43-44 51ST STREET
(FORMERLY 50-11 QUEENS BOULEVARD)
QUEENS, NEW YORK

Remedial Action Report

NYC VCP Project Number 18CVCP077Q

E-Designation Project Number 12EHAN020Q, 12TMP0020Q

Prepared For:

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APRIL 2021

REMEDIAL ACTION REPORT

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LIST OF ACRONYMS

Acronym	Definition
CAMP	Community Air Monitoring Plan
DER-10	NYS DEC Division of Environmental Remediation Technical Guidance Manual
DUSR	Data Usability Summary Report
EC	Engineering Control
HASP	Health and Safety Plan
IC	Institutional Control
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC OER	New York City Office of Environmental Remediation
NYS DEC	New York State Department of Environmental Conservation
ORC	Oxygen Release Compound
PID	Photoionization Detector
QA/QC	Quality Assurance/Quality Control
QEP	Qualified Environmental Professional
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
SCG	Standards, Criteria and Guidance
SCO	Soil Cleanup Objective
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SVOCs	Semi-Volatile Organic Compounds
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

CERTIFICATION

I, Stephen Kline, certify the following:

- I am currently a registered professional engineer licensed by the State of New York.
- I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the 43-44 51st Street, Queens, New York site, Site number 18CVCP077Q.
- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.
- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial Action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The OER-approved Remedial Action Work Plan dated July 19, 2018, and the revised Stipulations in a letter dated March 15, 2019 were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquid, or other material from the property was taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Name: Stephen M. Kline, P.E.

PE License Number: NYS 080431

Signature: _____

Date: April 6, 2021

EXECUTIVE SUMMARY

50-11 Queens Boulevard LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 43-44 51st Street (formerly 50-11 Queens Boulevard) in Woodside section of Queens, New York. A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop a Remedial Action Work Plan (RAWP). A remedial action was performed under the OER-approved RAWP in a manner that has rendered the Site protective of public health and the environment consistent with the proposed use of the property. This RAR describes the remedial action performed under the RAWP. The remedial action described in this document provides for the protection of public health and the environment and complies with applicable environmental standards, criteria and guidance, and applicable laws and regulations.

Site Location and Background

The Site is located at 43-44 51st Street in the Woodside section in Queens, New York, and is identified as Block 1319 and Lot 21 on the New York City Tax Map. The Site is 11,945-square feet and is bounded by a detached 1-story commercial building occupying Lot 12 (Clean Rite Center, a laundromat and dry-cleaning facility) with associated parking spaces to the north, Queens Boulevard to the south, 51st Street to the east, and detached 1-story commercial building (Boston Market) with associated driveways and parking spaces to the west. The Site is located in an area zoned for medium-density residential properties (R6 and R7X) with commercial overlay (C2-3).

Summary of Redevelopment Plan

The Site development consisted of the construction of a new 9-story mixed-use residential and commercial building with a cellar. The 99.3-feet high building covers the entire lot. The total gross building square footage is 86,519-square feet. The cellar level occupies 11,620-square feet (or 97 %) of the lot and features 6,450-square feet of subgrade ventilated parking spaces, a laundry room, a storage room, bicycle storage, a ramp leading up to the first floor, a parking attendants booth, and utility rooms. The top of the cellar floor slab is at an elevation of 81.5 feet based on the North American Vertical Datum of 1988 [NAVD 88]) or approximately 13 to 15 feet below ground surface (bgs). The ground level is 11,362 square feet in area and contains 8,675-square feet of commercial/retail spaces and 639 square feet for the residential

lobby. The second floor of the building contains a 2,205-square foot outdoor recreation area, fitness room, and apartments. The third to ninth floors consist mainly of residential apartments. The total residential floor area is 51,372-square feet. In total, the mixed-use building provides 75 housing units (61 quality housing units and 14 affordable housing units).

As proposed in the OER-Approved RAWP, the entire footprint of the Site was anticipated to be excavated to a depth of approximately 15 feet bgs for development purposes. Due to the foundation design changes, the construction of building foundation elements and support of excavation, and the over-excavation for spill remediation, depths of actual excavations were different from those of the proposed excavation. As part of the development, the entire lot was excavated down to a minimum of 14 feet bgs for the entire Site to construct the structural slab for the cellar and parking garage. However, excavation areas were extended deeper, including approximately 4,800 square feet of sub-grade structures to a depth of 16 feet bgs; other building foundation elements (approximately 6,000 square feet) extended to 18 feet bgs; the area adjoining elevator pit (approximately 400 square feet) excavated between 18 to 23 feet bgs; and a maximum of 23 feet bgs for the elevator pit and sewage ejector pit (approximately 250 square feet). As part of spill remediation, two areas in the southeastern portions of the Site were over excavated to 18 feet bgs (approximately 210 square feet) and 21 feet bgs (approximately 150 square feet), respectively. The development is consistent with the zoning classification for the area.

Summary of Description of Surrounding Property

The surrounding area of the Site is a dense urban development. The elevated subway No. 7 line runs above Roosevelt Avenue to the north of the Site. One sensitive receptor, Little Friends School Sunnyside Inc., is located at 43-42 47th Street and is approximately 0.2 miles west of the Site. The table below lists the properties that adjoin the Site and describes their current use.

Direction	Street Address/Location	Name and Current Use
North	50-18 Roosevelt Avenue	Clean Rite Center – Laundromat and Dry Cleaning
South	50-02, 50-08, and 50-24 Queens Boulevard (across Queens Blvd.)	Lomto Federal Credit Union – Commercial
		P.C. Richard & Son – Appliance sale center
East	51-05 Queens Boulevard (across 51st Street)	Korean Presbyterian Church – Place of Worship
West	50-01 Queens Boulevard	Boston Market - Restaurant

Summary of Past Site Uses and Areas of Concern

The historical documents from as early as 1932 show the Site as subdivided vacant land. By 1941, the Site was developed and contained a single-story building. Throughout its history, the building was mainly used for commercial purposes such as an auto showroom (circa the 1950s), medical offices and supply facility (circa 2000s to 2010s), and an electronics distributor (circa 2010s). On October 27, 2015, a demolition permit was issued by the NYC Department of Buildings (DOB) for the demolition of the one-story building. By the time of the Phase I Environmental Site Assessment (Phase I ESA) dated December 2017, the building was already demolished, and the Site was a vacant lot surrounded by a construction fence.

Based on the previous investigations, the Phase I ESA, and the correspondence with regulatory authorities, the Areas of Concern (AOCs) identified for this site include:

- The Site is assigned the NYC 'E'-Designation No. E-163 for Hazardous Materials, Noise and Air Quality. In 2015, a RI consisting of the collection and analyses of soil and perched groundwater samples was performed. The soil and perched groundwater analytical results showed petroleum contaminant constituents exceeding the New York State Department of Environmental Conservation (NYSDEC) regulatory guidance values, indicating the presence of petroleum products in the subsurface. Based on the RI results, the NYSDEC established a Spill Case No. 1602145 at the Site.
- The 50-24 Queens Boulevard property, located across Queens Boulevard to the southeast of the Site, was historically a filling station (from 1932 until circa 2006). On December 7, 2017, the NYSDEC indicated that the spill at this former Shell Service Station (Spill No. 9805297) has not been sufficiently delineated.
- The 50-01 Queens Boulevard property, located adjacent to the west of the Site, was historically a filling station (from 1932 until circa 1951). A spill was reported on March 25, 1996, for an unknown amount of gasoline contaminated soil. In September 2008, the NYSDEC contacted the existing tenant to investigate the case. However, upon further review, the NYSDEC did not find sufficient information regarding the historical reporting and soil investigation. The spill case was subsequently closed.

In addition, the Phase I ESA identified the following construction-related concerns:

- The 'E'-Designation for Hazardous Materials requires the Site owner to conduct testing and sampling protocol and remediation where appropriate, to the satisfaction of the NYC OER before the issuance of a building permit by the Department of Buildings.
- If dewatering is required for construction, water sampling and testing in conformance with federal, state, and/or local sewer discharge permit/approval requirements may be required.

Summary of the Work Performed under the Remedial Investigation

Several remedial investigations were conducted to prepare for the Remedial Action. The previous work performed at the Site, referenced the 50-11 Queens Boulevard address.

Remedial Investigation Report, AKRF Engineering P.C., June 2016

On behalf of 50-11 Queens Boulevard LLC, AKRF performed a remedial investigation of the Site which consisted of the following scope of work:

- Conducted a Site inspection to identify AOCs and physical obstructions.
- Installed five soil borings across the project Site and collected 11 soil samples for chemical analysis from the borings to evaluate groundwater quality;
- Installed one temporary groundwater monitoring well and collected two groundwater samples for chemical analysis to evaluate groundwater quality; and
- Installed four soil vapor probes around Site perimeter and collected four samples for chemical analysis.

Geotechnical Investigation Report, GeoTech Consultants, LLC, September 15, 2017

GeoTech Consultants LLC, performed a limited geotechnical investigation of the Site which consisted of the following scope of services:

- Drilling and full-time inspection of five test borings;
- Performance of engineering evaluation to determine the stratification and physical characteristics of

the subsoils, and to develop recommendations for the design and construction of foundations for support of the proposed building; and

- Preparation of a geotechnical report complete with test data, conclusions, and recommendations.

Phase I Environmental Site Assessment, GZA GeoEnvironmental of New York, December 2017

Sunlight Construction AA (also referred to herein as "Client" or "User") retained GZA GeoEnvironmental of New York (GZA) to perform a Phase I ESA of the property located at 50-11 Queens Boulevard, Woodside, New York. GZA performed the Phase I ESA in connection with the Client's proposed redevelopment of the Site. The Phase I ESA was performed in general conformance with the scope and limitations of ASTM International's Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process – E1527-13 (ASTM E1527-13) and included GZA's visual observation of the Site; a review of historical information, environmental databases, and information provided by the User; and interviews with a Site representative.

Remedial Investigation Report, GZA, May 2018

The RI scope of work was performed by GZA between February 9 and 22, 2018 to supplement the Remedial Investigation conducted in 2015 by AKRF and to delineate the impacts of the upgradient spill (Spill Case No. 9805297). GZA performed the following scope of work:

- Conducted a Site inspection to identify AOCs and physical obstructions (i.e., structures, buildings, etc.).
- Completed a geophysical survey along the sidewalk of Queens Boulevard and 51st Street.
- Installed three soil borings along the perimeter of the Site and collect soil samples at 1 foot above the observed perched groundwater table to identify areas that may potentially be contaminated by off-site sources per NYSDEC.
- Converted the three perimeter soil borings to permanent monitoring wells and collected three perched groundwater samples for chemical analysis to evaluate the perched groundwater quality. Monitoring wells were completed with 10 feet of 20-slot screen installed to span at least 5 feet of the perched groundwater table.

- Installed three soil borings spaced evenly across the project Site to evaluate the on-site soil quality and collect soil samples for chemical analysis.
- Converted two of the on-site soil borings to temporary monitoring wells and collected two perched groundwater samples for chemical analysis to evaluate the perched groundwater quality.
- Installed two soil vapor probes within the Site boundary and collected two soil vapor samples for chemical analysis. Soil vapor probes were spaced evenly across the project Site and installed approximately 1 foot below the proposed cellar slab, to evaluate potential soil vapor intrusion into the proposed building.

Supplemental Soil Vapor Investigation Report, GZA, September 12, 2018

On June 8, 2018, the Owner entered the Voluntary Cleanup Program (VCP) under Project No. 18CVCP077Q to investigate and remediate the Site. Part of the VCP was to implement the provisions stated in the OER-approved Remedial Action Work Plan (RAWP), dated July 19, 2018. As stipulated in the RAWP, a Supplemental Soil Vapor Investigation was performed to characterize the Site for potential environmental impacts from historic on-site/off-site operations. The supplemental soil vapor investigation was conducted by GZA on August 22, 2018. The investigation consisted of installing two soil vapor probes to 16 feet bgs and collecting two soil vapor samples for laboratory analysis.

Waste Characterization Sampling Report, GZA, January 8, 2019

Following the Remedial Investigation and the Supplemental Soil Vapor Investigation sampling activities, GZA also conducted waste characterization sampling at the Site in February 2018. GZA collected soil samples and the results were analyzed and compared to NYSDEC Part 375 Unrestricted Use and Residential Use Soil Cleanup Objectives (SCOs), the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSCS) and the United States Environmental Protection Agency (EPA) TCLP Maximum Contaminant Concentrations. Based on the redevelopment proposed building footprint of the 99.3-feet high building is approximately 7,803 sf, which covers approximately 65% of the lot. The entire Site will be excavated to 15 feet bgs.

Summary of Findings of Remedial Investigation

The succeeding sections summarizes the results and findings of the various investigations performed at the Site in preparation for the remedial action.

Remedial Investigation Report, AKRF Engineering P.C., June 2016

The results of the June 2016 RIR by AKRF found:

1. Elevation of the property ranges from approximately 97 to 100 feet;
2. Depth to groundwater ranges from approximately 16 to 22 feet bgs at the Site;
3. Groundwater flow is expected to be generally from northeast to southwest beneath the Site;
4. Depth to bedrock is expected to be approximately 200 feet bgs at the Site;
5. The stratigraphy pf the site, from the surface down, consists of approximately 1-foot thick layer of concrete in the basement underlain by apparent native sand with some silt. In the driveway, the stratigraphy consists of approximately 11 inches of apparent fill material consisting of sand and gravel, underlain by an approximate 9-inch-thick layer of concrete. Material below the concrete layer consists of apparent native sand with some silt. Bedrock was not encountered during this RI;
6. Soil/fill samples collected during the RI showed petroleum-related VOCs at varying concentrations, primarily below the NYSDEC 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (USCOs). No VOCs were detected in six soil samples; 15 individual VOCs were detected in the remaining five samples, at concentrations ranging from an estimated 0.095 parts per billion (ppb) to 179,000 ppb. Exceedances of USCOs were detected only in samples SB-6 (8.5-10) and SB-6 (11-13) for benzene (maximum of 194 ppb), ethylbenzene (maximum of 37,800 ppb), toluene (maximum of 40,700 ppb) and total xylenes (maximum of 179,000 ppb). Exceedances of the Restricted Residential Use Soil Cleanup Objective (RRSCO) was detected only for total xylene in SB-6 (8.5-10). Eighteen semi-volatile organic compounds (SVOCs) were detected in 5 of the 11 soil samples at concentrations ranging from 15 parts per billion (ppb) of naphthalene to 2,280 ppb of 2-methylnaphthalene. The detected SVOCs were primarily polycyclic hydrocarbons (PAHs). No SVOC concentrations exceeded the respective USCOs and RRSCOs. Metals including chromium (maximum 30.1 parts per million

(ppm)), lead (maximum 40.4 ppm), and zinc (maximum 55.4 ppm) were detected in all the soil samples analyzed. A total of 17 metals were detected in each of the soil samples; however, all detections were below their respective USCOs and RRSCOs. No polychlorinated biphenyls were detected in any of the soil samples analyzed. Pesticides were detected in two shallow soil samples; SB-1 (0-2) and SB-5 (0-2) with concentrations above the USCOs in only sample SB-1(0-2). Of the nine pesticides detected in SB-1 (0-2), five pesticides were detected above their respective USCOs including alpha-chlordane (135 ppb), dieldrin (48.8 ppb), 4,4'-DDD (9.1 ppb), 4,4'-DDE (29.6 ppb), and 4,4'-DDT (22 ppb);

7. Groundwater samples collected during the RI showed several petroleum-related VOCs detected in both groundwater samples MW-1 and TW-6, some of which exceeded the NYSDEC Class GA Ambient Water Quality Standards (drinking water standards); however, groundwater is not used a potable source in this part of Queens. The following VOCs exceeded the Class GA standards in both groundwater samples: benzene (maximum of 3,220 µg/L), ethylbenzene (maximum of 6,660 µg/L), isopropylbenzene (maximum of 361 µg/L), m,p-xylene (maximum of 19,200 µg/L), o-xylene (maximum of 7,320 µg/L), and toluene (maximum of 11,700 µg/L). Seven SVOCs were detected above the Class GA standards in one of the two groundwater samples (TW-6), including: 1,1'-biphenyl (26.9 µg/L), benzo(a)anthracene (1.8 µg/L), benzo(a)pyrene (0.84 µg/L), benzo(b)fluoranthene (1.1 µg/L), benzo(k)fluoranthene (0.3 µg/L), chrysene (1.4 µg/L), and indeno(1,2,3-cd)pyrene (0.52 µg/L). Six metals were detected in the dissolved groundwater sample, with three metals including iron, manganese, and sodium exceeding their respective Class GA standards. No PCBs or pesticides were detected in the groundwater samples analyzed. Due to a slow recharge rate at temporary well location TW-6, a sufficient groundwater sample could not be collected for all analyses. Metals were not analyzed for TW-6 due to low recovery; groundwater sample TW-6 was only analyzed for VOCs, SVOCs, PCBs and pesticides;

8. Soil vapor samples collected during the RI showed that 35 VOCs were detected in all soil vapor samples; however, none exceeded the Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Note that the AGVs are associated with indoor air conditions; therefore, the comparison assumes that any soil vapor detected would completely penetrate into a new building, a condition that does not typically occur, nor would be expected for the proposed construction. Several solvent-related VOCs, including acetone (maximum concentration of 62.7 µg/m3), chloroform (maximum concentration of 14 µg/m3),

TCE (maximum concentration of 0.81 micrograms per cubic meter [µg/m3]), and PCE (maximum concentration of 23 µg/m3) were detected. VOCs associated with petroleum [including benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), 1,2,4-trimethylbenzene, cyclohexane, heptane, hexane, and 2,2,4-trimethylpentane] were detected in all four soil vapor samples at concentrations up to 523 µg/m3 (2,2,4-trimethylpentane at SV-2).

Geotechnical Investigation Report, GeoTech Consultants, LLC, September 15, 2017

The findings of the Geotechnical Investigation Report were as follows:

- The borings revealed a general soil profile of 12 feet to 16 feet bgs of miscellaneous fill, followed by mostly medium dense to dense glacial sands to the termination depth of the borings
- Groundwater was observed in the deepest boring at a depth of 90 feet bgs.
- With cellar floor being set at a depth of 20 feet bgs, one can expect that footings for support of the proposed building will likely be established a few feet below that to bear on natural glacial sand soil, which is deemed suitable for foundation support. However as findings of boring B-5 indicated, there exist localized inferior layers of Class 6 loose sand in areas and at depth (possibly between borings). To ensure footings do not yield excessive differential settlements, it is necessary that the footings be designed with moderate bearing capacity and that all footing subgrade be subject to densification and special inspection prior to placing concrete.

Phase I ESA, GZA, December 2017

Based on the findings of the Phase I ESA, GZA identified the following in connection with the Site:

- The Site is assigned the NYC 'E'-Designation No. E-163 for Hazardous Materials, Noise and Air Quality. In 2015, a remedial investigation, consisting of the collection and analyses of soil and groundwater samples, was performed. The soil and groundwater analytical results showed petroleum contaminant constituents exceeding the NYSDEC regulatory guidance values, indicating the presence of petroleum products in the subsurface. Based on the RIR results, the NYSDEC established a Spill Case (No. 1602145) at the Site.

- The 50-24 Queens Boulevard property, located across Queens Boulevard to the southeast of the Site, was historically a filling station (from 1932 until circa 2006). On December 7, 2017, the NYSDEC indicated that the spill at this former Shell Service Station (Spill No. 9805297) has not been sufficiently delineated.
- The 50-01 Queens Boulevard property, located adjacent to west of the Site, was historically a filling station (from 1932 until circa 1951). A Spill was reported on March 25, 1996, for an unknown amount of gasoline contaminated soil. On September 2008, the NYSDEC contacted the existing tenant to investigate the case. However, upon further review, the NYSDEC did not find sufficient information regarding the historical reporting and soil investigation. The Spill Case was subsequently closed.

Remedial Investigation Report, GZA, May 2018

The 2018 RI Report findings are summarized below.

- The elevation of the property ranged from approximately 92 to 94 feet, based on the Borough President of Queens Datum.
- Depth to perched groundwater ranged from approximately 16 to 22 feet bgs.
- Perched groundwater is inferred to flow to the northwest.
- The subsurface underneath the Site consisted of the following:
  - UPPER FILL: Fill materials were encountered in the Site test borings from directly below the surface to a depth of about 10 to 11 feet. The Fill consisted of light brown to brown, fine to coarse sand, and gravel, containing up to 20 percent silt, 10 percent cobbles, and varying amounts of brick, and concrete fragments.
  - CONCRETE: 6 to 12 inches of concrete were encountered below the upper fill layer.
  - LOWER FILL: 5 to 6 feet of fill was encountered in the Site test borings from directly below the concrete. The Fill consisted of light brown to gray, fine to coarse Sand, and Gravel, containing up to 20 percent silt, 10 percent cobbles, and varying amounts of brick, and concrete fragments.
  - SAND: A Sand stratum was encountered below the Fill. This stratum consists of light brown to brown to gray, fine to coarse sand, with up to 35 percent gravel, and 20 percent silt.
- For the NYSDEC spill delineation investigation, GZA encountered the following underneath the sidewalk of 51st Street and Queens Boulevard:

- SURFACE COVER: 6 to 12 inches of concrete was encountered at the sidewalk borings. In some locations asphalt of about 6-inch thick was encountered underlying the concrete.
- FILL: Fill was encountered in the sidewalk test borings from directly below the surface cover to depths of about 3 to 7 feet. The Fill consisted of light brown to brown, fine to coarse sand, and gravel, containing up to 20 percent silt, 10 percent cobbles, and varying amounts of brick, and concrete fragments.
- SAND: A Sand stratum was encountered below the Fill in the sidewalk test borings. The Sand stratum varied in thickness to about 21 to 27 feet thick. This stratum consists of light brown to reddish-brown, fine to coarse sand, with up to 35 percent silt, and 10 percent gravel.

- Soil/fill sample results for the soil samples collected during the 2015 RI by AKRF and supplemented during the 2018 RI by GZA were compared to the NYSDEC 6NYCRR Part 375 Section 6.8 Unrestricted Use and Restricted Residential Use SCOs. The soil analytical results showed that:
  - No PCBs were detected exceeding SCOs.
  - Five VOCs including 1,2,4-trimethylbenzene, at 10 mg/kg, benzene (maximum 0.33 mg/kg), ethylbenzene (maximum 38 mg/kg), toluene at 41 mg/kg, and xylene (maximum 179 mg/kg) were detected exceeding Unrestricted Use SCOs in deep samples. Of these samples, xylene also exceeded Restricted Residential SCOs in one deep sample (SB-6, 8.5-10 feet).
  - Five SVOCs including benzo(a)anthracene at 2 mg/kg, benzo(a)pyrene at 1.8 mg/kg, benzo(b)fluoranthene at 2.5 mg/kg, chrysene at 1.8 mg/kg, and indeno(1,2,3-cd)pyrene at 1.4 mg/kg were detected exceeding Unrestricted Use SCOs in one deep sample (GZASB-5, 13-15 feet).
  - Five pesticides including 4,4'-DDD at 0.0091 mg/kg, 4,4'-DDE at 0.0296 mg/kg, 4,4'-DDT (maximum 0.022 mg/kg), cis-Chlordane at 0.135 mg/kg, and dieldrin at 0.0488 mg/kg were detected exceeding Unrestricted Use SCOs in shallow and deep samples.
  - Three metals including chromium at 30.1 mg/kg, lead at 82.1 mg/kg, and mercury (maximum 0.22 mg/kg) were detected exceeding Unrestricted Use SCOs in shallow and deep samples.

Overall, soil chemistry is similar to sites with historic urban fill material in New York City.

- Perched groundwater samples collected during the 2015 RI by AKRF and supplemented during the 2018 RI by GZA were compared to New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). The samples showed:
  - Pesticides or PCBs were not detected at exceeding concentrations.
  - Several VOCs including 1,2,4-trimethylbenzene (maximum 400 µg/L), 1,3,5-trimethylbenzene (maximum 130 µg/L), benzene (maximum 3,220 µg/L), ethylbenzene (maximum 6,660 µg/L), isopropylbenzene (maximum 361 µg/L), n-butylbenzene at 9.1 µg/L, n-propylbenzene (maximum 110 µg/L), naphthalene at 45 µg/L, o-xylene (maximum 7,320 µg/L), p/m-xylene (maximum 19,200 µg/L), sec-butylbenzene at 8.8 µg/L, and toluene (maximum 11,700 µg/L) were detected exceeding NYSDEC Class GA Ambient GQSs.
  - Five SVOCs including1,1'-Biphenyl at 26.9 µg/L, benzo(a)anthracene (maximum 0.03 µg/L), benzo(a)pyrene at 0.84 µg/L, benzo(b)fluoranthene at 1.1 µg/L, chrysene at 1.4 µg/L, indeno(1,2,3-cd)pyrene (maximum 0.52 µg/L), and naphthalene (maximum 1,410 µg/L) were detected exceeding their respective GQSs in five of the six wells.
  - Several metals including antimony at 11 µg/L, barium at 2,320 µg/L, beryllium at 19 µg/L, chromium at 183 µg/L, copper at 1,140 µg/L, iron (maximum 273,000 µg/L), lead at 150 µg/L, magnesium at 69,200 µg/L, manganese (maximum 34,400 µg/L), nickel at 429 µg/L, sodium (maximum 362,000 µg/L), and thallium at 27 µg/L were detected exceeding their respective GQSs in dissolved samples.
- Soil vapor samples collected during the 2015 RI by AKRF and supplemented during the 2018 RI by GZA were compared to the New York State Department of Health (NYSDOH) Final Guidance on Soil Vapor Intrusion (May 2017) Matrix A, B, and C guidance values. Soil gas samples showed petroleum-related VOCs and chlorinated VOCs present at low concentrations. The total concentration of petroleum-related VOCs (i.e., BTEX) ranged from 113.1 µg/m^3 to 5,970 µg/m^3. Overall, the highest reported concentration was for ethylbenzene (maximum 5,970 µg/m^3). The chlorinated VOC, tetrachloroethene (PCE) was detected in four soil vapor samples at concentrations between 1.4 µg/m^3 to 23 µg/m^3. Methylene Chloride was detected in four soil vapor samples at concentrations between 2.3 µg/m3 to 3.5 µg/m^3. The chlorinated VOC 1,1,1-trichloroethane was detected in two soil vapor samples at 2.3 µg/m^3. Trichloroethene (TCE) was detected in one sample at 0.81 µg/m^3. The

chlorinated VOC vinyl chloride was also detected in one sample at 2 µg/m^3. The chlorinated VOCs 1,1-dicloroethene, cis-1,2-dichloroethene and carbon tetrachloride were not detected in any of the samples. Concentrations of all chlorinated VOCs were within the monitoring level ranges established within the NYSDOH soil vapor guidance matrix.

Supplemental Soil Vapor Investigation Report, GZA, September 12, 2018

The Supplemental Soil Investigation laboratory analytical results show typical petroleum hydrocarbons and cleaning solvents in the soil vapor at petroleum-related VOCs and chlorinated VOCs present at low concentrations.

Waste Characterization Sampling Report, GZA, January 8, 2019

The Waste Characterization Sampling laboratory result showed that except for acetone (a known laboratory contaminant) the analytical results of the sample show that VOCs were either not detected or detected below the Unrestricted Use and Residential Use SCOs. The analytical results showed that majority of the SVOCs were either not detected or detected below the Unrestricted Use and Residential Use SCOs. Only two samples, GZA SB-5, and WC-4, exhibited concentrations of PAHs above the soil cleanup values.

Although several metals were detected in the soil sample, only lead and mercury were detected at concentrations exceeding the Unrestricted Use SCO and no metal exhibited concentrations that exceeded the applicable Residential Use SCOs. No PCBs were detected in the soil samples. Analytical results show some concentrations of pesticides 4,4'-DDT and 4,4-DDE above Unrestricted Use SCOs, but below Residential Use SCOs. The sampling results indicated that the sampled soils are considered Non-Hazardous based on RCRA characteristics and that TCLP sample results for metals were either below detection limits, or below the EPA toxicity guidance values and are therefore considered non-hazardous.

Summary of the Remedial Action

The Remedial Action achieved the protection of public health and the environment for the intended use of the property. The Remedial Action achieved all the Remedial Action Objectives established for the

project; addressed applicable standards, criteria, and guidance; reduced mobility, toxicity, and volume of contaminants; was cost-effective and implementable; and used standard methods that are well established in the industry. The remedial action is effective in the short-term and long-term.

A summary of the milestones achieved in the Remedial Action is as follows:

- Remedial Investigation was performed in March 2015 by AKRF and summarized in June 2016 RIR.
- NYSDEC Spill 16-02145 was opened in March 2015.
- A Phase I Environmental Site Assessment was performed in December 2017
- A Pre-Application Meeting was held with the owner, 50-11 Queens Blvd LLC, and the developer, Sunlight Construction AA, on December 14, 2017.
- A Supplemental Remedial Investigation (RI) was performed by GZA from February to March 2018.
- A Supplemental Soil Vapor Investigation was performed by GZA on August 22, 2018.
- A RI Report was prepared to evaluate data and information necessary to develop a Remedial Action Work Plan (RAWP).
- A Site Contact List was established.
- A Draft RAWP was prepared and released with a Fact Sheet on August 15, 2018, for a 30-day public comment period.
- The RAWP dated July 19, 2018, and Stipulation List dated November 6, 2018, were approved by the New York City Office of Environmental Remediation (OER) on November 21, 2018.
- Site briefings were conducted with the NYSDEC on December 11, 2018.
- A Pre-Construction Meeting was held on January 14, 2019.
- A Fact Sheet providing notice of the start of the remedial action was issued on January 25, 2019.
- The Stipulation List was revised on March 15, 2019 to remove the application of Oxygen Release Compound (ORC) from the remedial action based on correspondence with the NYSDEC Spill case manager.
- A Delineation Study was conducted for Spill 16-02145 between January to June 2019.
- The Remedial Action began in January 2019 and was completed in June 2019.

The remedial action consisted of the following tasks:

1. Prepared a Community Protection Statement and implemented a Citizen Participation Plan.
2. Mobilized site security and equipment; completed utility mark outs; and marked and staked excavation areas.
3. Additional soil vapor investigation was performed to supplement investigation data due to potential environmental impacts from historic on-site/off-site operations. Two soil vapor samples were collected, and results were submitted to OER on September 12, 2018, through the Supplemental Soil Vapor Investigation Report.
4. Performed Waste Characterization Study before excavation activities. Eleven (11) waste characterization soil samples were collected on February 9, 2018. Waste characterization samples were collected at a frequency dictated by disposal facilities.
5. Performed a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
6. Established Track 4 Site Specific SCOs. The following Track 4 SCOs were utilized: Petroleum-related VOCs: CP-51 Table 2; Total SVOCs: 200 mg/kg; Lead: 800 mg/kg; and Mercury: 1.5 mg/kg.
7. The following excavations were performed:
    - As part of the development, the entire lot was excavated down to between 14 to 16 feet below bgs for the construction of the sub-grade structures, 18 feet bgs for building foundation elements, 18 to 23 feet bgs for the area adjoining to elevator pit, and a maximum of 23 feet bgs for the elevator pit and sewage pump pit.
    - As part of remediation of Spill 16-02145, two areas in the southeastern portion of the Site were over-excavated to 18 feet bgs and 21 feet bgs, respectively. During excavation, petroleum-contaminated areas at the southeast corner of the Site (Grid-3), designated as Areas of Concern (AOCs), were encountered, and were removed from the Site.
8. Screened excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
9. Conducted materials management of excavated materials including temporarily stockpiling and segregating per defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.

10. Appropriately segregated excavated media on-site before disposal. Transported and disposed of all soil/fill material at permitted facilities following all applicable laws and regulations for handling, transporting, and disposing of, and the RAWP.
11. A total of 13,358.43 tons (approximately 8,300 cubic yards) or 415 truckloads of soil/fill was excavated and removed from the Site. The disposal of the excavated material was broken out as follows:
    - Approximately 640 cubic yards (1072.27 tons) of petroleum-impacted soil/fill (i.e., or 32 truckloads from AOCs) and transported to Doremus Avenue Redevelopment Project located at 191 Doremus Avenue, Newark, NJ
    - Approximately 4,400 cubic yards (7,221.24 tons) or 221 truckloads of non-hazardous soil/fill and transported it to Doremus Avenue Redevelopment Project located at 191 Doremus Avenue, Newark, NJ;
    - Approximately 2,600 cubic yards (4,074.92 tons) or 129 truckloads of non-hazardous soil/fill and transported it to PPARK NJ located at 100 Platen Avenue, Prospect Park, NJ;
    - Approximately 660 cubic yards (990 tons) or 33 truckloads of fill through the NYC Clean Soil Bank; with 360 cubic yards of clean soil and transported to 826 4th Avenue, Brooklyn, NY and 300 cubic yards of clean soil and transported to 38-01 Queens Blvd, Woodside, NY.
12. Ten site-wide endpoint soil samples were collected and analyzed to determine the attainment of SCOs. Two VOCs were detected at concentrations above their respective Track 4 Site Specific SCOs (NYSDEC CP-51 petroleum standards) in one endpoint sample (EP-2 at 16 feet bgs). This area was excavated deeper as part of the AOC excavations. However, the perched water table showed petroleum impacts down to the depth of excavation with VOCs exceeding CP-51 at all four AOC endpoint samples.
13. No underground storage tanks were encountered.
14. Remediation of NYSDEC Petroleum Spill Case No. 16-02145, which was opened on March 2, 2015 during preliminary remedial investigation activities. AOCs were encountered in the southeastern portions of the Site (Grid-3). As part of the remedial action, approximately 640 cubic yards (1,072.27 tons) of petroleum-impacted soil was excavated and removed from the property. Five AOC endpoint samples were obtained for spill closure. On December 9, 2020, GZA submitted a Spill Closure Report

to NYSDEC. On December 11, 2020, the NYSDEC closed Spill Case No. 16-02145 with no further action required.

15. Constructed an engineered Composite Cover System consisting of a minimum of 5 inches of reinforced concrete slab underlain by 8 inches of clean sub-base material in the building footprint to prevent human exposure to residual soil/fill remaining under the Site. The Contractor for the cover construction was Sunlight Construction AA.
16. Installed a Vapor Barrier System that consisted of W. R. Meadows Precon, which is a 73-mil thick composite sheet membrane comprised of an elastomeric membrane bonded to a seven-ply plasmatic matrix and a non-woven geotextile fabric. The Contractor for the Vapor Barrier System construction was Sunlight Construction.
17. Constructed and operated a cellar level parking garage with high volume air exchange in conformance with NYC Building Code.
18. Residual soil is present beneath the cover layer and will be subject to Site Management under this Remedial Action. Residual soil was demarcated as soil located beneath the composite cover's clean sub-base material and will be subject to Site Management under this Remedial Action.
19. Performed all activities required for the Remedial Action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
20. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
21. Used imported ¾-inch recycled concrete aggregate (RCA) for backfilling around the exterior walls in compliance with the Remedial Action Work Plan and accordance with applicable laws and regulations.
22. Submitted daily, weekly, and monthly reports during construction oversight activities. Daily, and weekly reports were submitted from January 9, 2019 to June 26, 2019. Monthly field reports were submitted from July 2019 to May 2020.
23. Submitted a Sustainability Report.
24. Submitted this RAR that describes the Remedial Action, certifies that the remedial requirements defined in the Remedial Action Work Plan have been achieved; defines the Site boundaries; describes all Engineering and Institutional Controls applicable to the Site; and describes any changes from the RAWP.

25. Submitted a Site Management Plan (SMP) for long-term management of residual soil, including plans for operation, maintenance, inspection, and certification of the performance of Engineering Controls and Institutional Controls. Inspections will be performed annually. Inspection and Certification reports will be submitted by July 30, 2023 (for the reporting period calendar year 2021-2022), July 30, 2027 (for the reporting period calendar years 2023-2026), July 30, 2037 (for the reporting period calendar years 2027-2036) and every ten years thereafter (for the reporting period consisting of the same ten prior calendar years). Inspection and Certification Reports will cover all calendar years since the prior reporting period.
26. The property will continue to be registered with an E-Designation by the NYC Department of Buildings. Engineering Controls and Institutional Controls will be managed in compliance with the SMP. Institutional Controls will include prohibition of the following: (1) prohibition of vegetable gardening and farming in residual soil; (2) prohibition of the use of groundwater beneath the site without treatment rendering it safe for the intended use; (3) prohibition of disturbance of residual soil unless it is conducted in accordance with the SMP; and (4) prohibition of higher levels of land usage than the restricted residential uses as described in Section 7 addressed by this remedial action without prior notification and approval by OER.

REMEDIAL ACTION REPORT

1.0 SITE BACKGROUND

50-11 Queens Boulevard LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 43-44 51st Street (formerly 50-11 Queens Boulevard) in Woodside section of Queens, New York. A Site Location Plan is included as **Figure 1**. The boundary of the property subject to this Remedial Action is shown in **Figure 2** and includes, in its entirety, Queens Block 1319 and Lot 21. The Remedial Action was performed under the OER-approved RAWP in a manner that has rendered the property protective of public health and the environment consistent with its intended use. This RAR describes the Remedial Action performed under the RAWP. The remedial action described in this document provides for the protection of public health and the environment and complies with applicable environmental standards, criteria, and guidance (SCGs) and applicable laws and regulations.

1.1 Site Location and Background

The Site is located at 43-44 51st Street in the Woodside section in Queens, New York, and is identified as Block 1319 and Lot 21 on the New York City Tax Map. The Site is 11,945-square feet and is bounded by a detached 1-story commercial building occupying Lot 12 (Clean Rite Center, a laundromat and dry-cleaning facility) with associated parking spaces to the north, Queens Boulevard to the south, 51st Street to the east, and detached 1-story commercial building (Boston Market) with associated driveways and parking spaces to the west. The Site is located in an area zoned for medium-density residential properties (R6 and R7X) with commercial overlay (C2-3). The Site Location Map is included as **Figure 1**. Photographs of the Site prior to the development are included in **Appendix A.** The Site Boundary Map is on **Figure 2**.

1.2 Redevelopment Plan

The Site development consisted of the construction of a new 9-story mixed-use residential and commercial building with a cellar. The 99.3-feet high building covers almost the entire lot. The total gross building square footage is 86,519-square feet. The cellar level occupies 11,620-square feet (or 97 %) of the lot and features 6,450-square feet of subgrade ventilated parking spaces, a laundry room, a storage room, bicycle storage, a ramp leading up to the first floor, a parking attendants booth, and utility rooms. The top of the

cellar floor slab is at an elevation of 81.5 feet based on the North American Vertical Datum of 1988 [NAVD 88]) or approximately 13 to 15 feet below ground surface (bgs. The ground level is 11,362 square feet in area and contains 8,675-square feet of commercial/retail spaces and 639 square feet for the residential lobby. The second floor of the building contains a 2,205-square foot outdoor recreation area, fitness room, and apartments. The third to ninth floors consist mainly of residential apartments. The total residential floor area is 51,372-square feet. In total, the mixed-use building provides 75 housing units (61 quality housing units and 14 affordable housing units).

As proposed in the OER-Approved RAWP, the entire footprint of the Site was anticipated to be excavated to a depth of approximately 15 feet bgs for development purposes. Due to the foundation design changes, the construction of building foundation elements and support of excavation, and the over-excavation for spill remediation, depths of actual excavations were different from those of the proposed excavation. As part of the development, the entire lot was excavated down to a minimum of 14 feet bgs for the entire Site to construct the structural slab for the cellar and parking garage. However, excavation areas were extended deeper, including approximately 4,800 square feet of sub-grade structures to a depth of 16 feet bgs; other building foundation elements (approximately 6,000 square feet) extended to 18 feet bgs; the area adjoining elevator pit (approximately 400 square feet) excavated between 18 to 23 feet bgs; and a maximum of 23 feet bgs for the elevator pit and sewage ejector pit (approximately 250 square feet). As part of spill remediation, two areas in the southeastern portions of the Site were over excavated to 18 feet bgs (approximately 210 square feet) and 21 feet bgs (approximately 150 square feet), respectively. The development is consistent with the zoning classification for the area. A map showing the building location and basement location is shown in the Development Plan on **Figure 3.**

1.3 Description of Surrounding Property

The surrounding area of the Site is a dense urban development. The elevated subway No. 7 line runs above Roosevelt Avenue to the north of the Site. One sensitive receptor, Little Friends School Sunnyside Inc., is located at 43-42 47th Street and is approximately 0.2 miles west of the Site. The table below lists the properties that adjoin the Site and describes their current use.

Direction	Street Address/Location	Name and Current Use
North	50-18 Roosevelt Avenue	Clean Rite Center – Laundromat and Dry Cleaning
South		Lomto Federal Credit Union – Commercial

Direction	Street Address/Location	Name and Current Use
	50-02, 50-08, and 50-24 Queens Boulevard (across Queens Blvd.)	P.C. Richard & Son – Appliance sale center
East	51-05 Queens Boulevard (across 51st Street)	Korean Presbyterian Church – Place of Worship
West	50-01 Queens Boulevard	Boston Market - Restaurant

1.4 Summary of Past Site Uses and Areas of Concerns

The historical documents from as early as 1932 show the Site as subdivided vacant land. By 1941, the Site was developed and contained a single-story building. Throughout its history, the building was mainly used for commercial purposes such as an auto showroom (circa the 1950s), medical offices and supply facility (circa 2000s to 2010s), and an electronics distributor (circa 2010s). On October 27, 2015, a demolition permit was issued by the Department of Buildings for the demolition of the one-story building. By the time of GZA's reconnaissance on November 8, 2017, the building was already demolished, and the Site was a vacant lot surrounded by a construction fence.

Based on the previous investigations, the Phase I Environmental Site Assessment, and the correspondence with regulatory authorities, the Areas of Concern (AOCs) identified for this site include:

- The Site is assigned the NYC 'E'-Designation No. E-163 for Hazardous Materials, Noise and Air Quality. In 2015, a RI consisting of the collection and analyses of soil and perched groundwater samples was performed. The soil and perched groundwater analytical results showed petroleum contaminant constituents exceeding the New York State Department of Environmental Conservation (NYSDEC) regulatory guidance values, indicating the presence of petroleum products in the subsurface. Based on the RI results, the NYSDEC established a Spill Case No. 1602145 at the Site.
- The 50-24 Queens Boulevard property, located across Queens Boulevard to the southeast of the Site, was historically a filling station (from 1932 until circa 2006). On December 7, 2017, the NYSDEC indicated that the spill at this former Shell Service Station (Spill No. 9805297) has not been sufficiently delineated.
- The 50-01 Queens Boulevard property, located adjacent to the west of the Site, was historically a filling station (from 1932 until circa 1951). A spill was reported on March 25, 1996, for an unknown amount of gasoline contaminated soil. In September 2008, the NYSDEC contacted the existing tenant to investigate the case. However, upon further review, the NYSDEC did not find sufficient information regarding the historical reporting and soil investigation. The spill case was subsequently closed.

In addition, the Phase I identified the following construction-related concerns:

- The 'E'-Designation for Hazardous Materials requires the Site owner to conduct testing and sampling protocol and remediation where appropriate, to the satisfaction of the NYC OER before the issuance of a building permit by the Department of Buildings.
- If dewatering is required for construction, water sampling and testing in conformance with federal, state, and/or local sewer discharge permit/approval requirements may be required.

1.5 Summary of Work Performed Under the Remedial Investigation

Several remedial investigations were conducted to prepare for the Remedial Action. The previous work performed at the Site, referenced the 50-11 Queens Boulevard address.

Remedial Investigation Report, AKRF Engineering P.C., June 2016

On behalf of 50-11 Queens Boulevard LLC, AKRF performed a remedial investigation of the Site which consisted of the following scope of work:

- Conducted a Site inspection to identify AOCs and physical obstructions.
- Installed five soil borings across the project Site and collected 11 soil samples for chemical analysis from the borings to evaluate groundwater quality;
- Installed one temporary groundwater monitoring well and collected two groundwater samples for chemical analysis to evaluate groundwater quality; and
- Installed four soil vapor probes around Site perimeter and collected four samples for chemical analysis.

Geotechnical Investigation Report, GeoTech Consultants, LLC, September 15, 2017

GeoTech Consultants LLC, performed a limited geotechnical investigation of the Site which consisted of the following scope of services:

- Drilling and full-time inspection of five test borings;
- Performance of engineering evaluation to determine the stratification and physical characteristics of the subsoils, and to develop recommendations for the design and construction of foundations for

support of the proposed building; and

- Preparation of a geotechnical report complete with test data, conclusions, and recommendations.

Phase I Environmental Site Assessment, GZA GeoEnvironmental of New York, December 2017

Sunlight Construction AA (also referred to herein as "Client" or "User") retained GZA GeoEnvironmental of New York (GZA) to perform a Phase I Environmental Site Assessment (ESA) of the property located at 50-11 Queens Boulevard, Woodside, New York. GZA performed the Phase I ESA in connection with the Client's proposed development of the Site. The Phase I ESA was performed in general conformance with the scope and limitations of ASTM International's Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process – E1527-13 (ASTM E1527-13) and included GZA's visual observation of the Site; a review of historical information, environmental databases, and information provided by the User; and interviews with a Site representative.

Remedial Investigation Report, GZA, May 2018

The RI scope of work was performed by GZA between February 9 and 22, 2018 to supplement the Remedial Investigation conducted in 2015 by AKRF and to delineate the impacts of the upgradient spill (Spill Case No. 9805297). GZA performed the following scope of work:

- Conducted a Site inspection to identify AOCs and physical obstructions (i.e., structures, buildings, etc.).
- Completed a geophysical survey along the sidewalk of Queens Boulevard and 51st Street.
- Installed three soil borings along the perimeter of the Site and collect soil samples at 1 foot above the observed perched groundwater table to identify areas that may potentially be contaminated by off-site sources per NYSDEC.
- Converted the three perimeter soil borings to permanent monitoring wells and collected three perched groundwater samples for chemical analysis to evaluate the perched groundwater quality. Monitoring wells were completed with 10 feet of 20-slot screen installed to span at least 5 feet of the perched groundwater table.

- Installed three soil borings spaced evenly across the project Site to evaluate the on-site soil quality and collect soil samples for chemical analysis.
- Converted two of the on-site soil borings to temporary monitoring wells and collected two perched groundwater samples for chemical analysis to evaluate the perched groundwater quality.
- Installed two soil vapor probes within the Site boundary and collected two soil vapor samples for chemical analysis. Soil vapor probes were spaced evenly across the project Site and installed approximately 1 foot below the proposed cellar slab, to evaluate potential soil vapor intrusion into the proposed building.

Supplemental Soil Vapor Investigation Report, GZA, September 12, 2018

On June 8, 2018, the Owner entered the Voluntary Cleanup Program (VCP) under Project No. 18CVCP077Q to investigate and remediate the Site. Part of the VCP was to implement the provisions stated in the OER-approved Remedial Action Work Plan (RAWP), dated July 19, 2018. As stipulated in the RAWP, a Supplemental Soil Vapor Investigation was performed to characterize the Site for potential environmental impacts from historic on-site/off-site operations. The supplemental soil vapor investigation was conducted by GZA on August 22, 2018. The investigation consisted of installing two soil vapor probes to 16 feet bgs and collecting two soil vapor samples for laboratory analysis.

Waste Characterization Sampling Report, GZA, January 8, 2019

Following the Remedial Investigation and the Supplemental Soil Vapor Investigation sampling activities, GZA also conducted waste characterization sampling at the Site in February 2018. GZA collected soil samples and the results were analyzed and compared to NYSDEC Part 375 Unrestricted Use and Residential Use Soil Cleanup Objectives (SCOs), the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standards (RDCSCS) and the United States Environmental Protection Agency (EPA) TCLP Maximum Contaminant Concentrations. Based on the redevelopment proposed building footprint of the 99.3-feet high building is approximately 7,803 sf, which covers approximately 65% of the lot. The entire Site will be excavated to 15 feet bgs.

1.6 Summary of Findings of Remedial Investigation

The succeeding sections summarizes the results and findings of the various investigations performed at the Site in preparation for the remedial action.

Remedial Investigation Report, AKRF Engineering P.C., June 2016

The results of the June 2016 RIR by AKRF found:

1. Elevation of the property ranges from approximately 97 to 100 feet;
2. Depth to groundwater ranges from approximately 16 to 22 feet bgs at the Site;
3. Groundwater flow is expected to be generally from northeast to southwest beneath the Site;
4. Depth to bedrock is expected to be approximately 200 feet bgs at the Site;
5. The stratigraphy pf the site, from the surface down, consists of approximately 1-foot thick layer of concrete in the basement underlain by apparent native sand with some silt. In the driveway, the stratigraphy consists of approximately 11 inches of apparent fill material consisting of sand and gravel, underlain by an approximate 9-inch-thick layer of concrete. Material below the concrete layer consists of apparent native sand with some silt. Bedrock was not encountered during this RI;
6. Soil/fill samples collected during the RI showed petroleum-related VOCs at varying concentrations, primarily below the NYSDEC 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (USCOs). No VOCs were detected in six soil samples; 15 individual VOCs were detected in the remaining five samples, at concentrations ranging from an estimated 0.095 parts per billion (ppb) to 179,000 ppb. Exceedances of USCOs were detected only in samples SB-6 (8.5-10) and SB-6 (11-13) for benzene (maximum of 194 ppb), ethylbenzene (maximum of 37,800 ppb), toluene (maximum of 40,700 ppb) and total xylenes (maximum of 179,000 ppb). Exceedances of the Restricted Residential Use Soil Cleanup Objective (RRSCO) was detected only for total xylene in SB-6 (8.5-10). Eighteen semi-volatile organic compounds (SVOCs) were detected in 5 of the 11 soil samples at concentrations ranging from 15 ppb of naphthalene to 2,280 ppb of 2-methylnaphthalene. The detected SVOCs were primarily polycyclic hydrocarbons (PAHs). No SVOC concentrations exceeded the respective USCOs and RRSCOs. Metals including chromium (maximum 30.1 parts per million (ppm)), lead (maximum 40.4 ppm), and zinc (maximum 55.4 ppm) were detected in all the soil samples analyzed. A total of

17 metals were detected in each of the soil samples; however, all detections were below their respective USCOs and RRSCOs. No polychlorinated biphenyls were detected in any of the soil samples analyzed. Pesticides were detected in two shallow soil samples; SB-1 (0-2) and SB-5 (0-2) with concentrations above the USCOs in only sample SB-1(0-2). Of the nine pesticides detected in SB-1 (0-2), five pesticides were detected above their respective USCOs including alpha-chlordane (135 ppb), dieldrin (48.8 ppb), 4,4'-DDD (9.1 ppb), 4,4'-DDE (29.6 ppb), and 4,4'-DDT (22 ppb);

7. Groundwater samples collected during the RI showed several petroleum-related VOCs detected in both groundwater samples MW-1 and TW-6, some of which exceeded the NYSDEC Class GA Ambient Water Quality Standards (drinking water standards); however, groundwater is not used a potable source in this part of Queens. The following VOCs exceeded the Class GA standards in both groundwater samples: benzene (maximum of 3,220 µg/L), ethylbenzene (maximum of 6,660 µg/L), isopropylbenzene (maximum of 361 µg/L), m,p-xylene (maximum of 19,200 µg/L), o-xylene (maximum of 7,320 µg/L), and toluene (maximum of 11,700 µg/L). Seven SVOCs were detected above the Class GA standards in one of the two groundwater samples (TW-6), including: 1,1'-biphenyl (26.9 µg/L), benzo(a)anthracene (1.8 µg/L), benzo(a)pyrene (0.84 µg/L), benzo(b)fluoranthene (1.1 µg/L), benzo(k)fluoranthene (0.3 µg/L), chrysene (1.4 µg/L), and indeno(1,2,3-cd)pyrene (0.52 µg/L). Six metals were detected in the dissolved groundwater sample, with three metals including iron, manganese, and sodium exceeding their respective Class GA standards. No PCBs or pesticides were detected in the groundwater samples analyzed. Due to a slow recharge rate at temporary well location TW-6, a sufficient groundwater sample could not be collected for all analyses. Metals were not analyzed for TW-6 due to low recovery; groundwater sample TW-6 was only analyzed for VOCs, SVOCs, PCBs and pesticides;

8. Soil vapor samples collected during the RI showed that 35 VOCs were detected in all soil vapor samples; however, none exceeded the Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Note that the AGVs are associated with indoor air conditions; therefore, the comparison assumes that any soil vapor detected would completely penetrate into a new building, a condition that does not typically occur, nor would be expected for the proposed construction. Several solvent-related VOCs, including acetone (maximum concentration of 62.7 µg/m3), chloroform (maximum concentration of 14 µg/m3), TCE (maximum concentration of 0.81 micrograms per cubic meter [µg/m3]), and PCE (maximum

concentration of 23 µg/m3) were detected. VOCs associated with petroleum [including benzene, toluene, ethylbenzene, xylenes (collectively referred to as BTEX), 1,2,4-trimethylbenzene, cyclohexane, heptane, hexane, and 2,2,4-trimethylpentane] were detected in all four soil vapor samples at concentrations up to 523 µg/m3 (2,2,4-trimethylpentane at SV-2).

Geotechnical Investigation Report, GeoTech Consultants, LLC, September 15, 2017

The findings of the Geotechnical Investigation Report were as follows:

- The borings revealed a general soil profile of 12feet-16feet of miscellaneous fill, followed by mostly medium dense to dense glacial sands to the termination depth of the borings
- Groundwater was observed in the deepest boring at a depth of 90 feet bgs.
- With cellar floor being set at a depth of 20 feet bgs, one can expect that footings for support of the proposed building will likely be established a few feet below that to bear on natural glacial sand soil, which is deemed suitable for foundation support. However as findings of boring B-5 indicated, there exist localized inferior layers of Class 6 loose sand in areas and at depth (possibly between borings). To ensure footings do not yield excessive differential settlements, it is necessary that the footings be designed with moderate bearing capacity and that all footing subgrade be subject to densification and special inspection prior to placing concrete.

Phase I Environmental Site Assessment, GZA, December 2017

Based on the findings of the Phase I ESA, GZA identified the following in connection with the Site:

- The Site is assigned the NYC 'E'-Designation No. E-163 for Hazardous Materials, Noise and Air Quality. In 2015, a remedial investigation, consisting of the collection and analyses of soil and groundwater samples, was performed. The soil and groundwater analytical results showed petroleum contaminant constituents exceeding the NYSDEC regulatory guidance values, indicating the presence of petroleum products in the subsurface. Based on the RIR results, the NYSDEC established a Spill Case (No. 1602145) at the Site.
- The 50-24 Queens Boulevard property, located across Queens Boulevard to the southeast of the Site, was historically a filling station (from 1932 until circa 2006). On December 7, 2017, the NYSDEC

indicated that the spill at this former Shell Service Station (Spill No. 9805297) has not been sufficiently delineated.

- The 50-01 Queens Boulevard property, located adjacent to west of the Site, was historically a filling station (from 1932 until circa 1951). A Spill was reported on March 25, 1996, for an unknown amount of gasoline contaminated soil. On September 2008, the NYSDEC contacted the existing tenant to investigate the case. However, upon further review, the NYSDEC did not find sufficient information regarding the historical reporting and soil investigation. The Spill Case was subsequently closed.

Remedial Investigation Report, GZA, May 2018

The 2018 Remedial Investigation findings are summarized below.

- The elevation of the property ranged from approximately 92 to 94 feet, based on the Borough President of Queens Datum.
- Depth to perched groundwater ranged from approximately 16 to 22 feet bgs.
- Perched groundwater is inferred to flow to the northwest.
- The subsurface underneath the Site consisted of the following:
  - UPPER FILL: Fill materials were encountered in the Site test borings from directly below the surface to a depth of about 10 to 11 feet. The Fill consisted of light brown to brown, fine to coarse sand, and gravel, containing up to 20 percent silt, 10 percent cobbles, and varying amounts of brick, and concrete fragments.
  - CONCRETE: 6 to 12 inches of concrete were encountered below the upper fill layer.
  - LOWER FILL: 5 to 6 feet of fill was encountered in the Site test borings from directly below the concrete. The Fill consisted of light brown to gray, fine to coarse Sand, and Gravel, containing up to 20 percent silt, 10 percent cobbles, and varying amounts of brick, and concrete fragments.
  - SAND: A Sand stratum was encountered below the Fill. This stratum consists of light brown to brown to gray, fine to coarse sand, with up to 35 percent gravel, and 20 percent silt.
- For the NYSDEC spill delineation investigation, GZA encountered the following underneath the sidewalk of 51st Street and Queens Boulevard:
  - SURFACE COVER: 6 to 12 inches of concrete was encountered at the sidewalk borings. In some locations asphalt of about 6-inch thick was encountered underlying the concrete.

- FILL: Fill was encountered in the sidewalk test borings from directly below the surface cover to depths of about 3 to 7 feet. The Fill consisted of light brown to brown, fine to coarse sand, and gravel, containing up to 20 percent silt, 10 percent cobbles, and varying amounts of brick, and concrete fragments.
- SAND: A Sand stratum was encountered below the Fill in the sidewalk test borings. The Sand stratum varied in thickness to about 21 to 27 feet thick. This stratum consists of light brown to reddish-brown, fine to coarse sand, with up to 35 percent silt, and 10 percent gravel.

- Soil/fill sample results for the soil samples collected during the 2015 RI by AKRF and supplemented during the 2018 RI by GZA were compared to the NYSDEC 6 NYCRR Part 375 Section 6.8 Unrestricted Use and Restricted Residential Use SCOs. The soil analytical results showed that:
  - No PCBs were detected exceeding SCOs.
  - Five VOCs including 1,2,4-trimethylbenzene, at 10 mg/kg, benzene (maximum 0.33 mg/kg), ethylbenzene (maximum 38 mg/kg), toluene at 41 mg/kg, and xylene (maximum 179 mg/kg) were detected exceeding Unrestricted Use SCOs in deep samples. Of these samples, xylene also exceeded Restricted Residential SCOs in one deep sample (SB-6, 8.5-10 feet).
  - Five SVOCs including benzo(a)anthracene at 2 mg/kg, benzo(a)pyrene at 1.8 mg/kg, benzo(b)fluoranthene at 2.5 mg/kg, chrysene at 1.8 mg/kg, and indeno(1,2,3-cd)pyrene at 1.4 mg/kg were detected exceeding Unrestricted Use SCOs in one deep sample (GZASB-5, 13-15 feet).
  - Five pesticides including 4,4'-DDD at 0.0091 mg/kg, 4,4'-DDE at 0.0296 mg/kg, 4,4'-DDT (maximum 0.022 mg/kg), cis-Chlordane at 0.135 mg/kg, and dieldrin at 0.0488 mg/kg were detected exceeding Unrestricted Use SCOs in shallow and deep samples.
  - Three metals including chromium at 30.1 mg/kg, lead at 82.1 mg/kg, and mercury (maximum 0.22 mg/kg) were detected exceeding Unrestricted Use SCOs in shallow and deep samples.

Overall, soil chemistry is similar to sites with historic urban fill material in New York City.

- Perched groundwater samples collected during the 2015 RI by AKRF and supplemented during the 2018 RI by GZA were compared to New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). The samples showed:

- Pesticides or PCBs were not detected at exceeding concentrations.
- Several VOCs including 1,2,4-trimethylbenzene (maximum 400 µg/L), 1,3,5-trimethylbenzene (maximum 130 µg/L), benzene (maximum 3,220 µg/L), ethylbenzene (maximum 6,660 µg/L), isopropylbenzene (maximum 361 µg/L), n-butylbenzene at 9.1 µg/L, n-propylbenzene (maximum 110 µg/L), naphthalene at 45 µg/L, o-xylene (maximum 7,320 µg/L), p/m-xylene (maximum 19,200 µg/L), sec-butylbenzene at 8.8 µg/L, and toluene (maximum 11,700 µg/L) were detected exceeding NYSDEC Class GA Ambient GQSs.
- Five SVOCs including1,1'-Biphenyl at 26.9 µg/L, benzo(a)anthracene (maximum 0.03 µg/L), benzo(a)pyrene at 0.84 µg/L, benzo(b)fluoranthene at 1.1 µg/L, chrysene at 1.4 µg/L, indeno(1,2,3-cd)pyrene (maximum 0.52 µg/L), and naphthalene (maximum 1,410 µg/L) were detected exceeding their respective GQSs in five of the six wells.
- Several metals including antimony at 11 µg/L, barium at 2,320 µg/L, beryllium at 19 µg/L, chromium at 183 µg/L, copper at 1,140 µg/L, iron (maximum 273,000 µg/L), lead at 150 µg/L, magnesium at 69,200 µg/L, manganese (maximum 34,400 µg/L), nickel at 429 µg/L, sodium (maximum 362,000 µg/L), and thallium at 27 µg/L were detected exceeding their respective GQSs in dissolved samples.

- Soil vapor samples collected during the 2015 RI by AKRF and supplemented during the 2018 RI by GZA were compared to the New York State Department of Health (NYSDOH) Final Guidance on Soil Vapor Intrusion (May 2017) Matrix A, B, and C guidance values. Soil gas samples showed petroleum-related VOCs and chlorinated VOCs present at low concentrations. The total concentration of petroleum-related VOCs (i.e., BTEX) ranged from 113.1 µg/m^3 to 5,970 µg/m^3. Overall, the highest reported concentration was for ethylbenzene (maximum 5,970 µg/m^3). The chlorinated VOC, tetrachloroethene (PCE) was detected in four soil vapor samples at concentrations between 1.4 µg/m^3 to 23 µg/m^3. Methylene Chloride was detected in four soil vapor samples at concentrations between 2.3 µg/m3 to 3.5 µg/m^3. The chlorinated VOC 1,1,1-trichloroethane was detected in two soil vapor samples at 2.3 µg/m^3. Trichloroethene (TCE) was detected in one sample at 0.81 µg/m^3. The chlorinated VOC vinyl chloride was also detected in one sample at 2 µg/m^3. The chlorinated VOCs 1,1-dicloroethene, cis-1,2-dichloroethene and carbon tetrachloride were not detected in any of the samples. Concentrations of all chlorinated VOCs were within the monitoring level ranges established

within the NYSDOH soil vapor guidance matrix.

Supplemental Soil Vapor Investigation Report, GZA, September 12, 2018

The Supplemental Soil Investigation laboratory analytical results show typical petroleum hydrocarbons and cleaning solvents in the soil vapor at petroleum-related VOCs and chlorinated VOCs present at low concentrations. The redevelopment of the property and the proposed remedial action to address the soil vapor contamination will remain in accordance with the OER-approved RAWP.

Waste Characterization Sampling Report, GZA, January 8, 2019

The Waste Characterization Sampling laboratory result showed that except for acetone (a known laboratory contaminant) the analytical results of the sample show that VOCs were either not detected or detected below the Unrestricted Use and Residential Use SCOs. The analytical results showed that majority of the SVOCs were either not detected or detected below the Unrestricted Use and Residential Use SCOs. Only two samples, GZA SB-5, and WC-4, exhibited concentrations of PAHs above the soil cleanup values.

Although several metals were detected in the soil sample, only lead and mercury were detected at concentrations exceeding the Unrestricted Use SCO and no metal exhibited concentrations that exceeded the applicable Residential Use SCOs. No PCBs were detected in the soil samples. Analytical results show some concentrations of pesticides 4,4'-DDT and 4,4-DDE above Unrestricted Use SCOs, but below Residential Use SCOs. The sampling results indicated that the sampled soils are considered Non-Hazardous based on RCRA characteristics and that TCLP sample results for metals were either below detection limits, or below the EPA toxicity guidance values and are therefore considered non-hazardous.

The 2015 Remedial Investigation Report, Geotechnical Investigation Report, Phase I Environmental Site Assessment, 2018 Remedial Investigation Report, Supplemental Soil Vapor Investigation Report, and Waste Characterization Sampling Report are included in **Appendix B.**

2.0 DESCRIPTION OF REMEDIAL ACTIONS

The Remedial Action was performed following an OER-approved Remedial Action Work Plan and achieved the Remedial Action Objectives established for the project. The Remedial Action was evaluated in an alternatives analysis and was determined to be protective of human health and the environment, compliant with standards, criteria, and guidelines (SCGs), effective in the short-term, effective in the long-term, capable of attaining appropriate levels of reduction of toxicity, mobility, or volume of contaminated material, implementable, cost-effective, acceptable to the community, consistent with land uses, and sustainable.

A summary of the milestones achieved in the Remedial Action is as follows:

- Remedial Investigation was performed in March 2015 by AKRF and summarized in June 2016 RIR.
- NYSDEC Spill 16-02145 was opened in March 2015.
- A Phase I Environmental Site Assessment was performed in December 2017
- A Pre-Application Meeting was held with the owner, 50-11 Queens Blvd LLC, and the developer, Sunlight Construction AA, on December 14, 2017.
- A Supplemental Remedial Investigation (RI) was performed by GZA from February to March 2018.
- A Supplemental Soil Vapor Investigation was performed by GZA on August 22, 2018.
- A RI Report was prepared to evaluate data and information necessary to develop a Remedial Action Work Plan (RAWP).
- A Site Contact List was established.
- A Draft RAWP was prepared and released with a Fact Sheet on August 15, 2018, for a 30-day public comment period.
- The RAWP dated July 19, 2018, and Stipulation List dated November 6, 2018, were approved by the New York City Office of Environmental Remediation (OER) on November 21, 2018.
- Site briefings were conducted with the NYSDEC on December 11, 2018.
- A Pre-Construction Meeting was held on January 14, 2019.
- A Fact Sheet providing notice of the start of the remedial action was issued on January 25, 2019.

- The Stipulation List was revised on March 15, 2019 to remove the application of Oxygen Release Compound (ORC) from the remedial action based on correspondence with the NYSDEC Spill case manager.
- A Delineation Study was conducted for Spill 16-02145 between January to June 2019.
- The Remedial Action began in January 2019 and was completed in June 2019.

The RAWP and Stipulation Letter is included in **Appendix C**.

The remedial action consisted of the following tasks:

1. Prepared a Community Protection Statement and implemented a Citizen Participation Plan.
2. Mobilized site security and equipment; completed utility mark outs; and marked and staked excavation areas.
3. Additional soil vapor investigation was performed to supplement investigation data due to potential environmental impacts from historic on-site/off-site operations. Two soil vapor samples were collected, and results were submitted to OER on September 12, 2018, through the Supplemental Soil Vapor Investigation Report.
4. Performed Waste Characterization Study before excavation activities. Eleven (11) waste characterization soil samples were collected on February 9, 2018. Waste characterization samples were collected at a frequency dictated by disposal facilities.
5. Performed a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
6. Established Track 4 Site Specific SCOs. The following Track 4 SCOs were utilized: Petroleum-related VOCs: CP-51 Table 2; Total SVOCs: 200 mg/kg; Lead: 800 mg/kg; and Mercury: 1.5 mg/kg.
7. The following excavations were performed:
    - As part of the development, the entire lot was excavated down to between 14 to 16 feet below bgs for the construction of the sub-grade structures, 18 feet bgs for building foundation elements, 18 to 23 feet bgs for the area adjoining to elevator pit, and a maximum of 23 feet bgs for the elevator pit and sewage pump pit.
    - As part of remediation of Spill 16-02145, two areas in the southeastern portion of the Site were over-excavated to 18 feet bgs and 21 feet bgs, respectively. During excavation, petroleum-contaminated

areas at the southeast corner of the Site (Grid-3), designated as Areas of Concern (AOCs), were encountered, and were removed from the Site.

8. Screened excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
9. Conducted materials management of excavated materials including temporarily stockpiling and segregating per defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10. Appropriately segregated excavated media on-site before disposal. Transported and disposed of all soil/fill material at permitted facilities following all applicable laws and regulations for handling, transporting, and disposing of, and the RAWP.
11. A total of 13,358.43 tons (approximately 8,300 cubic yards) or 415 truckloads of soil/fill was excavated and removed from the Site. The disposal of the excavated material was broken out as follows:
    - Approximately 640 cubic yards (1072.27 tons) of petroleum-impacted soil/fill (i.e., or 32 truckloads from AOCs) and transported to Doremus Avenue Redevelopment Project located at 191 Doremus Avenue, Newark, NJ
    - Approximately 4,400 cubic yards (7,221.24 tons) or 221 truckloads of non-hazardous soil/fill and transported it to Doremus Avenue Redevelopment Project located at 191 Doremus Avenue, Newark, NJ;
    - Approximately 2,600 cubic yards (4,074.92 tons) or 129 truckloads of non-hazardous soil/fill and transported it to PPARK NJ located at 100 Platen Avenue, Prospect Park, NJ;
    - Approximately 660 cubic yards (990 tons) or 33 truckloads of fill through the NYC Clean Soil Bank; with 360 cubic yards of clean soil and transported to 826 4th Avenue, Brooklyn, NY and 300 cubic yards of clean soil and transported to 38-01 Queens Blvd, Woodside, NY.
12. Ten site-wide endpoint soil samples were collected and analyzed to determine the attainment of SCOs. Two VOCs were detected at concentrations above their respective Track 4 Site Specific SCOs (NYSDEC CP-51 petroleum standards) in one endpoint sample (EP-2 at 16 feet bgs). This area was excavated deeper as part of the AOC excavations. However, the perched water table showed petroleum impacts down to the depth of excavation with VOCs exceeding CP-51 at all four AOC endpoint samples.

13. No underground storage tanks were encountered.
14. Remediation of NYSDEC Petroleum Spill Case No. 16-02145, which was opened on March 2, 2015 during preliminary remedial investigation activities. AOCs were encountered in the southeastern portions of the Site (Grid-3). As part of the remedial action, approximately 640 cubic yards (1,072.27 tons) of petroleum-impacted soil was excavated and removed from the property. Five AOC endpoint samples were obtained for spill closure. On December 9, 2020, GZA submitted a Spill Closure Report to NYSDEC. On December 11, 2020, the NYSDEC closed Spill Case No. 16-02145 with no further action required.
15. Constructed an engineered Composite Cover System consisting of a minimum of 5 inches of reinforced concrete slab underlain by 8 inches of clean sub-base material in the building footprint to prevent human exposure to residual soil/fill remaining under the Site. The Contractor for the cover construction was Sunlight Construction AA.
16. Installed a Vapor Barrier System that consisted of W. R. Meadows Precon, which is a 73-mil thick composite sheet membrane comprised of an elastomeric membrane bonded to a seven-ply plasmatic matrix and a non-woven geotextile fabric. The Contractor for the Vapor Barrier System construction was Sunlight Construction.
17. Constructed and operated a cellar level parking garage with high volume air exchange in conformance with NYC Building Code.
18. Residual soil is present beneath the cover layer and will be subject to Site Management under this Remedial Action. Residual soil was demarcated as soil located beneath the composite cover's clean sub-base material and will be subject to Site Management under this Remedial Action.
19. Performed all activities required for the Remedial Action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
20. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
21. Used imported ¾-inch recycled concrete aggregate (RCA) for backfilling around the exterior walls in compliance with the Remedial Action Work Plan and accordance with applicable laws and regulations.
22. Submitted daily, weekly, and monthly reports during construction oversight activities. Daily, and weekly reports were submitted from January 9, 2019 to June 26, 2019. Monthly field reports were submitted from July 2019 to May 2020.

23. Submitted a Sustainability Report.
24. Submitted this RAR that describes the Remedial Action, certifies that the remedial requirements defined in the Remedial Action Work Plan have been achieved; defines the Site boundaries; describes all Engineering and Institutional Controls applicable to the Site; and describes any changes from the RAWP.
25. Submitted a Site Management Plan (SMP) for long-term management of residual soil, including plans for operation, maintenance, inspection, and certification of the performance of Engineering Controls and Institutional Controls. Inspections will be performed annually. Inspection and Certification reports will be submitted by July 30, 2023 (for the reporting period calendar year 2021-2022), July 30, 2027 (for the reporting period calendar years 2023-2026), July 30, 2037 (for the reporting period calendar years 2027-2036) and every ten years thereafter (for the reporting period consisting of the same ten prior calendar years). Inspection and Certification Reports will cover all calendar years since the prior reporting period.
26. The property will continue to be registered with an E-Designation by the NYC Department of Buildings. Engineering Controls and Institutional Controls will be managed in compliance with the SMP. Institutional Controls will include prohibition of the following: (1) prohibition of vegetable gardening and farming in residual soil; (2) prohibition of the use of groundwater beneath the site without treatment rendering it safe for the intended use; (3) prohibition of disturbance of residual soil unless it is conducted in accordance with the SMP; and (4) prohibition of higher levels of land usage than the restricted residential uses as described in **Section 7** addressed by this remedial action without prior notification and approval by OER.

3.0 COMPLIANCE WITH REMEDIAL ACTION WORK PLAN

3.1 Construction Health & Safety Plan

The remedial construction activities performed under this program complied with the Construction Health and Safety Plan and applicable laws and regulations. The Site Safety Coordinator was Harry Zhao of Sunlight Construction AA.

3.2 Community Air Monitoring Plan

The Community Air Monitoring Plan provided for the collection and analysis of air samples during remedial construction activities to ensure proper protections were employed to protect workers and the neighboring community. Monitoring was performed from January 22, 2019 to June 4, 2019, in compliance with the Community Air Monitoring Plan in the approved RAWP. When exceedances were encountered, dust mitigation actions were implemented such as using water to weigh down the soil. The results of Community Air Monitoring are included in **Appendix D**.

3.3 Soil/Materials Management Plan

The Soil/Materials Management Plan provided detailed plans for managing all soil/materials that were disturbed at the Site, including excavation, handling, storage, transport, and disposal. It also included a series of controls to assure effective, nuisance-free remedial activity in compliance with applicable laws and regulations. Remedial construction activities performed under this program complied with the SMMP in the approved RAWP.

3.4 Storm-water Pollution Prevention

Stormwater pollution prevention included physical methods and processes to control and/or divert surface water flows and to limit the potential for erosion and migration of Site soils, via wind or water. Remedial construction activities performed under this program were in full compliance with methods and processes defined in the RAWP for stormwater prevention and applicable laws and regulations.

3.5 Deviations from the Remedial Action Work Plan

The following deviations from the RAWP were observed during remedial actions:

- The approved RAWP proposed waterproofing/vapor barrier membrane was a 46-mil Grace Preprufe

300R (or equivalent) below the slab throughout the full building area and a 31-mil Grace Preprufe 160R (or equivalent) outside all sub-grade foundation sidewalls. On behalf of our Client, GZA submitted a memorandum to the NYC OER to change the vapor barrier products to 73-mil W.R. Meadows PRECON composite sheet membrane with HYDRALSTIC 836 to seal penetrations, which are approved equivalent for Grace Preprufe 300R. OER correspondence dated April 17, 2019, approved the proposed change. The correspondence is included in **Appendix E**.

- According to the OER-approved RAWP, the proposed final bottom of excavation was approximately 15 feet bgs for the construction of the building cellar and foundation. It was expected that the total quantity of soil/fill to be excavated and disposed of off-Site is 6,650 cubic yards (9,975 tons). Due to the construction of foundation elements and the excavation of petroleum-impacted soil, the entire lot was excavated to depths between 14 to 16 feet bgs for most of the building footprint. However, several areas were excavated deeper to install building foundation elements, the elevator pit, the sewer ejector pit, and several areas were over excavated as part of spill remediation. Two areas in the southeastern portions of the Site were over excavated to 18 feet bgs and 21 feet bgs, respectively, to remove petroleum-impacted soil. A total of 13,358.43 tons (or approximately 8,300 cubic yards) of soil/fill was excavated and removed from the property representing approximately 25% additional soil excavation as part of the remedial action. OER and NYSDEC were notified of these changes in remedial scope in correspondence included in **Appendix E**.
- As part of spill remediation, two areas in the southeastern portions of the Site were over excavated to 18 feet bgs (approximately 210 square feet) and 21 feet bgs (approximately 150 square feet), respectively. Perched groundwater was encountered intermittently at depths greater than 18 feet bgs, during the excavation of the elevator pit. The horizontal flow of the perched water table was cut-off with steel sheeting to construct the elevator pit and sewer ejector sump pit. Other remedial excavations to depths greater than 18 feet bgs were performed in the wet soils, and spoils were allowed to dry prior to transportation off-site. Stockpiled soils were stored on top of 10 mil poly sheeting, then completely covered with another layer of 10 mil poly sheeting which was weighed down to prevent any mobility of the soil.
- The proposed SCOs for this Remedial Action were Track 4 Site-Specific SCOs. The VOC petroleum constituents as identified in CP-51 were listed as Track 4 SCOs for the Site. GZA collected and analyzed end-point samples to determine the attainment of SCOs. Several VOCs were detected at

concentrations above their respective Track 4 Site Specific SCOs in site-wide and AOC endpoint samples.

- The approved RAWP proposed a composite cover system will be comprised of a nominal 6 inches of reinforced concrete slab underlain by 8 inches of clean sub-base material in the building footprint. Due to design changes, the as-built composite cover system was comprised of a minimum of 5 inches of reinforced concrete slab underlain by 8 inches of clean sub-base material in the building footprint.
- According to the OER-approved RAWP, on-site reuse of soils was not planned. Approximately 70 cubic yards of clean soil was excavated from the northern portion of the Site and was reused to backfill the over excavated areas in the southeastern portion of the Site. The reused material, from depths ranging between 10 to 15 feet bgs, consisted mainly of light brown to brown to gray, fine to coarse sand, with up to 35 percent gravel, 20 percent silt, and a trace amount of brick and concrete fragments. The reused soil, characterized during RI and Waste Characterization, met Track 2 Residential Use SCOs and Groundwater Protection Standards.
- After careful review of all data and information, it was determined that the remedial activities would be protective of public health and the environment to manage contamination remaining in place. The majority of historical fill and petroleum impacted materials were removed to the extent practicable during the removal action and all remaining materials above the CP-51 cleanup levels are present under a permanent cover, eliminating any potential for public health exposure. The composite cover and vapor barrier system are protective of the health of building occupants and will be inspected and maintained over the long term under a Site Management Plan ensuring that the cover remains intact and functioning as designed. Further, any future excavation on the property would be controlled by continued registration of the E-designation and adherence to the soil and materials management plan to ensure safe handling and proper reconstruction of the cover when work was complete. Observed petroleum-impacts appeared to be associated with contamination migrating on to the Site at the perched water table from the upgradient source. No on-site source of petroleum contamination was observed. Since onsite groundwater use is prohibited from the potable supply, which would ensure that there are no direct exposures through ingestion of groundwater. The NYSDEC closed Spill Case No. 16-02145 at the Site.

Correspondence related to these deviations are included in **Appendix E.**

4.0 REMEDIAL PROGRAM

The following section presents a summary of the remedial program from project organization to RAWP completion. The photographs of remedial action are included in **Appendix A** and the Field Reports are included in **Appendix F**.

4.1 Project Organization

Principal personnel who participated in the remedial action include Zhuo Lin (50-11 Queens Boulevard LLC), Reinbill Maniquez (Senior Project Manager/Qualified Environmental Professional – GZA), Stephen M. Kline (Principal in Charge/Professional Engineer – GZA), Ernest Hanna (Professional Engineer – GZA), Myrna Hanna and Horace Zhang (Project Manager OER), Harry Zhao, Quan Lin, and Henry Huang (General Contractor - Sunlight Construction, LLC). The Professional Engineer (PE) for this project is Stephen M. Kline (GZA).

4.2 Site Controls

This section presents the Site controls that were implemented throughout the remedial effort to control the migration of contaminations and to minimize impacts to the surrounding community and the environment.

4.2.1 Site Preparation

On December 11, 2018, a pre-construction meeting was held with the parties involved with the remedial process. Representatives from OER, 50-11 Queens Blvd LLC, and GZA attended the event to discuss logistical and site preparation work before the ensuing mobilization. Site preparation activities occurred in the weeks leading up to February 22, 2019. Site preparation activities included the mobilization of heavy equipment to the Site, the erection of a construction fence along the perimeter, and the demolition and clearing of existing structures. The presence of utilities and easements on the Site was identified before the performance of invasive work such as excavation and drilling under this plan by using, at a minimum, the One-call System (811). A stabilized site construction entrance was prepared in advance of heavy equipment arriving at the Site. The entrance was constructed consistent with NYSDEC Erosion and Sediment Control guidance with appropriate suitable gravel placed on the geotextile membrane. The entrance was pitched onto the Site to help prevent soil from washing onto the street during rain events.

Street catch basins in front of and nearby the site were protected with berms and geotextile to limit sediment potentially released from the Site from collecting in the sewers. The necessary approvals were obtained from the NYC DOB, NYC OER, and other NYC agency approvals were secured before the start of construction. A NYC OER Project Notice was erected at the project entrance and in place during all phases of the Remedial Action.

4.2.2 Soil Screening

Excavations were supervised by a qualified environmental professional. In addition to sampling and chemical testing of soil on the Site, excavated soil was screened continuously using a hand-held PID, by observation, and by odor. This protocol was performed routinely during the excavation in conjunction with the results of the prior performed RIR and multiple waste characterization events performed. These steps allowed for proper material handling and management, and community protection.

4.2.3 Stockpile Management

Excavated soil was either direct loaded on to trucks or stockpiled and segregated from clean soil and construction materials. Soil stockpiles were kept covered with polyethylene (poly) sheeting to prevent dust, odor, and erosion. Soil excavated from AOC was stockpiled on, at minimum, a layer of 8-mil poly sheeting, and was kept covered at all times with appropriately anchored plastic tarps. Stockpiles were inspected daily, and before and after every storm event.

4.2.4 Truck Inspection

An outbound-truck inspection station was set up at the Site exit. Before exiting the Site, trucks were required to stop at the inspection station and were examined for evidence of contaminated soil on the undercarriage, body, and wheels. Brooms, shovels, and pressurized potable water were utilized for the removal of soil from vehicles and equipment, as necessary. Loaded trucks leaving the Site were covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks were properly recorded in logs and records and placarded in compliance with applicable City, State, and Federal laws, including those of the New York State Department of Transportation. Egress points for trucks and equipment transport from the Site were kept clean of dirt and other material during the site development. Soil and fill from the Site were not tracked into the surrounding community

All transport of materials was performed by licensed truckers and in compliance with applicable laws and regulations. A truck route to and from the Site from the nearest major highway was selected and considered to limit transport through residential areas, emphasize the use of defined truck routes, limit the total distance to the major thoroughfares and maintain safety in access to highways.

4.2.5 Site Security

The Site was secured with construction fencing along the perimeter. Unauthorized personnel were not allowed access to the Site. During off-hours, the Site was secured with a locked gate and guarded by security personnel once the equipment was mobilized to the Site.

4.2.6 Nuisance Controls

Vapor and dust management was implemented according to the RAWP. Particulates were monitored using both stationary and handheld equipment. The stationary equipment included two sets of Community Air Monitoring Plan (CAMP) stations (i.e., upwind, and downwind). Each set contained a MiniRAE 3000 PID and a TSI8530 Dust Trak II in an enclosure. The monitoring was conducted following the CAMP and HASP. Air monitoring was also performed utilizing handheld equipment, a MiniRAE 3000 PID. Air monitoring was performed during the duration of the intrusive work activities, and the air-monitoring data was utilized to determine what actions were required to control vapor, odor, and dust emissions. Petroleum-impacted soil was excavated during development, and 50-11 Queens Blvd LLC was notified of conditions during excavation that were considered of impact to the community. The means of odor-minimization during soil management activities included limiting the area of open excavations, the monitoring of odors in the surrounding areas, and the application of odor suppressant foam. Dust generated during the implementation of the remedy was suppressed using a hose system connected to the nearby fire hydrant. To GZA's knowledge, there were no complaints registered from the community during the remedial action.

4.2.7 Reporting

Daily field activities were documented in Daily Field Reports (DFRs) by GZA field representatives. DFRs included details such as the project number, statement of the activities, locations of work performed, quantities of material imported and exported from the Site, disposal facility, truck manifests, the status of

on-Site soil/fill stockpiles, a summary of all citizen complaints, with relevant details (the basis of the complaint; actions are taken, etc.), samples collected, air monitoring data, problems encountered, highest readings of the day, an update of construction progress, and photographs documenting the work performed that day.

After the completion of intrusive soil work and composite cover system construction, field reporting frequency was changed from daily to weekly, and subsequently monthly with the concurrence of OER. The reports providing a general summary of remedial work activities for each day or a period were uploaded to the OER EPIC website. Daily reports were not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP, or other sensitive or time-critical information. However, such information was included in the daily reports. Emergency conditions and changes to the RAWP were communicated directly to the OER project manager by personal communication. All daily, weekly, and monthly reports are included in **Appendix F**. Digital photographs of the Remedial Action are included in **Appendix A**.

4.3 Materials Excavation and Removal Action

4.3.1 Soil/Fill Excavation and Removal

As part of the development, the entire lot was excavated to between 14 to 16 feet bgs for the construction of the sub-grade structures, 18 feet bgs for building foundation elements, 18 to 23 feet bgs for the area adjoining to elevator pit, and a maximum of 23 feet bgs for the elevator pit and sewage pump pit. According to the OER-approved RAWP, the proposed final bottom of excavation was approximately 15 feet bgs for the construction of the building cellar and foundation. It was expected that the total quantity of soil/fill to be excavated and disposed of off-Site is 6,650 cubic yards (9,975 tons). Due to the construction of foundation elements and the excavation of petroleum-impacted soil, the entire lot was excavated to depths between 14 to 16 feet bgs for most of the building footprint. However, several areas were excavated deeper to install building foundation elements, the elevator pit, the sewer ejector pit, and several areas were over excavated as part of spill remediation. As part of this spill remediation, two areas in the southeastern portions of the Site were over excavated to 18 feet bgs and 21 feet bgs, respectively, to remove petroleum-impacted soil. A total of 13,358.43 tons (or approximately 8,300 cubic yards) of soil/fill was excavated and removed from the property representing approximately 25% additional soil excavation as part of the remedial action. OER was notified of these changes in remedial scope in

correspondence. A map showing the approximate locations where excavations were performed, and the approximate thickness of excavated material is shown on **Figure 4**.

4.3.2 Removal Action.

A total of 13,358.43 tons (8,300 cubic yards) of soil/fill was excavated and removed from the property during the Removal Action. Materials removed from the property under this Removal Action are generally classified, as follows: 660 cubic yards of clean soil, 7,020 cubic yards of non-hazardous soil/fill, and 640 cubic yards of petroleum-impacted non-hazardous soil/fill.

Clean soil consisted of light brown to brown to gray, fine to coarse sand, with up to 35 percent gravel, 20 percent silt, and a trace amount of brick and concrete fragments. Clean soil was encountered in portions of the Site between 10 to 15 feet bgs. The quantity of native soil removed from the property and recycled using the NYC Clean Soil Bank is 660 cubic yards.

The non-hazardous soil/fill comprised light brown to brown, fine to coarse sand, and gravel, containing up to 20 percent silt, 10 percent cobbles, and varying amounts of brick, and concrete fragments. Petroleum-like odor and elevated PID readings were noted in petroleum impacted non-hazardous soil/fill, which was characterized as brown to black, fine to coarse sand, and gravel, containing up to 20 percent silt, 10 percent cobbles, and varying amounts of brick, and concrete fragments. Non-hazardous soil/fill was encountered up to 16 to 23 feet bgs.

Areas in the southeastern portions of the Site were over excavated to 18 feet bgs and 21 feet bgs to remove petroleum-impacted soil.

4.3.3 Removal Action Performance Criteria.

The removal action performance criteria are based on the construction development plans. According to the OER-approved RAWP, the proposed final bottom of excavation was approximately 15 feet bgs for the construction of the building cellar and foundation. It was expected that the total quantity of soil/fill to be excavated and disposed of off-Site is 6,650 cubic yards (9,975 tons). Due to the construction of foundation elements and the excavation of petroleum-impacted soil, the entire lot was excavated to depths between

14 to 16 feet bgs for most of the building footprint. However, several areas were excavated deeper to install building foundation elements (i.e., Areas of Concern [AOCs]), the elevator pit, the sewer ejector pit, and several areas. Two areas in the southeastern portions of the Site were over excavated to 18 feet bgs and 21 feet bgs, respectively, to remove petroleum-impacted soil. The AOCs were over excavated as part of spill remediation. A map showing the approximate location of hotspots/AOCs removed in this Removal Action is shown on **Figure 4**.

4.3.4 Onsite Reuse**.**

According to the OER approved RAWP, on-site reuse of soils was not planned. Clean soil excavated from the northern portion of the Site was reused to backfill the over excavated areas in the southeastern portion of the Site. Approximately 70 cubic yards of material, from depths ranging between 10 to 15 feet bgs, consisted mainly of light brown to brown to gray, fine to coarse sand, with up to 35 percent gravel, 20 percent silt, and a trace amount of brick and concrete fragments. The reused soil, characterized during RI and Waste Characterization, met Track 2 Residential Use SCOs and Groundwater Protection Standards. A map showing the approximate source location of reused soil and the location of the placement of reused soil is shown on **Figure 5**.

4.3.5 UST Removal.

No USTs were encountered during the remedial activities.

4.3.6 NYSDEC Petroleum Spills

In 2015, a remedial investigation consisting of the collection and analyses of soil and groundwater samples was performed at the Site. The soil and perched groundwater analytical results showed petroleum contaminant constituents exceeding the NYSDEC regulatory guidance values. Based on the remedial investigation results, the NYSDEC established a Spill Case No. 16-02145 at the Site. The NYSDEC Spill Incidents Database indicated that a petroleum release was reported at the Site on June 6, 2016. The material spilled was identified as gasoline, and the cause of the spill was reported as “equipment failure.” The quantity of material spilled is listed as “unknown.”

The 50-24 Queens Boulevard property (located across Queens Boulevard to the southeast of the Site) was

a filling station from 1932 until circa 2006. The NYSDEC regulatory database records showed that the tanks were removed and closed. However, the property has an open spill case (Spill No. 9805297). On December 7, 2017, the NYSDEC indicated that the spill at this former Shell Service Station has not been sufficiently delineated. In January 2018, correspondence between Shell and NYSDEC documented an on-going effort to delineate the contaminant plume.

Based on the OER-approved Stipulation List dated March 15, 2019, and NYSDEC's August 15, 2018 correspondence, groundwater remediation, and monitoring are not required or warranted for the closure of Spill Case No. 16-02145.

The following regulatory correspondences related to the Site were also reviewed by GZA:

- Notice of No Objection, July 25, 2011, by NYC OER, sent to Queens Borough Commissioner, NYC Department of Buildings
- Spill Report Form for Case No. 16-02145, June 1, 2016, by NYSDEC
- Phase II Investigation Notice (Spill Case No. 16-02145), June 22, 2016, by the NYSDEC, sent to 50-11 Queens Boulevard, LLC and LG Advisors, Inc.
- Contaminant Plume Delineation (Spill Case 9805297 at 50-24 Queens Boulevard), December 7, 2017, by NYSDEC, sent to Equilon Enterprises LLC d/b/a Shell Oil Products US (Shell).
- Groundwater Delineation Work Plan, January 5, 2018, Former Shell S/S # 138726, 50-24 Queens Boulevard, prepared by AECOM, sent to NYSDEC
- Groundwater Delineation Work Plan Review and Approval, January 8, 2018, Former Shell S/S # 138726, 50-24 Queens Boulevard, prepared by NYSDEC, sent to Equilon Enterprises LLC d/b/a Shell Oil Products.
- 50-24 Queens Blvd, Woodside, New York, NYSDEC Spill Case No. 9805297- 2018Q2 Quarterly Monitoring Report, email correspondence by NYSDEC noting the results of the monitoring as evidence off-site source for 50-11 Queens Blvd. spill, August 20, 2018.
- Excavation Depth to the Extent of Practical Approval, May 1, 2019, correspondence between OER, NYSDEC, and GZA, 50-11 Queens Boulevard (12TMP0020Q, 12EHAN020Q, 18CVCP077Q).

As part of the development, the entire lot was excavated between 14 to 16 feet bgs for the construction of the sub-grade structures, 18 feet bgs for building foundation elements, 18 to 23 feet bgs for the area adjoining to elevator pit, and a maximum of 23 feet bgs for the elevator pit and sewage pump pit. GZA personnel field screened the excavated material using a PID equipped with a 10.6 eV lamp and observed for staining and olfactory indications of petroleum impact. During excavation, petroleum-contaminated areas at the southeast corner of the Site were encountered and were designated as AOC. As part of spill remediation, two areas in the southeastern portions of the Site were over excavated to 18 feet bgs and 21 feet bgs, respectively. Ten site-wide endpoint soil samples and five AOC endpoint samples from four areas were collected at the bottom of the excavation, and a sidewall sample at one location. In general, the contamination was observed at the southeastern sidewall of the excavation at the approximate depth of the perched water table. No source of shallow petroleum contamination extending down to the perched water table was apparent during remedial excavations. Subsequent correspondence with the NYSDEC identifies 50-24 Queens Blvd as a likely source of the contamination for Spill No. 16-02145.

On December 9, 2020, GZA submitted a Spill Closure Report to NYSDEC. The spill case was closed on December 10, 2020. The Spill Closure Report submitted to NYSDEC and NYSDEC's spill closure letter are included in **Appendix E**. A map showing the approximate location of hotspots/AOCs removed in this Removal Action is shown on **Figure 4**.

4.3.7 Dewatering.

During the excavation of the elevator pit, perched groundwater was encountered below 18 feet bgs. Sheet pile walls were installed along the perimeter of the elevator pit at depths between 15 and 25 feet bgs to limit the flow of perched groundwater into the excavation. The materials excavated below 18 feet bgs were excavated in the wet and allowed to dry prior to transportation off-site. No dewatering was performed at the Site.

4.3.8 Demolition

The Site was vacant before redevelopment. No demolition was performed.

4.3.9 Soil Cleanup Objectives

The following Track 4 Site-Specific SCOs were utilized for this project:

Contaminant	Site-Specific SCOs
Petroleum-related VOCs	CP-51 Table 2
Total SVOCs	200 ppm
Lead	800 ppm
Mercury	1.5 ppm

4.3.10 End Point Sample Results

The SCOs for this project were not achieved. Between February 19 and March 14, 2019, 10 site-wide endpoint samples (EP-1 to EP-10) were collected across the Site from the bottom of excavation at approximately 16 to 18 feet bgs. Between February 5 and May 4, 2019, five AOC endpoint samples were collected at depths ranging between 15 and 23 feet bgs in the southeastern portions of the Site where petroleum-impacted soil was observed. The deep soil samples collected as part of the 2015 and 2018 Remedial Investigations, representing soil/fill that remained in-place after the completion of the excavation, include samples GZASB-4 (19/18-20 feet bgs), GZASB-5 (18/18-20 feet bgs), GZASB-6 (18/18-20 feet bgs), and SB-1 (19-21 feet bgs). These RI soil samples were also considered as endpoint soil samples.

Samples were field screened by visual and olfactory means and using a PID before collection. The samples were containerized in laboratory-prepared jars, labeled, sealed, and placed in a chilled cooler for shipment to Alpha Analytical Laboratories of Westborough, Massachusetts, a New York State Environmental Laboratory Approval Program (ELAP)-certified laboratory. The sample results were compared to Site-specific SCOs (Track 4).

The results of the analysis indicate that:

- Several VOCs were detected in the site-wide endpoint samples, including 1,1,1,2-tetrachloroethane, 1,1-dichloropropene, 1,2,4,5-tetramethylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-

butanone, acetone, ethylbenzene, hexachlorobutadiene, isopropylbenzene, methyl cyclohexane, methyl tert butyl ether, naphthalene, n-butylbenzene, n-propylbenzene, o-xylene, p/m-xylene, p-chlorotoluene, p-diethylbenzene, p-ethyltoluene, p-isopropyltoluene, sec-butylbenzene, tert-butyl alcohol, tetrachloroethene, trichloroethene.. Benzene was detected in EP-2 (0.087 mg/kg) at a level exceeding Track 4 Site-Specific SCOs. Toluene was detected in EP-2 (0.78 mg/kg) at a level exceeding Track 4 Site-Specific SCOs.

- In AOC endpoint samples, several VOCs were detected at elevated concentrations. In AOC-2, 1,2,4-trimethyl benzene (180 mg/kg) also exceeded its Track 4 Site-Specific SCO. 1,3,5-Trimethylbenzene (52 mg/kg) exceeded Track 4 Site-Specific SCOs in AOC-2. Benzene (maximum 0.25 mg/kg) was detected at levels above Track 4 Site-Specific SCOs in AOC-2 and AOC-3. Ethylbenzene (maximum 61 mg/kg) was detected in AOC-2, AOC-3, and AOC-4 at concentrations exceeding its Track 4 Site-Specific SCOs. Isopropylbenzene (8.3 mg/kg) exceeded its Track 4 Site-Specific SCO in AOC-2. Naphthalene (18 mg/kg) exceeded Track 4 Site-Specific SCOs in AOC-2. N-propylbenzene (maximum 30 mg/kg) was detected at concentrations above Track 4 Site-Specific SCOs in AOC-2 and AOC-4. O-Xylene (maximum 6 mg/kg) exceeded Track 4 Site-Specific SCOs in AOC-3 and AOC-4. P/m-xylene (maximum 210 mg/kg) exceeded Track 4 Site-Specific SCOs in AOC-2, AOC-3, and AOC-4. Toluene (6.8 mg/kg) was detected at a level exceeding Track 4 Site-Specific SCOs in AOC-3.

- Several SVOCs were detected in the site-wide endpoint samples, including 2-methylnaphthalene, 2-Methylphenol, 3-Methylphenol/4-Methylphenol, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, biphenyl, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzofuran, diethyl phthalate, dimethyl phthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, nitrobenzene, phenanthrene, and pyrene. Benzo(a)anthracene (1.7 mg/kg), benzo(a)pyrene (1.5 mg/kg), benzo(b)fluoranthene (2 mg/kg), chrysene (1.4 mg/kg), and indeno(1,2,3-cd) (0.9 mg/kg), but did not exceed the Track 4SCOs in EP-9.

- In AOC endpoint samples, only trace levels of SVOC were detected, including 2,4-dimethylphenol, 2-methylnaphthalene, 3-methylphenol/4-methylphenol, benzo(a)anthracene, benzo(b)fluoranthene,

biphenyl, chrysene, dimethyl phthalate, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene. These did not exceed the Track 4 SCOs.

- Several metals were detected in the sitewide endpoint samples. Aluminum, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, vanadium, and zinc were detected in all 10 sitewide endpoint samples. Antimony was detected in GZASB-4 and GZASB-5. Arsenic, cobalt, potassium, and sodium were detected in all sitewide endpoint samples except for SB-1. Beryllium was detected in all sitewide endpoint samples except for EP-1 and EP-5. Cadmium was detected in all sitewide endpoint samples except for EP-2, EP-8, EP-10, and SB-1. Selenium was detected in EP-2, EP-5, EP-8, EP-10, and GZASB-5. All metals were at concentrations below their Site-specific Track 4 SCOs.

A map of end-point sample locations is shown on **Figure 4**. A tabular summary of endpoint sampling results compared to SCOs is included in **Tables 1 through 5**. Full laboratory reports are included in **Appendix G**.

4.3.11 End Point Data Usability Summary

The site-wide and AOC endpoint samples were received by Alpha, a New York State ELAP- certified labs, under the Chain of Custody, and no significant deviations were encountered during the preparation or analysis by the lab. No trip blank sample or duplicate sample was collected in the field or analyzed as part of endpoint sampling. The lab analytical report for SB-1 (2015 RIR) was not provided to GZA for data usability review.

Alpha run batch quality control analyses including method blank analysis, lab control sample analysis, matrix spike analysis, and lab duplicate analysis. Lab blanks were all within the specific parameters. The quality control non-conformances and data quality were summarized below:

- Several samples have elevated detection limits for all elements, except for mercury, due to the dilution required by matrix interferences encountered during analysis. The samples include:
  - Sample EP-1 (18') (Lab Sample ID: L1907073-01)
  - Sample EP-2 (16') (Lab Sample ID: L1906570-01)
  - Sample EP-3 (16') (Lab Sample ID: L1907919-01)

- Sample EP-4 (18') (Lab Sample ID: L1907919-02)
- Sample EP-5 (16') (Lab Sample ID: L1907073-02)
- Sample EP-6 (18') (Lab Sample ID: L1915788-01)
- Sample EP-7 (16') (Lab Sample ID: L1915788-02)
- Sample EP-8 (16') (Lab Sample ID: L1909988-01)
- Sample EP-9 (18') (Lab Sample ID: L1909766-01)
- Sample EP-10 (16') (Lab Sample ID: L1909988-02)

- The WG1217574-5 Method Blank associated with Sample EP-9 (18') (Lab Sample ID: L1909766-01) has a concentration above the reporting limit for bromomethane. Since the sample was non-detect to the RL for this target analyte, no further actions were taken. The results of the original analysis are reported.

- For sample EP-6 (18') (Lab Sample ID: L1915788-01), the collection date and time on the chain of custody was 17-APR-19 15:55; however, the collection date/time on the container label was 17-APR-19 16:03. At the GZA's request, the collection date/time is reported as 17-APR-19 16:03.

- For sample EP-7 (16') (Lab Sample ID: L1915788-02), the collection date and time on the chain of custody was 17-APR-19 16:03; however, the collection date/time on the container label was 17-APR-19 15:55. At the client's request, the collection date/time is reported as 17-APR-19 15:55.

- In sample EP-7 (16') (Lab Sample ID: L1915788-02), the surrogate recovery for 1,2-dichloroethane-d4 (137%) is outside the acceptance criteria; however, since the sample was non-detect for all target analytes associated with this surrogate, re-analysis was not required.

- For the Petroleum Hydrocarbon Identification analysis by GC-FID, sample AOC-3 (15' BTM) (Lab Sample ID: L1918210-02) was extracted and then analyzed using a gas chromatograph equipped with a flame ionization detector (GC/FID). The temperature program and associated experimental conditions were optimized to obtain a maximum resolution in an eighty-minute chromatographic run representative of hydrocarbons in the n-Octane (C8) to n-Tetracontane (C40) range. Qualitative

evaluation of the sample was conducted by reviewing the sample chromatogram in conjunction with a chromatogram of a normal alkane series generated with the same chromatographic conditions. Chromatograms of hydrocarbon reference materials obtained from our library of 74 reference standards were also utilized to provide the best possible sample match. Quantitative determination of the sample's hydrocarbon concentration was performed following EPA Method 8015M. The sample's total hydrocarbon concentration and all associated quality control data are included in the report.

- Also, based on a tentative interpretation of chromatographic pattern recognition and boiling point ranges, total Petroleum Hydrocarbon Identification of the sample contains hydrocarbons eluting in the range of n-Octane (C8) to after the elution of n-Tetracontane (C40). Based on the data generated, the sample contains material eluting in the low, mid, and high molecular weight ranges of the chromatogram. The mixture is a combination of material that resembles gasoline and material which is similar to Fuel Oil #2/Diesel Fuel.
- The encores for Volatile Organics analysis of sample AOC-4 (23') (Lab Sample ID: L1918679-01) were extruded beyond the required 48-hour holding time. GZA was notified and the results of the analysis are reported.
- Report revisions were made to the sample IDs of several samples in February 2018 and October 2020, including GZASB-4 (18-20'), GZASB-5 (18-20'), GZASB-6 (18-20'), AOC-1 BTM (18'), AOC-1 SW (18'), EP-1 (18'), EP-4 (18'), EP-9 (18'), EP-6 (18'), EP-7 (16'), and AOC-4 (23'). The changes were requested by GZA for sample nomenclature consistency and correction of sample depths.

4.4 Materials Disposal

Material disposal was conducted between February 22, 2019, and May 9, 2019. The type, quantity, and disposal location of each material removed and disposed of off-Site are presented below:

Disposal Location/Address	Type of Material	Quantity
Doremus Avenue Redevelopment Project 191 Doremus Avenue, Newark, NJ 07105	Non-hazardous soil/fill	4,400 cubic yards (7,221.24 tons)
Doremus Avenue Redevelopment Project 191 Doremus Avenue, Newark, NJ 07105	Petroleum impacted Non-hazardous soil/fill (From AOCs)	640 cubic yards (1,072.27 tons)
PPark NJ, LLC (PPark) 100 Platen Avenue, Prospect Park, NJ 07508	Non-hazardous soil/fill	2,600 cubic yards (4,074.92 tons)

Disposal Location/Address	Type of Material	Quantity
Clean Soil Bank No. 19CCSB124 826 4th Avenue, Brooklyn, NY 11232	Clean soil	360 cubic yards (540 tons)
Clean Soil Bank No. 19CCSB124 38-01 Queens Blvd Woodside, NY 11101	Clean soil	300 cubic yards (450 tons)
TOTAL		**8,300 cubic Yards (13,358.43 tons)**

The table above shows the total quantities of each class of material removed from the Site and the disposal locations. Letters from 50-11 Queens Blvd LLC to disposal facility providing materials type, source, and data; and acceptance letters from disposal facility stating it is approved to accept these materials are attached in **Appendix H**. The Clean Soil Bank correspondence and documentation are attached in **Appendix I**. Manifests are included in **Appendix J**. A summary of individual truck transport and material disposal quantities is included in **Table 6**.

4.5 Backfill Import

During this Remedial Action, ¾-inch recycled concrete aggregate was imported to the Site to backfill areas between the building foundation and the solider pile and lagging in compliance with the Remedial Action Work Plan and applicable laws and regulations. Soil for backfill was not imported to the Site.

4.6 Demarcation

The soil below the final composite cover system (building foundation) is residual soil that will be addressed by Site Management under this Remedial Action.

5.0 ENGINEERING CONTROLS

Engineering Controls were employed in the Remedial Action to address residual soil/fill, soil vapor, and petroleum compounds in the perched water table remaining at the site. The Site has three primary Engineering Control Systems. These are:

1. A composite cover system consisting of concrete building slab and walls;
2. A vapor barrier system under the building slab and on the foundation walls; and
3. A subgrade ventilated garage.

5.1 Composite Cover System

Exposure to residual soil/fill is prevented by an engineered Composite Cover System that has been built on the Site. This Composite Cover System is comprised of a minimum of 5 inches of reinforced concrete slab underlain by 8 inches of clean sub-base material in the building footprint. The contractor for the Composite Cover System construction was Sunlight Construction. **Figure 6** shows a map of the location of each Composite Cover System type built at the Site. **Figure 7** shows the as-built design for each cover type used in the Composite Cover System on this Site. Photographs of the construction of the Composite Cover System are included in **Appendix A**.

5.2 Vapor Barrier System

Exposure to soil vapor is prevented by a Vapor Barrier System that has been built on the Site. This Vapor Barrier System consists of Precon (73-mil) (manufactured by W. R. Meadows). The vapor barrier extends throughout the area occupied by the footprint of the building and up the foundation sidewalls on all sides to grade. All welds, seams, and penetrations were properly sealed with W. R. Meadows Precon Hydralastic 836, a cold-applied, solvent-free, single-component waterproofing compound, to prevent preferential pathways for vapor migration. Overlapped edges and seams of the W. R. Meadows Precon pieces were trimmed and overlapped by 4 to 6 inches of Hydralastic 836. The vapor barrier used to tie in was cleaned and dried before overlapping and seaming. The professional engineer for the Vapor Barrier System was Stephen M. Kline. The contractor for the Vapor Barrier System construction was Sunlight Construction. **Figures 6 and 7** show the as-built engineering diagram for the Vapor Barrier System used on this Site. Photographs of the installation of the Vapor Barrier System are included in **Appendix A**. A copy of the manufacturer's specifications for the Vapor Barrier System is included in **Appendix K**.

5.3 Subgrade Ventilated Garage

The parking garage is ventilated per provisions of New York City Building Code Section 27-766 of article 8 of subchapter 12. The subgrade garage space is provided with mechanical ventilation with air exhaust at the rate of not less than one cubic feet per minute (cfm) per square foot of total floor area with properly designed means for air inflow and air exhaust at a rate sufficient to maintain an average concentration of carbon monoxide not exceeding 100 parts per million (ppm) parts of air for periods longer than one hour and with a maximum concentration at any time not exceeding four hundred parts of carbon monoxide per one million parts of air. The subgrade ventilation is comprised of a MUA (make up air) fan (Greenheck model # QEID-20-75-A50) and exhaust fan (Greenheck model# CUE-240-B-VGD). The MUA and exhaust fan interlocked with a carbon monoxide control panel. Fan speed will modulate between low/high based on average CO readings. The concentration of carbon monoxide will be determined by periodic tests taken between three and four feet from the floor utilizing approved carbon monoxide detector tubes or other equivalent means. No air used for heating, cooling, or ventilation will be circulated through garages to the rest of the occupied building areas. The manufacturer's specification for subgrade ventilation is included in **Appendix L**.

6.0 INSTITUTIONAL CONTROLS

A series of Institutional Controls are required under this Remedial Action to assure permanent protection of public health by the elimination of exposure to residual materials. These ICs define the program to operate, maintain, inspect, and certify the performance of Engineering Controls and Institutional Controls on this property. These Institutional Controls will be implemented following the Site Management Plan included in this RAR.

Institutional Controls for this property are:

1. The property will continue to be registered with an E-Designation by the NYC Department of Buildings. Property owner and property owner's successors and assigns are required to comply with the approved SMP;
2. Compliance with an OER-approved Site Management Plan including procedures for appropriate operation, maintenance, inspection, and certification of performance of ECs and ICs. The property owner and property owner's successors and assigns will inspect ECs and ICs and submit to OER a written certification that evaluates their performance in a manner and at a frequency to be determined by OER;
3. Engineering Controls will not be discontinued without prior OER approval;
4. OER has the right to enter the Site upon notice for the purpose of evaluating the performance of ECs and ICs;
5. Vegetable gardens and farming in residual soil/fill on the Site are prohibited;
6. Use of groundwater underlying the Site without treatment rendering it safe for its intended use is prohibited;
7. All future activities on the Site that will disturb residual soil/fill must be conducted pursuant to the Soil/Materials Management provisions of the SMP, or otherwise approved by OER;
8. The Site is intended to be used for restricted residential and commercial use and will not be used for a higher level of use without prior approval by OER.

7.0 SITE MANAGEMENT PLAN

Site Management is the last phase of the remedial process and begins after the approval of the Remedial Action Report (RAR) and issuance of the Notice of Completion (NOC) by OER. It is the responsibility of the property owner to ensure that all Site Management responsibilities are performed. The penalty for failure to implement the SMP includes the revocation of the Notice of Completion and all associated certifications and liability protections providing notice of the revocation to the NYC DOB.

Engineering Controls and Institutional Controls have been incorporated into this Remedial Action to ensure that the site remains protective of public health and the environment. Generally, ECs provide physical protective measures and ICs provide restrictions on Site usage and establish the remedial operation, maintenance, inspection, and certification measures. This Site Management Plan has been established to govern long-term performance of ECs and ICs for this property.

The SMP provides a detailed description of procedures required to manage residual material at the Site following the completion of remedial construction in accordance with the NYC Voluntary Cleanup Agreement with OER. This includes: (1) operation and maintenance of Engineering Controls; (2) inspection of ECs and ICs; and (3) certification of performance of ECs and ICs.

7.1 Engineering Controls

Engineering Controls were employed in the remedial action to address residual materials remaining at the site. The Site has three Engineering Control Systems. Engineering Controls for this property are:

1. A composite cover system consisting of concrete building slab and walls;
2. A vapor barrier system under the building slab and on the foundation walls; and
3. A subgrade ventilated garage.

7.1.1 Operation and Maintenance of Composite Cover System

Section 5 describes the Composite Cover System utilized in this Remedial Action and provides as-built design details and the location of each cover type. The Composite Cover System is a permanent Engineering Control for the Site. The system will be inspected, and its performance certified at specified

intervals defined in this SMP. A Soil/Materials Management Plan is included in this Site Management Plan and outlines the procedures to be followed in the event that the composite cover system and underlying residual soil/material must be disturbed after the Remedial Action is complete.

The Composite Cover System does not require any special operation or maintenance activities. If the system is breached during future construction activities [or "normal wear and tear"], the system will be rebuilt by reconstructing the system according to the original design and tying newly constructed cover layers into existing cover layers to form a continuous layer(s).

7.1.2 Operation and Maintenance of Vapor Barrier System

Section 5 describes the Vapor Barrier System utilized in this Remedial Action and provides as-built design details and the system location. The Vapor Barrier System is a permanent Engineering Control for the Site. The system will be inspected, and its performance certified at specified intervals defined in this SMP.

The Vapor Barrier System does not require any special operation or maintenance activities. If the system is breached during future construction activities, the system will be rebuilt by reconstructing the vapor barrier layers and sealing the newly constructed materials with existing barrier materials in accordance with manufacturer specifications.

7.1.3 Operation and Maintenance of Subgrade Ventilated Garage

Section 5 describes the Subgrade Ventilated Garage utilized in this Remedial Action and provides as-built design details and the system location. The sub-grade ventilated garage is a permanent Engineering Control for the Site. The system will be inspected, and its performance certified at specified intervals defined in this SMP. The ventilated parking structure does not require any special operation or maintenance activities.

If the structure is breached during future construction activities, the structure will be rebuilt in accordance with the NYCDOB requirements.

7.2 Institutional Controls

A series of Institutional Controls are required under this Remedial Action to assure permanent protection of public health by elimination of exposure to residual materials. These ICs define the program to operate, maintain, inspect, and certify the performance of Engineering Controls and Institutional Controls on this property. These Institutional Controls will be implemented in accordance with the Site Management Plan included in this RAR.

Institutional Controls are also designed to prevent future exposure to residual soil/materials by controlling disturbances in the subsurface, restricting higher uses of the property than those addressed by the Remedial Action, and establishing restrictions on activities and site usage. Institutional Controls for this property are:

1. The property will continue to be registered with an E-Designation by the NYC Department of Buildings. Property owner and property owner's successors and assigns are required to comply with the approved SMP;
2. Compliance with an OER-approved Site Management Plan including procedures for appropriate operation, maintenance, inspection, and certification of performance of ECs and ICs. The property owner and property owner's successors and assigns will inspect ECs and ICs and submit to OER a written certification that evaluates their performance in a manner and at a frequency to be determined by OER;
3. Engineering Controls will not be discontinued without prior OER approval;
4. OER has the right to enter the Site upon notice for the purpose of evaluating the performance of ECs and ICs;
5. Vegetable gardens and farming in residual soil/fill on the Site are prohibited;
6. Use of groundwater underlying the Site without treatment rendering it safe for its intended use is prohibited;
7. All future activities on the Site that will disturb residual soil/fill must be conducted pursuant to the Soil/Materials Management provisions of the SMP, or otherwise approved by OER;
8. The Site is intended to be used for restricted residential and commercial use and will not be used for a higher level of use without prior approval by OER.

7.3 Inspections

Engineering Controls and Institutional Controls will be inspected on a periodic basis at a frequency established in this plan. The inspections will evaluate the following:

- If Engineering Controls or Institutional Controls employed at the Site continue to perform as designed and continue to be protective of human health and the environment;
- If anything has occurred that impairs the ability of the Engineering Controls or Institutional Controls to protect public health and the environment;
- If changes are needed to the remedial systems or controls;
- If compliance with this SMP has been maintained;
- If site records are complete and up to date; and
- General Site conditions at the time of inspection.

In addition, if an emergency occurs, such as a natural disaster, or if an unforeseen failure of any of the Engineering Controls occurs, an inspection of the Site will be performed within 30 days to evaluate the Engineering Controls, and a letter report of findings will be submitted to OER.

7.3.1 Inspection of Composite Cover System

The composite cover will be inspected to confirm that interior concrete building slabs and all accessible system components are continuous and do not show signs of removal/replacement by visual evaluation. Evidence of active invasive activity through the cover system, or past invasive activity, such as patches and repairs, should be evaluated and recorded. Photographs should be taken and presented in the Report to document findings. As stated above in **Section 7.0**, if the system is observed to have been breached, the system will be rebuilt by reconstructing the system according to the original design and connecting newly constructed cover layers with existing cover layers to form a continuous layer(s).

7.3.2 Inspection of Vapor Barrier System

The Vapor barrier underlying the interior concrete slab and outside the subgrade foundation sidewalls is inaccessible. Therefore, an inspection of the interior building concrete slab, walls and all other accessible system components will be performed to check for cracking or patchwork that could indicate damage to

the slab and subgrade foundation sidewalls. Any new signs of disturbance to the slab and subgrade foundation sidewalls, and potential damage to the underlying vapor barrier will be identified in the inspection. Photographs should be taken and presented in the Report to document findings.

7.3.3 Inspection of Subgrade Ventilated Garage

The subgrade ventilated garage will be ventilated as per New York City Building Code Section 27-766 of article 8 of subchapter 12 and equipment and systems shall be subject to tests and inspections as per provisions of New York City Building Code Section 27-730 in order to disclose defects or operating conditions dangerous to life or health. Such equipment or systems shall not be operated until these defects or conditions are corrected. Photographs should be taken and presented in the Report to document findings.

7.3.4 Site Use Prohibitions

Inspections to evaluate the status of site use prohibitions will include an evaluation of all the ICs listed above, including:

- whether there is vegetable gardening or farming in residual soil/fill;
- whether groundwater underlying the site has been used without treatment rendering it safe for its intended use;
- whether activities that have disturbed site soil/fill have been conducted pursuant to the Soil/Material Management provisions of the SMP, or otherwise approved by OER; and
- whether the site has been used for a higher level of use other than the restricted residential and commercial use addressed by the Remedial Action.

7.3.5 Inspection and Certification Letter Report

Results of inspections performed during a reporting period and certification of performance of all Engineering Controls and Institutional Controls will be included in an Inspection and Certification Letter Report. Inspections will be performed in 2022, 2026 and every five years thereafter. Inspection and Certification Letter Reports will be submitted by July 30, 2023 (for the reporting period calendar years 2021-2022), July 30, 2027 (for the reporting period calendar years 2023-2026) and every five years

thereafter (for the reporting period consisting of the five prior calendar years). Inspection and Certification Reports will cover all calendar years since the prior reporting period. Inspection and Certification Letter Reports will be submitted to OER in digital format. The letter report will utilize a form established by OER. This form includes, at a minimum:

- Date of inspections;
- Personnel conducting inspections;
- Description of the inspection activities performed;
- Observations, conclusions, or recommendations;
- Copy of any monthly inspection forms;
- Photographs; and
- Certification of the performance of Engineering Controls and Institutional Controls executed by the P.E. or QEP responsible for this Inspection and Certification Letter Report, as discussed below.

The certification of the performance of ECs and ICs will establish:

- If Engineering Controls and Institutional Controls employed at the Site continue to be in place, perform as designed and continue to be protective of human health and the environment;
- If anything has occurred that impairs the ability of Engineering Controls or Institutional Controls to protect public health and the environment;
- If changes are needed to the remedial systems or controls;
- If compliance with this Site Management Plan has been maintained;
- If vegetable gardening and farming in residual soils has been prevented;
- If groundwater underlying the Site is being utilized without treatment rendering it safe for the intended purpose has been prevented;
- If activities on the Site that have disturbed residual soil/fill material have been in accordance with the Soil/Materials Management Plan in this SMP;
- If the Site has been used for a higher level of use other than the restricted residential and commercial use addressed by the Remedial Action;
- If site records are complete and up to date;

- If the Site continues to be registered as an E-Designated property by the NYC Department of Buildings;

OER may enter the Site upon notice for the purpose of evaluating the performance of ECs and ICs**.**

7.3.6 Notifications

Notifications will be submitted by the property owner to OER as described below:

- 60-day advance notice of any proposed changes in Site use, such as an upgrade from existing use to residential or commercial use that was not contemplated is the Remedial Action.
- Notice within 30 days of any emergency, such as a fire, flood, or earthquake that has the potential to reduce the effectiveness of Engineering Controls in place at the Site.

7.4 Soil / Materials Management Plan

Any future intrusive work that will disturb residual soil/fill beneath the property, including modifications or repairs to the existing composite cover system, will be performed in compliance with this Soil/Materials Management Plan (SMMP). Intrusive work will also be conducted in accordance with the procedures defined in the Community Air Monitoring Plan (CAMP) included in this chapter and a Construction Health and Safety Plan (HASP). The HASP is the responsibility of the property owner and should follow NYSDEC DER-10 Technical Guide and 29 CFR 1910 and 1926, and all other applicable Federal, State and City regulations. Intrusive construction work should be compliant with this SMMP and described in the next Inspection and Certification Letter Report.

7.4.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional (QEP). Soil screening will be performed during any future intrusive work.

7.4.2 Stockpile Methods

If stockpiles are used to isolate excavated soil they will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of

inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 6-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

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

7.4.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Excavated soil will only be reused on-site with prior approval by OER.

7.4.4 Materials Excavation, Load-Out and Departure

The PE/QEP overseeing the remedial action will:

- Oversee intrusive work and the excavation and load-out of excavated material;
- Ensure that there is a party responsible for the safe execution of invasive and other work performed under this management plan;
- Ensure that Site maintenance activities and maintenance-related grading cuts will not interfere with, or otherwise impair or compromise the remedial measures established during the remediation construction phase;
- Ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate permits or authorized notifications.

- Ensure that all loaded outbound trucks are inspected and cleaned if necessary, before leaving the Site; and
- Ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site intrusive work.

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

7.4.5 Off-Site Materials Transport

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

Outbound truck transport routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

7.4.6 Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) an OER Historical Fill Notification Form and letter from the PE/QEP or property owner to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material

generated at an environmental remediation Site in New York City under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include, as an attachment, a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material.

Documentation associated with disposal of all material will include records and approvals for receipt of the material. All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be retained and included in the following Inspection and Certification Report. A manifest system for off-Site transportation of exported materials will be employed. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

7.4.7 Materials Reuse On-Site

All the non-hazardous soil excavated during any future repair or construction purposes will be placed in the same excavation it was derived from or will be disposed of off-site unless otherwise approved by OER beforehand.

7.4.8 Repair of Remedial Systems

After completion of invasive work, any damage to the engineering controls (composite cover system, vapor barrier, etc.) will be restored to the original condition established during initial construction.

7.4.9 Import of Backfill Soil from Off-Site Sources

In the event that soil importation is needed for the backfilling purposes, this Section presents the requirements for imported fill materials. All imported soils will meet OER-approved backfill and cover

soil quality objectives for this Site. The backfill and cover soil quality objectives include NYSDEC Part 375 Track 2 Residential SCOs and groundwater protections standards. A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

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

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC; and
- Virgin quarried material or other materials with an approved Beneficial Use Determination (BUD) from NYSDEC for reuse as clean fill.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this SMP. The Inspection and Certification Letter Report will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.

7.4.10 Source Screening and Testing

Inspection of imported fill material will include visual, olfactory, and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and

- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables, or foreign matter.

Composite samples of imported material from the identified clean soil sources will be taken at a minimum frequency of one sample for every 500 cubic yards of material. One composite sample will be collected form each source of virgin quarried material or other material with an NYSDEC approved BUD, unless otherwise approved by OER. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements, is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) without fines may be imported from facilities permitted or registered by NYSDEC. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA will not be used as cover material.

7.4.11 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported, and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. If discharge to the City sewer system is not feasible, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility or some other means compliant with applicable laws and regulations. Discharge of water generated during remedial construction to surface waters (i.e., a stream or river) is prohibited without a SPDES permit issued by NYSDEC.

7.4.12 Stormwater Pollution Prevention

Applicable laws and regulations pertaining to stormwater pollution prevention will be addressed during the remedial program. All existing stormwater systems will be inspected to ensure proper operation.

7.4.13 Odor Control

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

The odor control plan must be capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP.

7.4.14 Dust Control

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

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

If nuisance dust emissions are identified, work will be halted, and the source of dust will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEPs.

7.4.15 Noise

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

7.5 Community Air Monitoring Plan

Real-time air monitoring for VOCs and particulate levels at the perimeter of the exclusion zone or work

area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

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

7.5.1 VOC Monitoring, Response Levels, and Actions

Volatile organic compounds will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the

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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down.

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

7.5.2 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (µg/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 µg/m3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 µg/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 µg/m3 of the upwind level and in preventing visible dust migration.

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

7.6 Contingency Plan

This contingency plan is developed for the remedial construction or repair work to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

7.7 Emergency Telephone Numbers

In the event of any emergency condition pertaining to these remedial systems, the Owner's representative(s) should contact the appropriate parties from the contact list below. Prompt contact should also be made to Reinbill Maniquez. These emergency contact lists must be maintained in an easily accessible location at the Site.

Emergency Contact Numbers

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

Project Contact Numbers

Reinbill Maniquez	(646) 929-8925
Office of Environmental Remediation	(212) 788-8841; 311

8.0 SUSTAINABILITY REPORT

This Remedial Action provided for sustainable remediation and redevelopment through a variety of means that are defined in this Sustainability Report.

Reuse of Clean, Recyclable Materials and Conservation of Natural Resources. Reuse of clean, recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction since these materials can be locally derived. Conservation of non-renewable resources was achieved by reusing soil onsite. An estimate of the tonnage of recycled material reused on this project is 70 cubic yards of onsite soil.

Conversion to Clean Fuels. Use of clean fuel improves NYC's air quality by reducing harmful emissions. Natural gas is utilized as the principal fuel in the new building.

Recontamination Control. Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later that could impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site. The area of the Site that utilizes recontamination controls under this plan is 11,362-square feet.

Linkage with Green Building. Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use.

Paperless Brownfield Cleanup Program. Sunlight Construction AA participated in OER's paperless Voluntary Cleanup Program. Under this program, submission of electronic documents replaced submission of hard copies for the review of project documents, communications, and milestone reports. A best estimate of the mass (pounds) of paper saved under this plan is 300 pounds.

Low-Energy Project Management Program. Sunlight Construction AA participated in OER's low-energy project management program. Under this program, whenever possible, meetings were held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation. A gross estimate of the number of miles of personal transportation that was conserved in this process is 150 miles.