. Kline has been the Program Manager for the Term-contract since 2017 and has been responsible for planning, coordination, and design of due diligence investigations at proposed New York City school sites in the five boroughs of New York. In addition, managed several the designs and installations of sub-slab depressurization systems (SSDS) and underground storage tank (UST) removals and spill closure projects. Prepared design specifications for SSDS/Vapor Barriers, UST removal and excavations, excavated material sampling, and transportation and disposal. Prior to becoming Program Manager, Mr. Kline has worked on the NYCSCA term contract since 2011.

Principal-In-Charge, West Side Federation of Senior and Supportive Housing, Mill Brook Terrace Development, Bronx, New York. Managed all aspects of the environmental project from due diligence investigation services and assisted the client through the NYC Office of Environmental Remediation (OER) Voluntary Cleanup Program (VCP) application. The site investigation revealed areas of hazardous lead levels in the subsurface soils. Conducted a waste characterization study to manage soil disposal. Submitted and received approval for a remedial investigation work plan (work plan), a remedial investigation report (RIR), remedial action work plan (RAP), and a construction health and safety plan (CHASP) with included a community air monitoring program (CAMP). Managed the City/State Environmental Quality Review (CEQR/SEQR), and National Environmental Policy Act (NEPA) environmental assessment services. The regulatory approval and development process required strict deadlines for deliverables, and close coordination with several city and state agencies. Assisted with the application for an EPA Generator ID and submitted annual hazardous waste reports to the New York

Stephen M. Kline, P.E.

Associate Principal

State Department of Environmental Conservation (NYSDEC). Remedial Action Report (RAR) was accepted by OER and a Notice of Satisfaction received.

Principal-In-Charge, 910 East 192nd Street, LLC, Spill Investigation and Remediation Services, Bronx, New York. Performed a Phase I Environmental Site Assessment (ESA) that identified a gas station on the Site from 1940 through 1962, until redevelopment in the 1970's as a current community center building. A subsequent Phase II Environmental Site Investigation (ESI) identified petroleum impacted soils, groundwater and the presence of light non-aqueous phase liquids (LNAPL). A NYSDEC Spill Case was opened, and a Spill Investigation Work Plan was approved. Managed the spill investigation activities and certified as a PE the Spill Investigation Report which included a work plan for an Interim Remedial Measure (IRM). The IRM consisted of Vacuum Enhanced Fluid Recovery (VEFR) events to evaluate the feasibility of collecting residual petroleum contamination from beneath the Site building using VEFR. After the removal of LNAPL, GZA performed an enhanced in-situ bioremediation. This remedial action injected Regenesis Remediation Services PetroFix™ activated carbon remediation fluid with the PetroFix™ electron acceptor blend additive. The in-situ injection of the PetroFix material to the subsurface was used to bioremediate the observed dissolved petroleum contamination. In addition, the long residence time of the active carbon in the formation is intended to bind and contain residual petroleum contamination from migrating off site.

Principal-In-Charge, Stantec Consulting Services, New York City Economic Development Corporation (NYCEDC) Lower Concourse – Exterior Street Reconstruction, Bronx, New York. As part of the Lower Concourse Planning Initiative that seeks to improve the Exterior Street Corridor to vehicular traffic and subsurface utilities including sewers, water lines and drainage structures. The Site comprises an approximately 2,200-foot length of Exterior Street, running north to south, between East 138th Street and East 150th Street. GZA performed a Phase I and Phase II Environmental Site Assessments to identify potential environmental impacts to the proposed Exterior Street Reconstruction project. GZA also developed a RAWP and CHASP to be used by the redevelopment contractor and reviewed environmental specifications for the bid documents of the project.

Principal-In-Charge, BJs Wholesale Club, Inc, Brooklyn Bay Center Redevelopment, Brooklyn, New York. The remediation involved implementation CAMP, and the management, handling, and off-site disposal of impacted material above site-specific soil cleanup objectives. The site building was equipped with a Liquid Boot ™ spray applied vapor barrier and a SSDS. The interior of the building was monitored for methane and hydrogen sulfide using a gas detection system. Mr. Kline performed contractor submittal review and vapor barrier testing and PE inspections to document the installation of the engineering controls in accordance with the OER VCP. Developed a Site Management Plan (SMP) and Remedial Completion Report (RCR). Performing groundwater monitoring and Annual Review Reports (ARR).

Principal-In-Charge, The Brotherhood / Sister Sol, 512 West 143rd Street West 143rd Street, New York, New York. GZA performed an Environmental Assessment Statement (EAS) in connection with the construction of the new Community Center. The project funding meant that the NYCEDC was the Lead Agency and The New York State grants are being administered by the Dormitory Authority of the State of New York (DASNY). GZA completed this EAS including additional CEQR studies for Shadows, Historical and Cultural Resources, Air Quality and Hazardous Materials. The full demolition of the existing building meant that in addition to the Phase I, Phase II Work Plan, Phase II Investigation, RAWP and CHASP, GZA also performed an ACM and Lead Paint Survey of the building. The project received a Negative Declaration. During construction, GZA observed and documented the soil excavation and off-site soil disposal, performed CAMP, collected end point samples, investigated and delineated a petroleum spill, and submitted a remedial completion report to the NYCDEP and a spill closure report to the NYSDEC.

Principal-In-Charge, Tutor Perini Construction, Contract CH057 Project Harold Structures, East Side Access, Long Island City, New York. Administered a contractor-support project during the pre-construction and construction phase of East Side Access for the Metropolitan Transit Authority's Capital Construction Project. Performed drilling within the Sunny Side Yard railroad yard including night drilling. Directed the subsurface investigation to characterize the 12,800 cubic yard cut and cover tunnel, and inspections for suspect asbestos-containing materials, lead-based paint, polychlorinated biphenyls, for demolition of several

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structures and a bridge crossing. Developed a conceptual understanding of materials that might need special handling and management. Developed a dewatering design and performed permitting to remove the tunnel boring machine removal pit.

Principal-In-Charge, Kiewit Power Engineers, Bergen-Linden Overhead Corridor (BLC-OH), East Rutherford, New Jersey. Supported the development pf project for the upgrade of 120 high power electrical transmission towers around Bergen and Linden County, New Jersey. Implemented Site Erosion Sediment Control procedures and performed regular weekly inspections for compliance. Managed the pre-disposal soil and groundwater waste characterization sampling and coordinated sequence efforts of project deliverables, such as waste transporter and dewatering permits. Updated health and safety plan, managed CAMP and waste handling services as the transmission line upgrades across the Erie Street Former Manufactured Gas Plant (MGP) in Elizabeth, NJ.

Principal-in-Charge, 219 Hudson Street, New York, New York. Redevelopment of a former automobile services station located adjacent to the Holland Tunnel. The construction of a nine-story residential building with ground level commercial. Performed the remedial investigation that identified eight gasoline USTs and opened a NYSDEC Spill case. Prepared the RAWP, CAMP, CHASP, a Soils and Materials Management Plan, environmental contract specifications for construction and redevelopment the Site Management Plan and the Remedial Action Report. GZA also provided remediation oversight the removal and closure of USTs and petroleum impacted soils. Engineering controls included the installation of a chemical vapor barrier. Also designed and permitted a groundwater dewatering system that included chemical pretreatment prior to sewer discharge.

Remedial Engineer, 233 Landing Road Housing Development, Bronx, New York. Assisted Client on the redevelopment of a vacant site into a 13-story apartment building for affordable housing. Historic site uses included MGP-related structures and an engineering research facility. GZA conducted a Phase I ESA, a vapor encroachment assessment (VEA), and a Phase II environmental Site investigation (ESI). Upon discovery of contamination, the project was enrolled in the NYC OER VCP and is an E-Designated Site. GZA completed a remedial investigation (RI), a RAWP, and provided CAMP monitoring during contaminated soil removal. GZA designed a vapor barrier and a SSDS and provided engineering services during their installations. The discovery of previously unidentified subsurface structures and two 5,000-gallon USTs during construction added complexity to the project.

Remedial Engineer, Loring Place North Housing Development, Bronx, New York. Provided environmental services as client purchased, investigated and remediated site that included three vacant multi-family residences and was to be redeveloped into an eight-story supporting housing unit. The project is enrolled in the NYC OER's VCP. GZA completed a Phase I ESA, VEA, Phase II ESI, ACM survey, and a RAWP. GZA performed perimeter air monitoring as per the CAMP and designed and oversaw the removal of contaminated soil, and installation of a chemical vapor barrier during redevelopment.

Project Manager, Enercon Inc., Indian Point Energy Center, Buchanan, New York. Supervised a field team during the implementation of a comprehensive site investigation to delineate and determine the source of tritium, strontium and cesium detected in groundwater at the Indian Point Energy Center. The investigation consisted of a thorough review of construction drawings, historic hydrogeologic data and historic groundwater chemistry data to prepare a Conceptual Site Model (CSM) for the release. GZA advanced bedrock and overburden borings at the Site to supplement the existing groundwater monitoring wells at the Site. Rock cores were characterized for the presence of water bearing fractures as well as lithology. All bedrock borings were subject to downhole geophysical borehole logging consisting of acoustic televiewer, optical televiewer, temperature, conductivity, and heat pulse flow meter. Hydraulic conductivity was evaluated using a combination of extraction packer testing and sustain yield pump tests. Wells were completed using multilevel sampling systems. GZA then completed an organic dye tracer test to confirm contaminant flow paths and groundwater velocities. GZA was able to delineate the extent of horizontal and vertical groundwater contamination, determine the sources of the contamination and the post release flow paths. GZA then designed a pilot remediation system in order to allow for hydraulically contain contaminated groundwater.

Project Manager, TransCanada, Ravenswood Power Generating Station, Long Island City, New York. Managed the spill response investigation following the discovery of a 25,000-gallon kerosene release from an underground fuel oil line connecting a gas turbine generator with the 2-million-gallon aboveground storage tank (AST). GZA conducted a subsurface investigation to delineate the vertical and horizontal extent of kerosene associated with the release. Developed a CSM that accounted for Site features (old

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foundation elements and utility conduits) and shallow bedrock which complicated kerosene migration patterns. Recommended IRM to begin collecting recoverable kerosene. The spill investigation (including off-site delineation and IRM was completed within 3 months of mobilization to the Site. The spill investigation included: a vapor intrusion study, an inspection of the East River bulkhead, a tidal influence study, the installation of over 30 soil borings, installation of 14 monitoring wells, installation of 4 recovery sumps, and design of an IRM product recovery system. Within the first 4 months of the release over 4,000 gallons of kerosene were recovered, and a report was submitted to the NYSDEC.

Project Manager, Public Utility Regenerating Station (PURS), Columbia University, New York, New York. Managed the due diligence Site Investigation inform a property transaction between Columbia University and Con Edison. Plans for this Site include relocating the existing Con Edison PURS facility and redevelopment of the Site as part of a new campus construction, including complete excavation for subgrade basement levels up to 60 feet below ground surface. A comprehensive subsurface investigation included installation of installation of groundwater monitoring wells, collection and analysis soil samples, groundwater samples and soil vapor sample. Additionally, a utility clearance was conducted, Community Air Monitoring was completed; and hydraulic conductivity aquifer testing was completed. Vibration monitoring of sensitive Con Edison structures conducted during Sonic drilling. GZA's report documented the former Manufactured Gas Plant (MGP) Structures and subsurface soil and groundwater impacts requiring special handling during redevelopment of the Site.

Project Manager, Stantec, Fort Washington Park Reconstruction, New York, New York. Managed the hazardous materials assessment portion of the EAS for the 160-acre Fort Washington Park (FWP) as part of the New York CEQR. The New York City Department of Parks and Recreation (DPR) parkland is located adjacent to the east bank of the Hudson River on the far Upper West Side of Manhattan from 135th Street in the south to Spuyten Duyvil in the north. GZA evaluated the potential for contaminated materials in the soil, groundwater or building materials of FWP to be disturbed during reconstruction and excavation activities. The preliminary contaminated materials assessment identified 73 potential sources of contamination and recommended additional investigations at 14 of these areas. Additional phases of work included: development and approval of Sampling and Analysis Plans; Preliminary Environmental Site Assessments; Construction Soil Management Plans; CHASPs; and coordination with the NYSDEC and NYCDEP.

Project Manager, Dormitory Authority State of New York (DASNY), Environmental Term Contract, Various Locations, New York. Managed environmental sampling and analytical testing for DASNY-controlled building projects for the 6 years. Provided subcontractor selection and UST testing, repair and closure services for Manhattan Family Court building, Brooklyn College Heating Plant, and the Bronx Community College water supply system. In support of the Bellevue Hospital Office of the Chief Medical Examiner building construction, performed soil and groundwater investigation of an existing petroleum spill and reported on the impacts of observed contamination on soil excavation, disposal and construction dewatering. Brooklyn College Heating Plant remedial design included 48-hour constant rate pumping test, development of contract plans and specifications, NYCDEP sewer discharge and NYSDEC Long Island Well Permits. Principle author of all deliverables including NYSDEC-approved: Site Investigation/Spill Investigation Work Plans; Remedial Action Work Plans; Spill Closure Reports; and Remedial Action/Corrective Action Reports. Performed extensive project administration, including coordination between subcontractors, DASNY, construction managers, on-site engineering staff, and the appropriate New York City and State regulatory agencies.

Field Manager, NYSDEC Superfund Standby Contract (Contract No. D003060), Various Locations. For four years, Mr. Kline conducted project management, field oversight, historical review, and report preparation. This multi-year, multi-million-dollar term environmental contract covered the following work items related to sites within the New York State superfund program, included: Preliminary Site Assessments; Remedial Investigations; Feasibility Studies; Remedial Design; and Remedial Construction.

GZA GeoEnvironmental of New York