SOORI HIGHLINE

522 WEST 29TH STREET,
NEW YORK, NY

Remedial Action Report

NYC VCP Project Number 13CVCP151M
E-Designation Project Number 13EHAN427M

Prepared For:

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LIST OF ACRONYMS

Acronym	Definition
AST	Aboveground Storage Tank
CAMP	Community Air Monitoring Plan
C&D	Construction & Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
CO	Certificate of Occupancy
CPC	City Planning Commission
DSNY	Department of Sanitation
"E"	E-Designation
EAS	Environmental Assessment Statement
EIS	Environmental Impact Statement
ESA	Environmental Site Assessment
EC/IC	Engineering Control and Institutional Control
ELAP	Environmental Laboratory Accreditation Program
FDNY	New York City Fire Department
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IDW	Investigation Derived Waste
Notice – NNO	Notice of No Objection
Notice – NTP	Notice to Proceed
Notice – NOS	Notice of Satisfaction
Notice – FNOS	Final Notice of Satisfaction
NYC BSA	New York City Board of Standards and Appeals
NYC DCP	New York City Department of City Planning
NYC DEP	New York City Department of Environmental Protection
NYC DOB	New York City Department of Buildings
NYC DOF	New York City Department of Finance
NYC HPD	New York City Housing Preservation and Development
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation
	Division of Environmental Remediation
NYS DEC PBS	New York State Department of Environmental Conservation

Acronym	Definition
	Petroleum Bulk Storage
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
OSHA	United States Occupational Health and Safety Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
PM	Particulate Matter
QEP	Qualified Environmental Professional
RA	Register Architect
RAP	Remedial Action Plan
RCA	Recycled Concrete Aggregate
RD	Restrictive Declaration
RI	Remedial Investigation
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOCs	Semi-Volatile Organic Compounds
USCS	Unified Soil Classification System
USGS	United States Geological Survey
UST	Underground Storage Tank
TAL	Target Analyte List
TCL	Target Compound List
TCO	Temporary Certificate of Occupancy
VB	Vapor Barrier
VOCs	Volatile Organic Compounds

CERTIFICATION

I, Stephen M. 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 Soori Highline site located at 522-532 West 29th Street, New York, NY, site number 13CVCP151M.
- I have reviewed this document, to which my signature and seal are affixed.
  The vapor barrier, and composite cover system constructed during this remedial action were professionally observed by me or by a person under my direct supervision 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 2013 and Stipulations in a letter dated September 6, 2013 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

PE License Number : NY 080431

Signature

Date : September 4, 2018

EXECUTIVE SUMMARY

W29 Highline Owners LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 522-532 West 29th Street in Chelsea section of Manhattan, 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 pursuant to 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 522 West 29th Street in the Chelsea section of Manhattan, and is identified as Block 700, Lot 47 on the New York City Tax Map. The Site is approximately 14,800 square feet and is located along the southern portion of West 29th Street mid-block between 10th and 11th Avenues.

The Site was comprised of three lots occupied by three buildings: a two-story brick building on the former Lot 47, and one-story buildings on former Lots 48 and 49. Prior to redevelopment, the Site was occupied by three commercial buildings that were occupied by a catering company and art galleries.

Based on a review of historical Sanborn maps, a lumber yard and residential dwelling occupied the Site in 1911. By 1930, the Site was occupied by commercial structures for Sheffield Farms, Dry Milk Co., an automotive repair shop, and a coal yard. The Site was occupied by a motor-freight station until 2002. In 2013, The Site was purchased from High Ridge Enterprises Inc. by W29 Highline Owners, LLC. for the planned redevelopment. Subsequently, the New York City Department of City Planning

(DCP) approved the merger of the former Tax Lots 47, 48, and 49, into Lot 47.

Summary of Redevelopment Plan

The redevelopment project consisted of redeveloping the Site with an 11-story mixed-use building consistent with existing medium-density commercial zoning designation for the property (C6-3). The development involved the demolition of the previous buildings and construction of the new mixed-use building which features eleven floors and one cellar level. The cellar is primarily used for a gym, storage and utility rooms. Floor 1 is used for commercial space, lobby/reception area utility rooms, parking space and a driveway. Floors 2 through 11 are used for residential space. The building rises approximately 135 feet above current street level. An approximate 15 feet by 100 feet parking area is located on the western portion of the Site. The top of the basement floor is approximately 12 to 14 feet below sidewalk level, that required the excavation of the entire footprint to approximately 15 feet below ground surface (bgs), with additional for the elevator pit to approximately 19 feet bgs.

Summary of Description of Surrounding Property

The Site is bounded by multi-story commercial and residential buildings, an art gallery, and a storage facility to north (Block 701 Lots 7501, 22, 22 and 24 across West 29th Street), a multi-story residential condominium to the south (Block 700 Lot 9), 13-story residential building to the east (Block 700 Lot 45), four-story commercial building to the west (Block 700 Lot 53).

Summary of Past Site Uses and Areas of Concern

The Site has been used as a lumber yard, a motor-freight station in history. Prior to the redevelopment, it was occupied by a catering company and two art galleries, respectively. The Areas of Concern (AOC) identified for this Site included:

1. Urban Fill present at the Site from grade to as much as 5 feet below ground surface (bgs)

2. Underground storage tank (UST) that was closed-in-place at the 532 W.29th Street building
3. Historical Industrial and Automotive Site use
4. Former spill at the 524 W. 29th Street building; and
5. "E" designation for hazardous materials, air quality and noise.

Summary of the Work Performed under the Remedial Investigation

GZA GeoEnvironmental of New York (GZA) performed the following RI scope of work at the Site in May 2013:

1. Conducted a Site inspection to identify AOCs and physical obstructions (e.g., structures, buildings, etc.);
2. Drilled eight soil borings across the Site and collected eighteen soil samples for chemical analysis from the soil borings to evaluate soil quality. The soil analytical results were compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 New York Codes of Rules and Regulations Part 375 Unrestricted Use Soil Cleanup Objectives- Track 1 (SCOs) and the Restricted-Residential Use – Track 2 SCOs.
3. Installed three groundwater monitoring wells at the Site to collect four groundwater samples for chemical analysis to evaluate groundwater quality. The groundwater analytical results were compared to NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (AWQS); and
4. Installed six soil vapor probes at the Site and collected six soil vapor samples for chemical analysis to evaluate soil vapor quality. The soil vapor analytical results were evaluated using the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion, Air Guidance Values (AGVs).

Summary of Findings of Remedial Investigation

The RI findings identified for the Site included:

1. Elevation of the property ranged from 10 to 12 feet.

2. Depth to groundwater ranges from 9 to 10 feet bgs at the Site.
3. Groundwater flow is generally from east to west beneath the Site.
4. Depth to bedrock is approximately 20 to 40 feet bgs at the Site.
5. The stratigraphy of the site, from the surface down, consisted of 2 feet of concrete underlain by 6 to 13 feet of fill (prior to construction) underlain by 5 to 21 feet of loose to dense Sand underlain by 4 to 10 feet of Sand and Silt underlain by weathered rock. Soil/fill sample results collected during the site investigation were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives and Restricted Residential Use Soil Cleanup Objectives as presented in 6NYCRR Part 375-6.8. Results indicated:
    - Polychlorinated biphenyls (PCBs) were not detected in soil samples collected.
    - Several volatile organic compounds (VOCs) including acetone, methylene chloride, benzene, butanone, dioxane, and dichloroethene were detected in three soil samples exceeding Unrestricted Use Soil Cleanup Objectives (SCOs). No VOCs were detected above their respective Restricted Residential SCOs in any soil sample.
    - Several semi-volatile organic compounds (SVOCs) were detected in soil samples from the Site with eight exceeding their respective Restricted Residential SCOs. These SVOCs included benzo(a)anthracene (max. of 5.4 mg/kg), benzo(a)pyrene (max. of 4.8 mg/kg), benzo(b)fluoranthene (max. of 6 mg/kg), benzo(k)fluoranthene (max. of 2.3 mg/kg), chrysene (max. of 6 mg/kg), dibenzo(a,h)anthracene (max. of 0.78 mg/kg), indeno(1,2,3-cd)pyrene (max. of 3.2 mg/kg) and 2-methylnaphthalene (max. of 23 mg/kg).
6. Metals, including barium (maximum of 360 mg/kg), copper (maximum of 100 mg/kg), iron (maximum of 16,000 mg/kg), lead (maximum of 1,200 mg/kg), mercury (maximum of 4.4 mg/kg), nickel (maximum of 32 mg/kg) and zinc iron (maximum of 410 mg/kg) exceeded Unrestricted Use (Track 1) SCOs, and of these barium, iron, lead and mercury also exceeded Restricted Residential (Track

2) SCOs. Groundwater sample results collected during the RI were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Groundwater samples collected during the RI and supplemental site characterization showed:

- Several VOCs were detected above NYSDEC Part 703.5 Groundwater Quality Standards (GQS) and included 1,1-dichloroethene (max. of 12 µg/l), cis-1,2-dichloroethene (max. of 160 µg/l), benzene (max. of 12 µg/l), n-butylbenzene (max. of 11µg/l), sec-butylbenzene (max. of 12 µg/l), isopropylbenzene (max. of 12 µg/l), naphthalene (max. of 35 µg/l), and n-propylbenzene (max. of 37 µg/l). Three SVOCs including acenaphthene (max. of 20 µg/l), naphthalene (max. of 24 µg/l), and benzo(a)pyrene (max. of 0.11 µg/l) were detected above their respective GQS.
- Four metals including iron, magnesium, manganese, and sodium were detected in groundwater above their respective GQS.
- No PCBs were detected in any of the collected groundwater samples.

7. Soil vapor results collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Moderate to high concentrations of petroleum and chlorinated VOCs were observed in each vapor sampling point. Tetrachloroethene (PCE) was identified in all samples at concentrations less than 10 µg/m^3 except at one sampling point, at 288 µg/m3. Trichloroethene (TCE) was identified in all samples at concentrations less than 5 µg/m^3 except at one sampling point, at 228 µg/m^3. 1,1,1-Trichloroethane (1,1,1-TCA) was detected in one of five samples at 231 µg/m^3. The results for PCE, TCE and 1,1,1-TCA were above the monitoring level ranges of the NYS DOH soil vapor guidance matrix and indicate that remedial action to address soil vapor is warranted. Comparatively elevated concentrations of PCE, TCE, and 1,1,1-TCA were observed near the old spill location. Petroleum-related VOCs included ethanol (999 µg/m^3), acetone (504 µg/m^3), n-hexane (7,820

µg/m^3), cyclohexane (4,200 g/m3), trimethylpentane (54,600 µg/m^3), and ethylbenzene (11,100 µg/m^3).

Summary of the Remedial Action

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

- A Pre-Application Meeting was held on May 2, 2013.
- A Remedial Investigation (RI) was performed between May 13 and May 25, 2013
- 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 July 29, 2013 for a 30-day public comment period.
- OER briefed NYSDEC and NYC DOHMH on August 15, 2013.
- The RAWP and Stipulation List dated September 6, 2013 was approved by the New York City Office of Environmental Remediation (OER) on December 5, 2013.
- NYCDOHMH approved proposed remedial actions on January 8, 2014.
- A Pre-Construction Meeting was held on June 4, 2014.
- A Fact Sheet providing notice of the start of the remedial action was issued on June 10, 2014.
- The remedial action was begun in June 2014 and was largely completed by May 2015.
- Redevelopment activities continued at the Site through December 2017.

Appendix C contains the RAWP and Stipulation List.

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 (July 2014); completed utility mark outs; and marked and staked excavation areas.
3. Two Waste Characterization Studies were performed prior to excavation activities. Ten waste characterization soil samples were collected on April 9, 2014. Then a supplemental waste characterization sampling program of nine additional sampling locations was conducted on June 4, 2014. Waste characterization samples were collected at a frequency dictated by disposal facility(s).
4. Performed a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds. CAMP Monitoring was performed during days of intrusive site work from July 3, 2014 to October 10, 2014. During construction, CAMP exceeded for particulates and proper actions were taken to control dust.
5. Selected Unrestricted Use (Track 1) SCOs for under the building and Established Track 4 Site Specific Soil Cleanup Objectives (SCOs) for parking areas. The development changed, and the entire property was excavated to 16 feet below grade. The following Track 4 SCOs were utilized: Total SVOCs 250 mg/kg, Total Lead 1,000 mg/kg, and Total Mercury 2.5 mg/kg.
6. Soil/fill was excavated to an average depth of 16 feet bgs across the rectangular site with additional excavation for the elevator pit to approximately 19 feet bgs. Approximately 10,919 cubic yards (16,377.84 tons) of soil/fill were excavated and removed from the property.
7. Transported and disposed 16,377.84 tons of soil/fill material at permitted facilities in accordance with all applicable laws and regulations for handling, transporting, and disposing, and the RAWP. Soil/fill was disposed at the following facilities:

a. 7,968.20 tons (contaminated non-hazardous soil/fill to Prospect Park NJ (Prospect Park), a clean fill facility in Prospect Park, New Jersey.
b. 1,839.27 tons (contaminated non-hazardous soil/fill) to Coplay Quarry Reclamation Project (Coplay), a clean-fill facility in Whitehall, Pennsylvania.
c. 6,570.37 tons petroleum-contaminated soil to Bayshore Recycling Corp. (Bayshore) in Woodbridge, NJ, a petroleum waste disposal facility.

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 in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10. Collected and analyzed three post excavation end-point samples in addition to ten waste classification samples at final excavation depths (16 feet bgs) to determine attainment of SCOs. Additionally, ten tank bottom post-excavation samples were also collected. All endpoint soil samples were below Unrestricted Use SCOs. Track 1 Unrestricted Use remedy is achieved.
11. Removed four underground storage tanks (USTs) (one 2,000-gallon, two 550-gallon, and one 1,000-gallon) in compliance with applicable laws and regulations. A Tank Removal Affidavit was filed with FDNY and tanks were registered with NYSDEC PBS Unit on November 18, 2014.
12. Remediation of NYSDEC Petroleum Spill number 14-04620 which was opened on July 7, 2014 during remedial/excavation activities. This spill was closed by the NYSDEC on April 10, 2015.
13. As part of new development, constructed an engineered Composite Cover System consisting of 15 inches of concrete slab underlain by a 3-inch concrete mud mat; and a base coarse of 6 to 8 inches of ¾-inch bluestone in building areas. The Composite Cover system will prevent human exposure to residual soil/fill remaining under the Site.
14. As part of new development, installed a Vapor Barrier System that consisted of Grace Preprufe 300R, Preprufe 160R, Bituthene 4000, and HydroDuct 220

below-grade foundation damp proofing material. The vapor barrier was installed on top of a 3-inch concrete mud mat.

15. Performed all activities required for the Remedial Action, including NYCDEP dewatering discharge permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
16. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
17. Submitted daily and monthly reports during construction oversight activities. Daily reports were submitted from July 3, 2014 to May 5, 2015.
18. Submitted a Sustainability Report.
19. 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.
20. As Unrestricted Use SCOs are achieved, a Site Management Plan (SMP) is not required.
21. As Unrestricted Use SCOs are achieved, the property will not be registered with an E-Designation by the NYC Department of Buildings.

REMEDIAL ACTION REPORT

1.0 SITE BACKGROUND

W29 Highline Owners LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 522-532 West 29th Street in Chelsea section of Manhattan, New York. The boundary of the property subject to this Remedial Action is shown in Figure 1 and includes, in its entirety, Manhattan Block 700 and Lot(s) 47, 48 and 49. The Remedial Action was performed pursuant to 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 Remedial Action Report (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 522 West 29th Street in the Chelsea section of Manhattan, and is identified as Block 700, Lot 47 on the New York City Tax Map. The Site is approximately 14,800 square feet and is located along the southern portion of West 29th Street mid-block between 10th and 11th Avenues. The Site is bounded by multi-story commercial and residential buildings, an art gallery, and a storage facility to north (Block 701 Lots 7501, 22, 22 and 24 across West 29th Street), a multi-story residential condominium to the south (Block 700 Lot 9), 13-story residential building to the east (Block 700 Lot 45), four-story commercial building to the west (Block 700 Lot 53). Historically, the site was occupied by three commercial buildings (a two-story brick building on Lot 47, and one-story buildings on Lots 48 and 49) that were occupied by a catering company and art galleries.

A Site location map is attached as **Figure 1**. The Site Boundary Map is shown on **Figure 2**.

1.2 REDEVELOPMENT PLAN

The redevelopment plan consisted of redeveloping the lot with an 11-story mixed-use building consistent with existing medium-density commercial zoning designation for the property (C6-3). The development involved the demolition of the previous buildings and construction of the new mixed-use building which features eleven floors and one cellar level. The cellar is primarily used for a gym, storage and utility rooms. Floor 1 is used for commercial space, lobby/reception area utility rooms, parking space and a driveway. Floors 2 through 11 are used for residential space. The building rises approximately 135 feet above current street level. An approximate 15 feet by 100 feet parking area is located on the western portion of the Site.

The top of the basement floor is approximately 12 to 14 feet below sidewalk level, that required the excavation of the entire footprints to approximately 16 feet below ground surface (bgs), with additional for the elevator pit to approximately 19 feet bgs. A Site location map showing the property boundary and the redevelopment plan is attached as **Figure 2**. The redevelopment plan is included in **Appendix A**.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is currently in a mixed-use neighborhood approximately 1,500 feet east of the Hudson River. The current businesses in the area are various art galleries, a juice company, auto repair shop and a storage facility. A review of the New York City Office of Environmental Remediation (OER) Searchable Property Environmental E-Database (SPEED) shows two Petroleum Bulk Storage centers within a half mile radius. In addition, the SPEED database shows numerous sites with known chemical releases.

The surrounding area is primarily characterized by residential and commercial use. The Site is bounded to the west by a four-story mixed-use building, which is currently vacant; to the east by a development site currently under construction; to the north by a six-story storage center, a three-story building mixed-use building, and four-story mixed-use building with art galleries on the first floor of the mixed-use building. To the south, there is a multistory residential building.

1.4 SUMMARY OF PAST USES AND AREAS OF CONCERN

The Site was purchased from High Ridge Enterprises Inc. by W29 Highline Owners LLC. Based on a review of historic Sanborn maps, a lumberyard and residential dwelling occupied the Site in 1911. In 1930, the Site was occupied by commercial structures for Sheffield Farms, Dry Milk Co. an automotive repair shop and a coal yard. From 1950-1976, the Site was occupied by a motor-freight station until c. 2002. Most recently, the Site was occupied by three separate businesses. Lot 47 was occupied by a catering company and Lot 48 and Lot 49 were occupied by an art gallery.

The Areas of Concern (AOC) identified for this Site include prior to Remedial Investigation included:

- Urban Fill present at the Site from grade to as much as 5 feet below ground surface (bgs);
- An underground storage tank (UST) that was closed-in-place at the 532 W. 29th Street building;
- Historical Industrial and Automotive Site use; and
- A former spill at the 524 W. 29th Street building.

1.5 SUMMARY OF WORK PERFORMED UNDER THE REMEDIAL INVESTIGATION

RI activities were performed in May 2013, and included the collection of soil, soil vapor, and groundwater samples. The scope of the field activities and methods are summarized below. GZA GeoEnvironmental of New York (GZA) performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (e.g., structures, buildings, etc.);
2. Drilled eight soil borings across the Site and collected eighteen soil samples for chemical analysis from the soil borings to evaluate soil quality. The soil analytical results were compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 New York Codes of Rules and Regulations Part 375

Unrestricted Use Soil Cleanup Objectives- Track 1 (SCOs) and the Restricted-Residential Use – Track 2 SCOs.

3. Installed three groundwater monitoring wells at the Site to collect four groundwater samples for chemical analysis to evaluate groundwater quality. The groundwater analytical results were compared to NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values (AWQS); and
4. Installed six soil vapor probes at the Site and collected six soil vapor samples for chemical analysis to evaluate soil vapor quality. The soil vapor analytical results were evaluated using the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion, Air Guidance Values (AGVs).

1.6 SUMMARY OF FINDINGS OF REMEDIAL INVESTIGATION

A RI was performed, and the results are documented in a companion document called "Remedial Investigation Report, 522-532 West 29th Street", dated May 2013 (RIR). The RI findings identified for the Site included:

1. Elevation of the property ranged from 10 to 12 feet.
2. Depth to groundwater ranges from 9 to 10 feet bgs at the Site.
3. Groundwater flow is generally from east to west beneath the Site.
4. Depth to bedrock is approximately 20 to 40 feet bgs at the Site.
5. The stratigraphy of the site, from the surface down, consisted of 2 feet of concrete underlain by 6 to 13 feet of fill (prior to construction) underlain by 5 to 21 feet of loose to dense Sand underlain by 4 to 10 feet of Sand and Silt underlain by weathered rock
6. No polychlorinated biphenyls (PCBs) were detected from the soil samples collected. Several volatile organic compounds (VOCs) including acetone, methylene chloride, benzene, butanone, dioxane, and dichloroethene were detected in three soil samples exceeding Unrestricted Use Soil Cleanup Objectives (SCOs). No VOCs were detected above their respective Restricted Residential SCOs in any soil sample. Several semi-volatile organic compounds

(SVOCs) were detected in soil samples from the Site with eight exceeding their respective Restricted Residential SCOs. These SVOCs included benzo(a)anthracene (max. of 5.4 mg/kg), benzo(a)pyrene (max. of 4.8 mg/kg), benzo(b)fluoranthene (max. of 6 mg/kg), benzo(k)fluoranthene (max. of 2.3 mg/kg), chrysene (max. of 6 mg/kg), dibenzo(a,h)anthracene (max. of 0.78 mg/kg), indeno(1,2,3-cd)pyrene (max. of 3.2 mg/kg) and 2-methylnaphthalene (max. of 23 mg/kg). Metals, including barium (maximum of 360 mg/kg), copper (maximum of 100 mg/kg), iron (maximum of 16,000 mg/kg), lead (maximum of 1,200 mg/kg), mercury (maximum of 4.4 mg/kg), nickel (maximum of 32 mg/kg) and zinc iron (maximum of 410 mg/kg) exceeded Unrestricted Use (Track 1) SCOs, and of these barium, iron, lead and mercury also exceeded Restricted Residential (Track 2) SCOs.

7. Several VOCs were detected above NYSDEC Part 703.5 Groundwater Quality Standards (GQS) and included 1,1-dichloroethene (max. of 12 µg/l), cis-1,2-dichloroethene (max. of 160 µg/l), benzene (max. of 12 µg/l), n-butylbenzene (max. of 11µg/l), sec-butylbenzene (max. of 12 µg/l), isopropylbenzene (max. of 12 µg/l), naphthalene (max. of 35 µg/l), and n-propylbenzene (max. of 37 µg/l). Three SVOCs including acenaphthene (max. of 20 µg/l), naphthalene (max. of 24 µg/l), and benzo(a)pyrene (max. of 0.11 µg/l) were detected above their respective GQS. Four metals including iron, magnesium, manganese, and sodium were detected in groundwater above their respective GQS. No PCBs were detected in any of the collected groundwater samples.
8. Moderate to high concentrations of petroleum and chlorinated VOCs were observed in each vapor sampling point. Tetrachloroethene (PCE) was identified in all samples at concentrations less than 10 µg/m3 except at one sampling point, at 288 µg/m3. Trichloroethene (TCE) was identified in all samples at concentrations less than 5 µg/m3 except at one sampling point, at 228 µg/m3. 1,1,1-Trichloroethane (1,1,1-TCA) was detected in one of five samples at 231 µg/m3. The results for PCE, TCE and 1,1,1-TCA were above the monitoring level ranges of the NYS DOH soil vapor guidance matrix and indicate that remedial action to address soil vapor is warranted. Comparatively elevated concentrations

of PCE, TCE, and 1,1,1-TCA were observed near the old spill location. Petroleum-related VOCs included ethanol (999 µg/m3), acetone (504 µg/m3), n-hexane (7,820 µg/m3), cyclohexane (4,200 g/m3), trimethylpentane (54,600 µg/m3), and ethylbenzene (11,100 µg/m3).

Appendix B includes the RIR.

2.0 DESCRIPTION OF REMEDIAL ACTIONS

The Remedial Action was performed in accordance with 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:

- A Pre-Application Meeting was held on May 2, 2013.
- A Remedial Investigation (RI) was performed between May 13 and May 25, 2013
- 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 July 29, 2013 for a 30-day public comment period.
- OER briefed NYSDEC and NYC DOHMH on August 15, 2013.
- The RAWP and Stipulation List dated September 6, 2013 was approved by the New York City Office of Environmental Remediation (OER) on December 5, 2013.
- NYCDOHMH approved proposed remedial actions on January 8, 2014.
- A Pre-Construction Meeting was held on June 4, 2014.
- A Fact Sheet providing notice of the start of the remedial action was issued on June 10, 2014.
- The remedial action was begun in June 2014 and was largely completed by May 2015.
- Redevelopment activities continued at the Site through December 2017.

Appendix C contains the RAWP and Stipulation List.

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 (July 2014); completed utility mark outs; and marked and staked excavation areas.
3. Two Waste Characterization Studies were performed prior to excavation activities. Ten waste characterization soil samples were collected on April 9, 2014. Then a supplemental waste characterization sampling program of nine additional sampling locations was conducted on June 4, 2014. Waste characterization samples were collected at a frequency dictated by disposal facility(s).
4. Performed a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds. CAMP Monitoring was performed during days of intrusive site work from July 3, 2014 to October 10, 2014. During construction, CAMP exceeded for particulates and proper actions were taken to control dust.
5. Selected Unrestricted Use (Track 1) SCOs for under the building and Established Track 4 Site Specific Soil Cleanup Objectives (SCOs) for parking areas. The development changed, and the entire property was excavated to 16 feet below grade. The following Track 4 SCOs were utilized: Total SVOCs 250 mg/kg, Total Lead 1,000 mg/kg, and Total Mercury 2.5 mg/kg.
6. Soil/fill was excavated to an average depth of 15 feet bgs across the rectangular site with additional excavation for the elevator pit to approximately 19 feet bgs. Approximately 10,919 cubic yards (16,377.84 tons) of soil/fill were excavated and removed from the property.
7. Transported and disposed 16,377.84 tons of soil/fill material at permitted facilities in accordance with all applicable laws and regulations for handling, transporting, and disposing, and the RAWP. Soil/fill was disposed at the following facilities:

a. 7,968.20 tons (contaminated non-hazardous soil/fill to Prospect Park NJ (Prospect Park), a clean fill facility in Prospect Park, New Jersey.
b. 1,839.27 tons (contaminated non-hazardous soil/fill) to Coplay Quarry Reclamation Project (Coplay), a clean-fill facility in Whitehall, Pennsylvania.
c. 6,570.37 tons petroleum-contaminated soil to Bayshore Recycling Corp. (Bayshore) in Woodbridge, NJ, a petroleum waste disposal facility.

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 in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
10. Collected and analyzed three post excavation end-point samples in addition to ten waste classification samples at final excavation depths (16 feet bgs) to determine attainment of SCOs. Additionally, ten tank bottom post-excavation samples were also collected. Endpoint samples were below Unrestricted Use SCOs. Track 1 Unrestricted Use remedy is achieved.
11. Removed four underground storage tanks (USTs) (one 2,000-gallon, two 550-gallon, and one 1,000-gallon) in compliance with applicable laws and regulations. A Tank Removal Affidavit was filed with FDNY and tanks were registered with NYSDEC PBS Unit on November 18, 2014.
12. Remediation of NYSDEC Petroleum Spill number 14-04620 which was opened on July 7, 2014 during remedial/excavation activities. This spill was closed by the NYSDEC on April 10, 2015.
13. As part of new development, constructed an engineered Composite Cover System consisting of 15 inches of concrete slab underlain by a 3-inch concrete mud mat; and a base coarse of 6 to 8 inches of ¾-inch bluestone in building areas. The Composite Cover system will prevent human exposure to residual soil/fill remaining under the Site.
14. As part of new development, installed a Vapor Barrier System that consisted of Grace Preprufe 300R, Preprufe 160R, Bituthene 4000, and HydroDuct 220

below-grade foundation damp proofing material. The vapor barrier was installed on top of a 3-inch concrete mud mat.

15. Performed all activities required for the Remedial Action, including NYCDEP dewatering discharge permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
16. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
17. Submitted daily and monthly reports during construction oversight activities. Daily reports were submitted from July 3, 2014 to May 5, 2015.
18. Submitted a Sustainability Report.
19. 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.
20. As Unrestricted Use SCOs are achieved, a Site Management Plan (SMP) is not required.
21. As Unrestricted Use SCOs are achieved, the property will not be registered with an E-Designation by the NYC Department of Buildings.

3.0 COMPLIANCE WITH REMEDIAL ACTION WORK PLAN

3.1 CONSTRUCTION HEALTH & SAFETY PLAN

The remedial construction activities performed under this program were in compliance with the Construction Health and Safety Plan and applicable laws and regulations. The Site Safety Coordinator was initially Andrzej Stasiuk of Site Safety Network. Site Safety Network was replaced by Tristate Safety and the Site Safety Coordinator was Richard Dicasoli.

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 during intrusive site work from July 3, 2014 to October 10, 2014 in compliance with the Community Air Monitoring Plan in the approved RAWP. The results of Community Air Monitoring are shown 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 were in compliance with the SMMP in the approved RAWP.

3.4 STORM-WATER POLLUTION PREVENTION

Storm water 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

storm water prevention and applicable laws and regulations.

3.5 DEVIATIONS FROM THE REMEDIAL ACTION WORK PLAN

The deviations from the RAWP are noted as follows:

1. The RAWP proposed to establish Track 1 Unrestricted Use SCOs for the new building (Lot 48 and 49), and Track 4 Site Specific SCOs for the parking area (Lot 47). Excavation and removal of soil/fill exceeding Track 1 Unrestricted Use SCOs in the area of the two buildings (Lots 48 and 49). Areas under the proposed new building will be excavated to a depth of approximately 15 feet below grade for development purposes. Parking lot area (Lot 47) will be excavated to the depths of 3 feet below grade. Approximately 11,250 tons of soil/fill will be excavated during remediation and development. However, the project excavated and removed soil/fill exceeding Track 1 Unrestricted Use SCOs in the whole Site to a depth of approximately 16 feet below grade for development purposes with additional for the elevator pit to approximately 19 feet bgs. Approximately 10,919 cubic yards (16,377.84 tons) of soil/fill was excavated during remediation and development.
2. Moreover, the RAWP specified the construction and maintenance of an engineered composite cover consisting of approximately 3-feet thick cap in the parking lot area to mitigate the potential for human exposure to residual soil/fill remaining under the Site. However, the project excavated and removed soil/fill in the whole Site to a depth of approximately 15 feet below grade for development purposes. The engineered composite cover was installed at the entire project footprint.
3. The Stipulation List indicates that two post-excavation samples from the bottom of the excavation location of the parking areas at approximately 3 feet below ground surface (EP-2 and EP-3) and one post-excavation sample from the bottom of the larger excavation at approximately 15 feet below ground surface (EP-1) would be collected to evaluate the performance of the remedy with respect to attainment of Track 1 SCOs. The samples in the parking area were to be analyzed for contaminants of concern (pesticides, and lead) and the sample from the bottom

of the lager excavation was to be sampled for the full analytical suite as proposed in the RAWP. A subsequent design change added a cellar level below the parking area. After communication with OER on October 9, 2014, the post-excavation samples endpoint depths for EP-2 and EP-3 were changed to the new deeper subgrade level of 16 feet bgs and the analytical parameters for all post-excavation samples were changed to VOCs, SVOCs, pesticides, lead, and mercury. The revised sampling scheme is protective of public health and the environment.

4.0 REMEDIAL PROGRAM

The following sections present a summary of the remedial program from project organization to RAWP completion. The photographs of remedial action are included in the Daily and Monthly Reports included in **Appendix E**.

4.1 PROJECT ORGANIZATION

Principal personnel who participated in the remedial action include Stefano Cafiso (Project Manager W29 Highline Owners LLC), Murat Sonmez, (Project Manager-W29 Highline Owners LLC), Reinbill Maniquez (Project Manager – GZA), Clifford Bell (Senior Project Manager - GZA), Stephen M. Kline (Associate Principal / Professional Engineer - GZA), Ernest Hanna (Professional Engineer GZA), Kate Glass and Horace Zhang (Project Managers OER), ECD NYC (Contractor), and Brookside Environmental (Remedial Contractor). The Professional Engineer (PE) for this project is Stephen M. Kline (GZA).

4.2 SITE CONTROLS

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

Site Preparation

On June 10, 2014, a pre-construction meeting was held with the parties involved with the remedial process. Representatives from OER, W29 Highline Owners LLC, ECD NY, Brookside, Site Safety Corporation, and GZA attended the event to discuss logistical and site preparation work prior to the ensuing mobilization. Site preparation activities occurred in the weeks leading up to July 2014. The site preparation activities included the mobilization of heavy equipment to the Site, the erection of construction fence along the perimeter, and the demolition and clearing of existing structures. The presence of utilities and easements on the Site was identified prior to 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 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 prior to start of construction. A NYC OER Project Notice was erected at the project entrance and in place during all phases of the Remedial Action.

An OER Project Notice was erected at the project entrance and was in place during all phases of the Remedial Action.

Soil Screening

Excavations were supervised by the qualified environmental professional. In addition to extensive 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 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.

Stockpile Management

Excavated soil from suspected areas of contamination (e.g., contamination identified from the RIR, prior identified underground storage tanks or USTs, structures, and USTs encountered during remedial action and construction etc.) were either direct-loaded on to trucks or stockpiled and segregated from clean soil and construction materials. Stockpiles were inspected daily, and before and after every storm event. Excavated soil was stockpiled on, at minimum, a layer of 8-mil sheeting, and were kept covered at all times with appropriately anchored plastic tarps.

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.

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 equipment was mobilized to the Site.

Nuisance Controls

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. W29 Highline Owners LLC was notified of conditions during excavation that were considered of impact to the community. Dust generated during the implementation of the remedy was suppressed using a hose system connected to the nearby fire- hydrant. The means of odor-minimization during soil management activities included limiting the area of open excavations and the monitoring of odors in the surrounding areas. There were no complaints registered from the community during the remedial action, to GZA's knowledge.

Reporting

Daily reports providing a general summary of activities for each day of active remedial work were prepared for the Site. The daily reports included:

- Project number and statement of the activities and an update of progress made and locations of work performed;
- Quantities of material imported to and/or exported from the Site;
- Status of on-Site soil/fill stockpiles;

- A summary of citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP exceedances, if any; and,
- Photographs of notable Site conditions and activities.

GZA Site personnel recorded daily activities in field logs and photographed representations of those activities. Deviations from the approved work plans, as noted, by GZA field personnel were communicated to the QEP immediately. The QEP contacted W29 Highline Owners LLC and the managing regulatory contact to report changes in field conditions. The field reports are included in **Appendix E**. Digital photographs of the Remedial Action are included in the reports.

4.3 MATERIALS EXCAVATION AND REMOVAL ACTION

This section presents the materials that were excavated / removed during the remedial activities at the Site.

Soil/Fill Excavation and Removal

Soil/fill was excavated to an average depth of 16 feet bgs across the rectangular site with additional for the elevator pit to approximately 19 feet bgs. Approximately 10,919 cubic yards (16,377.84 tons) of soil/fill was excavated during remediation and development. There was no on-Site reuse of materials.

Based on the initial waste classification performed in April 2014 and discussed in **Section 4.4**, soil to a depth of 16 feet bgs across the site were classified in either non-hazardous excavated material cells or petroleum excavated material cells. Based on the classification of materials the soil was designated for either of two non-hazardous waste facilities or the petroleum waste facility as identified in **Section 4.4**.

The results of the final waste classification event conducted in August 2014 resulted in two additional waste classification grids for non-hazardous soil from 15-18 feet. The soil also was designated for one of the two non-hazardous waste facilities. A map showing the location where excavations were performed is shown in **Figure 3**. The Waste Characterization Reports are included in **Appendix F**.

Onsite Reuse

No excavated materials were reused on-site during the development project.

UST Removal

On July 3, 2014 during excavation for installation of the soil mixture wall in the northwest corner of the site, a 2,000-gallon abandoned-in-place fuel tank was encountered. The UST appeared to be resting on a concrete slab at about 7 feet bgs. The tank was removed on July 7, 2014 by ECD NY Inc. (ECD) and Brookside Environmental of Copiague, New York (Brookside), a New York City Fire Department (FDNY)-licensed tank contractor. Details surrounding sampling of adjacent soil, the Spill number that was opened, and the final removal and closure of the tank and spill are summarized in **Appendix G** Tank Closure Reports.

On August 23, 2014, the excavation contractor encountered an approximate 550-gallon steel tank encased in concrete located along the center of the northern boundary and approximately 5 feet from the steel sheeting. The tank was removed from the ground, placed on plastic, and covered with plastic. There were no indications of a release from the tank although stained soil surrounding the concrete structure was observed upon its removal from the subsurface. These soils were segregated and stockpiled and were transported to Bayshore. On August 28, 2014, closure of the tank was performed by Brookside Environmental of Copiague, New York (Brookside), a New York City Fire Department (FDNY)-licensed tank contractor and assisted by ECD NY. Upon removal of the concrete encasement, GZA observed that the tank was filled with sand. The UST was cleaned and transported off-Site to Cousins Metal Industries, Inc. of Oceanside, NY for recycling. Please refer to **Appendix G** for the Affidavit of Closure submitted to the FDNY by Brookside for the 550-gallon fuel oil UST, as an attachment to the registration application to the NYSDEC Petroleum Bulk Storage Unit, dated November 18, 2014.

Soil around the 550-gallon tank was eventually removed as part of the Site-wide excavation and disposal to the extent practical to:

- 15 feet bgs (the approximate building cellar design excavation depth),

- the north approximately 5 feet before encountering steel sheeting coincident with the north property boundary
- the west approximately 75 feet before encountering the soil mixture wall located and coincident with the west property boundary
- the east approximately 70 feet before encountering the steel sheeting to the coincident with the east property boundary
- the south approximately 90 feet before encountering the steel sheeting coincident with the south property boundary.

On September 19, 2014, the excavation contractor encountered an approximate 1,000-gallon tank located about 20 south of the northern property boundary and about 10 feet west of the east property boundary. The tank was estimated to be about 5 feet in diameter and 12 feet long. The top half of the tank was encased in concrete and wood and the top of the concrete structure was encountered at about 7 feet below the sidewalk grade, and the approximate average depth to groundwater. At that time, the site was subject to dewatering and the prevailing depth to water was below the tank excavation. The tank was removed on September 22, 2014 by Brookside and ECD NY. Upon removal, GZA noted that the tank was perforated on the underside. Upon removal of the tank, about 50 gallons of groundwater that apparently had infiltrated into the tank through the perforations discharged into the tank excavation. During removal of the 1,000-gallon tank, soil was screened a PID. Any petroleum-impacted soil as observed by evidence of olfactory or visual indications of impacts, or with PID responses above background, was segregated and eventually transported to Bayshore.

Soil beyond the 1,000-gallon tank excavation eventually was removed as part of the Site-wide excavation and disposal to the fullest extent allowable to:

- 16 feet bgs (the approximate building cellar design excavation depth),
- the north approximately 25 feet before encountering steel sheeting coincident with the north property boundary

- the west approximately 120 feet before encountering the soil mixture wall located and coincident with the west property boundary
- the east approximately 25 feet before encountering the steel sheeting to coincident with the east property boundary
- the south approximately 65 feet before encountering the steel sheeting coincident with the south property boundary.

A map showing the locations of the tanks and where excavations were performed is shown in **Figure 3**. Please refer to **Appendix G** for the Affidavit of Closure submitted to the FDNY by Brookside for the fuel oil UST, as an attachment to the registration application to the NYSDEC Petroleum Bulk Storage Unit, dated November 18, 2014.

NYSDEC Petroleum Spills

Remediation of NYSDEC Petroleum Spill number 14-04620 which was opened on July 7, 2014 during remedial/excavation activities. This spill was closed by the NYSDEC on April 10, 2015. The Spill Closure Report is included in **Appendix G**.

Dewatering

Infiltrating groundwater was restricted by a soil-mixture wall (secant) pile wall installed by the contractor on the west side of the site and steel sheeting driven to rock on the north, east and south sides of the site. From between September 9, 2014 until September 25, 2014, well points were installed which were manifolded and directed to a site treatment system in conformance to the NYC DEP Bureau of Wastewater Treatment (BWT) Wastewater Quality Control Permit issued to the Site. The required permit and approval was obtained from NYC DEP separately from the OER-approved RAWP by a third-party consultant. Dewatering was initiated at the site in October 2014.

Soil Cleanup Objectives

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

Contaminant	Site-Specific SCOs (PPM)
Total SVOCs	250 mg/kg
Lead	1,000 mg/kg
Mercury	2.5 mg/kg

End Point Sample Results

On April 9, and June 4, 2014, GZA implemented a waste characterization sampling program to characterize the soil for off-site disposal. Ten borings were drilled down to 15 feet bgs and sampled across the Site. During the waste characterization sampling, representative endpoint samples (SB-1 through SB-10) were collected at the bottom of each boring. The sample results are included in the Waste Characterization Reports included in **Appendix F.**

In addition. ten (10) tank bottom post-excavation samples were collected where the approximate 2,000-gallon tank was removed on July 7, 2014, including VOC 1, SVOC 1, VOC 2, SVOC 2, VOC 3, SVOC 3, VOC 4, SVOC 4, VOC 5, and SVOC 5. These samples were obtained at 7 feet bgs and analyzed for VOCs and SVOCs. The results of the post-excavation samples were compared to the Part 375 Unrestricted Use (Track 1) SCOs and the Part 375 Restricted Residential Use (Track 2) SCOs. The tank bottom endpoint results indicate that:

- VOCs did not exceed Track 1 SCOs.
- Several SVOCs were detected. Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene and Indeno(1,2,3-cd)pyrene exceeded both Track 1 and Track 2 SCOs at SVOC 1, SVOC 2, SVOC 3, and SVOC 4. At SVOC 5, Benzo(b)fluoranthene and Indeno(1,2,3-cd)pyrene were also detected above Track 1 and Track 2 SCOs. Chrysene exceeded Track 2 SCO at SVOC 2 and SVOC 4. Chrysene was found above Track 1 and Track 2 SCOs at SVOC 2 and SVOC 4. Benzo(k)fluoranthene exceeded Track 1 and Track 2 SCOs at SVOC 4. Benzo(k)fluoranthene and Dibenzo(a,h)anthracene were detected

above Track 2 SCOs at SVOC 1 and SVOC 2. Dibenzo(a,h)anthracene also exceeded Track 2 SCO at SVOC4.

In September 4, 2014, supplemental waste characterization endpoint samples were collected. The results of the final waste classification resulted in two additional waste classification grids for non-hazardous soil from 15-18 feet. The soil also was designated for one of the two non-hazardous waste facilities.

As part of the Stipulation List, three post-excavation samples were collected at approximately 16 feet bgs between October 3, 2014 and October 7, 2014, including EP-1, EP-2 (where previous tank bottom endpoint samples were taken) and EP-3. Two confirmation samples (EP-2 and EP-3) were collected from the base of the parking area excavation on Lot 47 at locations determined by OER. EP-1 was collected from the base of the new building area excavation. The post-excavation samples were obtained at 16 feet bgs and analyzed for VOCs, SVOCs, pesticides, lead, and mercury. The results of the post-excavation samples were compared to the Track 1 SCOs and Track 2 SCOs. The endpoint samples results showed that there were no exceedances of any of the SCOs in each of the samples analyzed:

- No VOCs exceeded Part 375 Unrestricted Use Soil Cleanup Objectives (Track 1).
- No SVOCs were detected.
- Lead and mercury did not exceed Part 375 Unrestricted Use Soil Cleanup Objectives (Track 1).
- No pesticides were detected.

A map of endpoint sample locations is shown in **Figure 4**. A tabular summary of endpoint sampling results compared to SCOs is included in **Tables 1** through **3**. The laboratory reports for the endpoint samples are presented in **Appendix H**.

4.4 MATERIALS DISPOSAL

Material disposal was conducted between July 14, 2014 and January 19, 2015. Detailed disposal summary and manifest are included in **Appendix I**. The tonnage of material removed and disposed off-Site is presented below:

Destination	Type of Material	Quantity
Prospect Park NJ	Contaminated non-hazardous soil/fill	7,968.20 tons
Coplay Quarry Reclamation Project	Contaminated non-hazardous soil/fill	1,839.27 tons
Bayshore Recycling Corp.	Petroleum-contaminated soil	6,570.37 tons
TOTAL		16,377.84 tons

Table above shows the total quantities of each class of material removed from the Site and the disposal locations. Letters from Stefano Cafiso 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 I**.

4.5 BACKFILL IMPORT

Backfill was not imported to the site during this Remedial Action or development.

4.6 DEMARCATION

Soil below the final cover is residual soil that will be addressed by Site Management under this Remedial Action.

5.0 ENGINEERING CONTROLS

Unrestricted Use SCOs were achieved and Engineering Controls are not required. However, the following protective construction elements were employed during construction:

1. a Composite Cover System consisting of concrete covered sidewalks, and concrete building slabs;
2. a Vapor Barrier/Water-resistant Membrane.

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 15-inch reinforced concrete slab underlain by 8 inches of clean sub-base material in the open floor building areas with a thicker slab at where pile caps and grade beams were located. The Contractor for construction of the Composite Cover System was ECD New York. **Appendix J** shows the as-built design for each remedial cover type used on this Site. **Figure 5** shows the location of the cover built at the Site.

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 extends beneath the footprint of the building and consists of Grace Preprufe 300R, Preprufe 160R, Bituthene 4000, and HydroDuct 220 below-grade foundation damp-proofing material. Joints were sealed with Preprufe LT tape and Bituthene EdgeGuard tape. Prior to applying horizontal Preprufe the mud slab was confirmed to be bull floated or broom swept. White HDPE film facing was prepared on the horizontal substrate with protective white coating facing concrete to be poured. Laps were overlapped 3 inches and sealed with Preprufe Tape. Round penetrations were fitted snugly and were patched with a minimum of 12 inches greater than the diameter of the penetration. Preprufe Tape was used to seal patches at penetrations. The Contractor

for construction of the Vapor Barrier System was ECD NY. **Figure 5** shows the location of the Vapor Barrier System used on this Site. **Appendix J** includes the for the Vapor Barrier System as well as photographs and inspection reports.

6.0 INSTITUTIONAL CONTROLS

Unrestricted Use SCOs were achieved and Institutional Controls are not required.

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. Unrestricted Use SCOs were achieved and Site Management is not required.

8.0 SUSTAINABILITY REPORT

This Remedial Action provided for sustainable remediation 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 limited use of non-renewable resources such as virgin top-soils. Recycled material was not used in this project. On-Site soils were graded and covered with concrete.

Reduced Energy Consumption and Promotion of Greater Energy Efficiency. Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, and can lower traffic congestion and provide substantial cost savings.

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 composite cover and vapor barrier system will provide protection against recontamination originating from off-site sources. The area of the Site that utilizes recontamination controls under this plan is 14,800 square feet.

Storm-water Retention. Storm-water retention improves water quality by lowering the rate of combined storm-water and sewer discharges to NYC's sewage treatment plants during periods of precipitation and reduces the volume of untreated influent to local surface waters. A 186.7- sq. ft. storm-water retention tank was installed in the cellar of the new building.

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. W29 Highline Owners LLC 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.

Low-Energy Project Management Program. W29 Highline Owners LLC 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.

Trees and Plantings. Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance. The project aims to plant sidewalk trees along West 29th Street.