545-551 WEST 48TH STREET
534-542 WEST 49TH STREET
MANHATTAN, NEW YORK

Remedial Action Report

NYC VCP Number: 13CVCP083M

Prepared for:

FPG Clinton Acquisition, LLC

45 Main Street, Suite 302

Brooklyn, NY 11201

Prepared by:

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

1808 Middle Country Road

Ridge, NY 11961

FEBRUARY 2015

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 10
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 DOHMH	New York City Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
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
SCG	Standards, Criteria and Guidance
SCO	Soil Cleanup Objective
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SVOCs	Semi-Volatile Organic Compounds
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

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CERTIFICATION

I, Ariel Czemerinski, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Redevelopment Project located at 545-551 West 48th Street, and 534-542 West 49th Street, Site Number 13CVCP083M.

I certify that the OER-approved Remedial Action Work Plan dated August 2012 and the associated Stipulation List dated October 2012, was implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Ariel Czemerinski
Name

076508
PE License Number

Signature

PE Stamp

3/10/2014
DATE

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EXECUTIVE SUMMARY

Site Location and Prior Usage

The Site is located at 545-551 West 48th Street and 534-542 West 49th Street in the Clinton section in Manhattan, New York, and was previously identified as Block 1077, Lots 8, 9, 10, 55, and 56 on the New York City Tax Map. As part of redevelopment, the five lots were combined to form two lots (Lot 55 and Lot 10). Figure 1 shows the Site location and a map of the site boundary is shown on Figure 2.

Lot 10 (545-551 West 48th Street) is located on the north side of West 48th Street between 10th Avenue and 11th Avenue. The square shaped lot consists of 100 feet of street frontage on West 48th Street and has a depth of 100.42 feet for a total of approximately 10,042 ft^2. Lot 10 is bounded by West 48th Street to the south, a 7-story office building occupied by the Salvation Army (535 West 48th Street) to the east, a car dealership lot (666 11th Avenue) to the west, and the north half of the Site (534-542 West 49th Street) to the north.

Lot 55 (534-542 West 49th Street) is located on the south side of West 49th Street between 10th Avenue and 11th Avenue. The rectangular shaped lot consists of 111.6 feet of street frontage on West 49th Street and has a depth of 100.42 feet for a total of approximately 11,207 ft^2. Lot 55 is bounded by West 49h Street to the north, 5-story office building occupied by the American Red Cross (514 West 49th Street) to the east, a 5-story brick residential building (544 West 49th Street) to the west, and the south half of the Site (545-551 West 48th Street) to the south.

Prior to redevelopment, Lot 55 was developed with a one-story parking garage building with a basement level and Lot 56 was developed with a one-story brick building used for auto repair. Lots 8, 9 and 10 were undeveloped and are used as an open-air parking lot.

Summary of Proposed Redevelopment Plan

The proposed redevelopment plan for the Site included the construction of two new 7-story residential apartment buildings (Towers A and B). Tower A was to be constructed on the north half of the Site and front West 49th Street, and Tower B was to be constructed on the south half of the Site and front West 48th Street. Combined, Tower A and Tower B were to cover approximately 70 percent of the Site. Both buildings were to have a full basement level which

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would be utilized for residential apartments, common and recreation areas, and mechanical equipment rooms. The first floor of both buildings were to consist of a lobby area, residential apartments, and a connection to the rear cellar level courtyard. Floors 2 through 7 of both buildings were to consist of residential apartments. The total gross building square footage for Tower A was to be 55,023 ft^2 and 49,258 ft^2 for Tower B.

A cellar level rear courtyard (6,414 ft^2) was to be created between the two towers and was to consist of private rear yard spaces, common terrace space, and a greenhouse enclosed in glass that connects the cellar level of Tower A with the cellar level of Tower B. The entire open space between the two buildings was to be capped with a concrete slab.

Excavation for the cellar level for the two towers and the rear courtyard was to require excavation of the entire Site to a depth of 14-16 feet. Since bedrock was determined to be present at a depth ranging from 4 to 14 feet below grade, excavation of at least 4 to 7 feet into the bedrock would be required across the Site. In addition, since groundwater was measured to be approximately 9 feet below grade in the asphalt paved parking area, both the basements of the Tower A and Tower B buildings and the rear cellar level courtyard would require the installation of a waterproofing membrane/system.

Layout of the proposed Site development is presented in Figure 3. The current zoning designation is R8 with a C2-4 commercial overlay. The proposed use was consistent with existing zoning for the property.

Summary of Past Uses of Site and Environmental Findings

A Phase I Environmental Site Assessment Report was prepared by EBC in May 2012 for the Site. The Phase I report identified the following Site history.

Lots 8 & 9 – 549-551 W. 48th Street

Lots 8 and 9 were each developed prior to 1890 with residential buildings. The buildings were demolished between 1968 and 1979. According to the 1995 Sanborn map, the lots were combined with Lot 10 and used as a parking facility.

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Lot 10 – 545-547 W. 48th Street

Lot 10 was originally two separate lots labeled as 545 and 547 W. 48th Street. Both lots were developed prior to 1890 with residential buildings. The buildings were demolished by 1968. The lot remained vacant until it was combined with Lots 8 and 9 sometime prior to 1995 and used as a parking facility.

Lot 55 – 534-540 W. 49th Street

Prior to 1890, Lot 55 consisted of three lots with street addresses 534-536, 538, and 540 which were each developed as residential properties with outbuildings. By 1911, 534-536 and 538 W. 49th Street were combined and redeveloped into a 2-story garage/repair shop. In 1911, 540 W. 49th Street was utilized as a wagon repair shop. Sometime between 1911 and 1919, 540 W. 49th Street was combined with 534-536 W. 49th Street and redeveloped into a 1-story automobile service station and repair shop. The tank in the sidewalk was no longer shown but a 275 gallon gasoline tank appears in the southwest corner of the building. In 1959 the property is redeveloped with a new 1-story garage building and appears to have been used as a parking garage, auto repair facility and for auto sales through the 1980's. It was then used as a parking garage to the present time. A 250 gallon underground gasoline tank is present beneath the sidewalk in the 1911 Sanborn map. A 275 gallon gasoline tank is shown in the southwest corner of the building in the 1919, 1930 and 1950 Sanborn maps.

Lot 56 – 542 W. 49th Street

Prior to 1890, Lot 56 was developed with a residential home and outbuildings. By 1911 the property was used labeled "dairyman". According to NYC DOB records and the 1919 Sanborn map, the lot was redeveloped in 1919 into a 1-story auto repair shop in the front of the lot and an adjoining 2-story machine shop in the rear of the lot. By 1930, the property was used by a trucking company. The building reverted back to an auto repair facility by 1947 and has remained an auto repair facility since.

The AOCs identified for this Site include:

1. Historic fill is present at the Site to a depth of at least 4 feet below the basement level of the parking garage and to a depth of approximately 7 feet or to the bedrock surface in the

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asphalt paved parking lot located behind the automotive repair facility and parking garage building.

Summary of Environmental Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed seven soil borings across the entire project Site, and collected ten soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed three sub-slab soil vapor probes within the parking garage building and collected three samples for chemical analysis;
4. Installed three soil vapor implants within the asphalt paved parking lot and collected three samples for chemical analysis; and
5. Several attempts were made to collect a groundwater sample, but groundwater was not encountered within the overburden soil above the bedrock located at approximately 7 feet below grade in the asphalt paved parking lot. However a pre-existing monitoring well was discovered in the central portion of Lot 8. Originally the well was believed to be a fill port, but upon further inspection it was a determined that it was a monitoring well installed for a geotechnical report. A groundwater sample was collected from the monitoring well for chemical analysis. Supplemental groundwater sampling was to be performed after the redevelopment project began and demolition of the former buildings and excavation to the bedrock surface was completed.

Summary of Environmental Findings

1. Elevation of the property ranges from approximately 25 to 27 feet.
2. Groundwater is not present within overburden soil at the Site.
3. Depth to bedrock at the Site ranges from 4 to at least 14 feet below grade.
4. The stratigraphy of the Site, from the surface down, consists a layer of historic fill to a depth of at least 4 feet below the basement level of the parking garage and a depth of approximately 7 feet below the asphalt paved parking lot located behind the automotive repair facility and parking garage building. Bedrock consisting of a mica schist is present below the fill.

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5. Soil/fill samples collected during the RI showed no PCBs at detectable concentrations. No VOCs were present at detectable concentrations, with the exception of naphthalene which was detected at a low level in two of ten soil samples (8.7 ppb and 1,200 ppb) and 1,2,4-trimethylbenzene, which was detected at a low level (6.9 ppb) in one of the soil samples. The concentration of the VOC is below Unrestricted Use SCOs. Six SVOCs, were detected in shallow soils at concentrations above Restricted Residential SCOs and included benzo(a)anthracene, benzo(a)pyrene, benzo(a)fluoranthene, benzo(k)fluor-anthene, chrysene, dibenzo(k)anthracene and indeno(1,2,3-cd)pyrene. These SVOCs were all PAH compounds and their concentrations and distributions indicate that they are associated with historic fill material observed in shallow samples. Five pesticides, including 4,4,4-DDD (max of 150 ppb), 4,4,4-DDE (max of 61 ppb), 444-DDT (max of 360 ppb), chlordane (max of 150 ppb) and dieldrin (max of 300 ppb) were detected above Unrestricted Use SCOs, and one pesticide (dieldrin) exceeded Restricted Residential SCOs (in one sample). Five metals, including barium, chromium, mercury, lead and zinc exceeded Unrestricted Use SCOs in the soil samples, and of these metals, barium (max of 2,530 ppm), mercury (max of 2.26 ppm), and lead (max of 1,160 ppm) also exceeded their respective Restricted Residential SCOs. Overall, the findings were consistent with observations for other historical fill sites in Manhattan.
6. Bedrock is present at the Site at a depth of approximately 7 feet below grade in the asphalt paved parking lot located behind the parking garage and automotive repair facility buildings and is assumed to be slightly more than 4 feet below grade beneath the basement of the parking garage building. Groundwater was not encountered within the soil borings performed within the overburden soil above bedrock. The pre-existing monitoring well in Lot 8 showed no PCBs at detectable concentrations. No VOCs were present at detectable concentrations. Five SVOCs were detected above NYS Groundwater Quality Standards (GQS). These SVOCs were all PAH compounds and their concentrations and distributions indicate that they are associated with historic fill material. Two pesticides (4,4,4-DDT and dieldrin) were detected, but only dieldrin was detected above its respective GQS. One dissolved metal, sodium, exceeded GQS in the groundwater sample and is attributed to saline intrusion or road salting. Overall, the findings were consistent with observations for other historical fill sites in Manhattan.

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7. Sub-slab and soil vapor samples collected during the RI showed petroleum and chlorinated VOCs at low to moderate concentrations. Total petroleum VOCs were identified from 50 to 522 µg/m^3. Acetone was detected to a maximum concentration of 342 µg/m^3, toluene was detected at 101 µg/m^3, and xylenes were at 70 µg/m^3. PCE was identified in all samples with a maximum concentration of 121 µg/m^3, and TCE was detected within only one of the samples at a concentration of 30.4 µg/m^3. These results for TCE and PCE are within the monitoring level ranges of the State DOH soil vapor guidance matrix. Neither PCE nor TCE were detected within any of the soil samples collected at the Site.

Summary of the Remedy

A Pre-Application Meeting was held on March 29, 2012. A Remedial Investigation (RI) was performed in April of 2012 and a RI Report dated September 2012 was prepared to evaluate data and information necessary to develop a Remedial Action Work Plan (RAWP). A Site Contact List was established and a RAWP dated August 2012 was prepared and released with a Fact Sheet on September 13, 2012, for a 30-day public comment period. The RAWP and Stipulation List dated October 2012, was approved by the New York City Office of Environmental Remediation (OER) on October 12, 2012. A pre-construction meeting was held on March 1, 2013 and remedial action began in March of 2013 and completed in December of 2014.

The following remedial actions were completed in this program:

1. Prepared a Community Protection Statement and implemented a Citizen Participation Plan.
2. Performed a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Established Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs). Achieved Track 1 SCOs for soil through excavation and removal of all historic fill material and soil to the bedrock surface across the entire Site, and additional excavation/removal of bedrock as necessary for construction of the new buildings' cellar levels and rear courtyard area.
4. Removal of three 550-gallon gasoline underground storage tanks and one 300-gallon waste oil underground storage tank and closure of the associated NYSDEC Spill Number (1300285) in compliance with applicable local, State and Federal laws and regulations;

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5. Installation of two bedrock groundwater monitoring wells following Site excavation down to bedrock, and collection of groundwater samples from the two monitoring wells;
6. Installed a waterproofing membrane/vapor barrier system beneath the cellar slab of both Tower A and Tower B and behind all foundation walls of both buildings to grade. The vapor barrier system and building slab are directly above competent bedrock and will limit migration of any potential soil vapors from off site.
7. Imported materials to be used for backfill in compliance with this plan and in accordance with applicable laws and regulations.
8. Transported and disposed off-Site of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Collected, sampled and analyzed samples representative of excavated media as required by disposal facilities. Appropriately segregated excavated media on Site.
9. Screened excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
10. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
11. Performed all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
12. Submitted a RAR that: certifies that the remedial requirements have been achieved; defines the Site boundaries; and describes the remedial activities including any changes from the RAWP.

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REMEDIAL ACTION REPORT

1.0 SITE BACKGROUND

FPG Clinton Acquisition, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 545-551 West 48th Street in Clinton section of Manhattan, New York. The boundary of the property subject to this Remedial Action is shown in Figure 1 and include, in their entirety, Manhattan, Block 1077 and Lots 10 and 55. 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 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, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Prior Usage

The Site is located at 545-551 West 48th Street and 534-542 West 49th Street in the Clinton section in Manhattan, New York, and was previously identified as Block 1077, Lots 8, 9, 10, 55, and 56 on the New York City Tax Map. As part of redevelopment, the five lots were combined to form two lots (Lot 55 and Lot 10). Figure 1 shows the Site location and a map of the site boundary is shown on Figure 2.

Lot 10 (545-551 West 48th Street) is located on the north side of West 48th Street between 10th Avenue and 11th Avenue. The square shaped lot consists of 100 feet of street frontage on West 48th Street and has a depth of 100.42 feet for a total of approximately 10,042 ft^2. Lot 10 is bounded by West 48th Street to the south, a 7-story office building occupied by the Salvation Army (535 West 48th Street) to the east, a car dealership lot (666 11th Avenue) to the west, and the north half of the Site (534-542 West 49th Street) to the north.

Lot 55 (534-542 West 49th Street) is located on the south side of West 49th Street between 10th Avenue and 11th Avenue. The rectangular shaped lot consists of 111.6 feet of street frontage on West 49th Street and has a depth of 100.42 feet for a total of approximately 11,207 ft^2. Lot 55 is bounded by West 49h Street to the north, 5-story office building occupied by the American Red

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Cross (514 West 49th Street) to the east, a 5-story brick residential building (544 West 49th Street) to the west, and the south half of the Site (545-551 West 48th Street) to the south.

Prior to redevelopment, Lot 55 was developed with a one-story parking garage building with a basement level and Lot 56 was developed with a one-story brick building used for auto repair. Lots 8, 9 and 10 were undeveloped and are used as an open-air parking lot.

1.2 Proposed Redevelopment Plan

The proposed redevelopment plan for the Site included the construction of two new 7-story residential apartment buildings (Towers A and B). Tower A was to be constructed on the north half of the Site and front West 49th Street, and Tower B was to be constructed on the south half of the Site and front West 48th Street. Combined, Tower A and Tower B were to cover approximately 70 percent of the Site. Both buildings were to have a full basement level which would be utilized for residential apartments, common and recreation areas, and mechanical equipment rooms. The first floor of both buildings were to consist of a lobby area, residential apartments, and a connection to the rear cellar level courtyard. Floors 2 through 7 of both buildings were to consist of residential apartments. The total gross building square footage for Tower A was to be 55,023 ft^2 and 49,258 ft^2 for Tower B.

A cellar level rear courtyard (6,414 ft^2) was to be created between the two towers and was to consist of private rear yard spaces, common terrace space, and a greenhouse enclosed in glass that connects the cellar level of Tower A with the cellar level of Tower B. The entire open space between the two buildings was to be capped with a concrete slab.

Excavation for the cellar level for the two towers and the rear courtyard was to require excavation of the entire Site to a depth of 14-16 feet. Since bedrock was determined to be present at a depth ranging from 4 to 14 feet below grade, excavation of at least 4 to 7 feet into the bedrock would be required across the Site. In addition, since groundwater was measured to be approximately 9 feet below grade in the asphalt paved parking area, both the basements of the Tower A and Tower B buildings and the rear cellar level courtyard would require the installation of a waterproofing membrane/system.

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Layout of the proposed Site development is presented in Figure 3. The current zoning designation is R8 with a C2-4 commercial overlay The proposed use was consistent with existing zoning for the property.

1.3 Description of Surrounding Property

The area surrounding the Site consists of a mix of residential and industrial properties. Figure 4 shows the surrounding land usage of the adjacent properties listed below as well as additional properties located up to 500 feet away from the Site. No hospitals or daycare facilities are located within a 250 ft radius of the Site. Five small high schools are located at the former H.S. 535 Park West High School located at 737 10th Avenue (between West 50th Street and West 51st Street). These five small high schools include Manhattan Bridges High School, Food and Finance High School, High School of Hospitality Management, Urban Assembly School for Design and Construction, and Facing History High School.

Surrounding Property Usage

Direction	Property Description
North Opposite Side of W. 49th Street	Block 1078, Lot 8 (541 W. 49th Street) – A 75' by 100' lot. The lot is developed with a 6-story apartment building. Block 1078, Lot 111 (539 W. 49th Street) – A 25' by 100' lot. The lot is developed with a 5-story residential building. The building, built approximately 1901, has 20 residential units. Block 1078, Lot 12 (537 W. 49th Street) – A 25' by 100' lot. The lot is developed with a 5-story residential building. The building, built approximately 1901, has 20 residential units. Block 1078, Lot 13 (535 W. 49th Street) – A 25' by 100' lot. The lot is developed with a 5-story residential building. The building, built approximately 1901, has 20 residential units.
South Opposite Side of W. 48th Street	Block 1076, Lot 51 (540 W. 48th Street) – A 100’ by 100’ lot under construction. Block 1076, Lot 55 (542 W. 48th Street) – A 20’ by 100’ lot developed with a 4-story commercial building, circa 1940. Block 1076, Lot 56 (544 W. 48th Street) – A 30’ by 100’ lot developed with a 3-story commercial building. The first floor of the building is utilized as parking.
East Adjacent Property	Block 1077 Lot 43 (514 W. 49th Street) – A 332' by 100' corner lot developed with a 4-story industrial building, circa 1920. Block 1077 Lot 12 (535 W. 48th Street) – A 75' by 100' lot developed with a 7-story commercial building. The building is utilized as a salvation army.

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West Adjacent Property	Block 1077 Lot 1 (559-561 W. 48th Street) – A 175' by 200' corner lot. The lot is developed with a 2-story commercial building and was built approximately 1984. Block 1077 Lot 57 (544 W. 49th Street) – A 25' by 100' lot developed with a 5-story residential building, built approximately 1909.

1.4 Remedial Investigation

A remedial investigation was performed and the results are documented in a document called "*Remedial Investigation Report*, 545-551 West 48th Street and 534-542 West 49th Street", dated August 2012 (RIR).

Summary of Past Uses of Site and Areas of Concern

A Phase I Environmental Site Assessment Report was prepared by EBC in May 2012 for the Site. The Phase I report identified the following Site history.

Lots 8 & 9 – 549-551 W. 48th Street

Lots 8 and 9 were each developed prior to 1890 with residential buildings. The buildings were demolished between 1968 and 1979. According to the 1995 Sanborn map, the lots were combined with Lot 10 and used as a parking facility.

Lot 10 – 545-547 W. 48th Street

Lot 10 was originally two separate lots labeled as 545 and 547 W. 48th Street. Both lots were developed prior to 1890 with residential buildings. The buildings were demolished by 1968. The lot remained vacant until it was combined with Lots 8 and 9 sometime prior to 1995 and used as a parking facility.

Lot 55 – 534-540 W. 49th Street

Prior to 1890, Lot 55 consisted of three lots with street addresses 534-536, 538, and 540 which were each developed as residential properties with outbuildings. By 1911, 534-536 and 538 W. 49th Street were combined and redeveloped into a 2-story garage/repair shop. In 1911, 540 W. 49th Street was utilized as a wagon repair shop. Sometime between 1911 and 1919, 540 W. 49th Street was combined with 534-536 W. 49th Street and redeveloped into a 1-story automobile service station and repair shop. The tank in the sidewalk was no longer shown but a 275 gallon gasoline tank appears in the southwest corner of the building. In 1959 the property is

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redeveloped with a new 1-story garage building and appears to have been used as a parking garage, auto repair facility and for auto sales through the 1980's. It was then used as a parking garage to the present time. A 250 gallon underground gasoline tank is present beneath the sidewalk in the 1911 Sanborn map. A 275 gallon gasoline tank is shown in the southwest corner of the building in the 1919, 1930 and 1950 Sanborn maps.

Lot 56 – 542 W. 49th Street

Prior to 1890, Lot 56 was developed with a residential home and outbuildings. By 1911 the property was used labeled "dairyman". According to NYC DOB records and the 1919 Sanborn map, the lot was redeveloped in 1919 into a 1-story auto repair shop in the front of the lot and an adjoining 2-story machine shop in the rear of the lot. By 1930, the property was used by a trucking company. The building reverted back to an auto repair facility by 1947 and has remained an auto repair facility since.

The AOCs identified for this Site include:

1. Historic fill is present at the Site to a depth of at least 4 feet below the basement level of the parking garage and to a depth of approximately 7 feet or to the bedrock surface in the asphalt paved parking lot located behind the automotive repair facility and parking garage building.

Summary of Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed seven soil borings across the entire project Site, and collected ten soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed three sub-slab soil vapor probes within the parking garage building and collected three samples for chemical analysis;
4. Installed three soil vapor implants within the asphalt paved parking lot and collected three samples for chemical analysis; and
5. Several attempts were made to collect a groundwater sample, but groundwater was not encountered within the overburden soil above the bedrock located at approximately 7 feet below grade in the asphalt paved parking lot. However a pre-existing monitoring well

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was discovered in the central portion of Lot 8. Originally the well was believed to be a fill port, but upon further inspection it was a determined that it was a monitoring well installed for a geotechnical report. A groundwater sample was collected from the monitoring well for chemical analysis. Supplemental groundwater sampling was to be performed after the redevelopment project began and demolition of the former buildings and excavation to the bedrock surface was completed.

Summary of Environmental Findings

1. Elevation of the property ranges from approximately 25 to 27 feet.
2. Groundwater is not present within overburden soil at the Site.
3. Depth to bedrock at the Site ranges from 4 to at least 14 feet below grade.
4. The stratigraphy of the Site, from the surface down, consists a layer of historic fill to a depth of at least 4 feet below the basement level of the parking garage and a depth of approximately 7 feet below the asphalt paved parking lot located behind the automotive repair facility and parking garage building. Bedrock consisting of a mica schist is present below the fill.
5. Soil/fill samples collected during the RI showed no PCBs at detectable concentrations. No VOCs were present at detectable concentrations, with the exception of naphthalene which was detected at a low level in two of ten soil samples (8.7 ppb and 1,200 ppb) and 1,2,4-trimethylbenzene, which was detected at a low level (6.9 ppb) in one of the soil samples. The concentration of the VOC is below Unrestricted Use SCOs. Six SVOCs, were detected in shallow soils at concentrations above Restricted Residential SCOs and included benzo(a)anthracene, benzo(a)pyrene, benzo(a)fluoranthene, benzo(k)fluor-anthene, chrysene, dibenzo(k)anthracene and indeno(1,2,3-cd)pyrene. These SVOCs were all PAH compounds and their concentrations and distributions indicate that they are associated with historic fill material observed in shallow samples. Five pesticides, including 4,4,4-DDD (max of 150 ppb), 4,4,4-DDE (max of 61 ppb), 444-DDT (max of 360 ppb), chlordane (max of 150 ppb) and dieldrin (max of 300 ppb) were detected above Unrestricted Use SCOs, and one pesticide (dieldrin) exceeded Restricted Residential SCOs (in one sample). Five metals, including barium, chromium, mercury, lead and zinc exceeded Unrestricted Use SCOs in the soil samples, and of these metals, barium (max of

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2,530 ppm), mercury (max of 2.26 ppm), and lead (max of 1,160 ppm) also exceeded their respective Restricted Residential SCOs. Overall, the findings were consistent with observations for other historical fill sites in Manhattan.

6. Bedrock is present at the Site at a depth of approximately 7 feet below grade in the asphalt paved parking lot located behind the parking garage and automotive repair facility buildings and is assumed to be slightly more than 4 feet below grade beneath the basement of the parking garage building. Groundwater was not encountered within the soil borings performed within the overburden soil above bedrock. The collection of groundwater samples will require drilling into the bedrock. Due to current Site conditions (height restriction of basement, and an active/crowded parking lot), monitoring well installation and groundwater sampling was deferred until after the redevelopment project begins and demolition of the existing buildings and excavation to the bedrock surface is completed. However a pre-existing monitoring well was discovered in Lot 8 and was sampled for chemical analysis. The groundwater sample collected during the RI showed no PCBs at detectable concentrations. No VOCs were present at detectable concentrations. Five SVOCs were detected above NYS Groundwater Quality Standards (GQS). These SVOCs were all PAH compounds and their concentrations and distributions indicate that they are associated with historic fill material. Two pesticides (4,4,4-DDT and dieldrin) were detected, but only dieldrin was detected above its respective GQS. One dissolved metal, sodium, exceeded GQS in the groundwater sample and is attributed to saline intrusion or road salting. Overall, the findings were consistent with observations for other historical fill sites in Manhattan.
7. Sub-slab and soil vapor samples collected during the RI showed petroleum and chlorinated VOCs at low to moderate concentrations. Total petroleum VOCs were identified from 50 to 522 µg/m^3. Acetone was detected to a maximum concentrations of 342 µg/m^3, toluene was detected at 101 µg/m^3, and xylenes were at 70 µg/m^3. PCE was identified in all samples at a maximum concentration of 121 µg/m^3 and TCE was detected within only one of the samples at a concentration of 30.4 µg/m^3. These results for TCE and PCE are within the monitoring level ranges of the State DOH soil vapor guidance matrix. Neither PCE nor TCE were detected within any of the soil samples collected at the Site.

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For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste was not suspected at this Site.

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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 Pre-Application Meeting was held on March 29, 2012. A Remedial Investigation (RI) was performed in April of 2012 and a RI Report dated September 2012 was prepared to evaluate data and information necessary to develop a Remedial Action Work Plan (RAWP). A Site Contact List was established and a RAWP dated August 2012 was prepared and released with a Fact Sheet on September 13, 2012, for a 30-day public comment period. The RAWP and Stipulation List dated October 2012, was approved by the New York City Office of Environmental Remediation (OER) on October 12, 2012. A pre-construction meeting was held on March 1, 2013 and remedial action began in March of 2013 and completed in December of 2014.

The following remedial actions were completed in this program:

1. Prepared a Community Protection Statement and implemented a Citizen Participation Plan.
2. Performed a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Established Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs). Achieved Track 1 SCOs for soil through excavation and removal of all historic fill material and soil to the bedrock surface across the entire Site, and additional excavation/removal of bedrock as necessary for construction of the new buildings' cellar levels and rear courtyard area.
4. Removal of three 550-gallon gasoline underground storage tanks and one 300-gallon waste oil underground storage tank and closure of the associated NYSDEC Spill Number (1300285) in compliance with applicable local, State and Federal laws and regulations;
5. Installation of two bedrock groundwater monitoring wells following Site excavation down to bedrock, and collection of groundwater samples from the two monitoring wells;

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6. Installed a waterproofing membrane/vapor barrier system beneath the cellar slab of both Tower A and Tower B and behind all foundation walls of both buildings to grade. The vapor barrier system and building slab are directly above competent bedrock and will limit migration of any potential soil vapors from off site.
7. Imported of materials to be used for backfill in compliance with this plan and in accordance with applicable laws and regulations.
8. Transported and disposed off-Site of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Collected, sampled and analyzed samples representative of excavated media as required by disposal facilities. Appropriately segregated excavated media on Site.
9. Screened excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
10. Implemented storm-water pollution prevention measures in compliance with applicable laws and regulations.
11. Performed all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
12. Submitted a RAR that: certifies that the remedial requirements have been achieved; defines the Site boundaries: and describes the remedial activities including any changes from the RAWP.

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3.0 COMPLIANCE WITH REMEDIAL ACTION WORK PLAN

3.1 Construction Health & Safety Plan (CHASP)

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 Kevin Waters - EBC.

3.2 Community Air Monitoring Plan (CAMP)

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 in compliance with the Community Air Monitoring Plan in the approved RAWP. The results of Community Air monitoring are shown in Appendix C.

3.3 Soil/Materials Management Plan

The Soil/Materials Management Plan in the RAWP provided detailed plans for managing all soils/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 full 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

No significant deviations from the Remedial Action Work Plan occurred during implementation of the Remedial Action Work Plan with the exception of the following:

- The redevelopment plan was revised to include first floor commercial/retail space.

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4.0 REMEDIAL PROGRAM

4.1 Project Organization

The PE responsible for implementation of the remedial action for this project was Ariel Czmerinski P.E., AMC Engineering. On-Site air monitoring in accordance with the CHASP and CAMP, soil screening and soil sampling was performed by either Sunny Chen, Kevin Brussee and Kevin Waters of EBC or Sara Babyatsky of AMC Engineering. The Qualified Environmental Professional which implemented the remedial action was Kevin Brussee, Project Manager-EBC. The excavation and foundation contractor was Sampogna Contracting Corp., and the developer was Wonder Works Construction Corp.

4.2 Site Controls

Site Preparation

Plans for the Tower A building (NYC DOB Job number NB-121324030) and Tower B building (NYC DOB Job number NB-121324049) were approved on July 26, 2013. Waste characterization soil sampling for the south half of the Site (Lot 10) was performed on December 18, 2012, and waste characterization soil sampling for the north half of the Site (Lot 55) was performed on March 1, 2013, to obtain soil disposal approval and minimize the need for on-Site soil stockpiles. On March 1, 2013, equipment was mobilized to the Site to begin excavation of on-Site soil.

Soil Screening

All intrusive soil excavation activities were overseen by an EBC qualified environmental professional (QEP). In addition to extensive sampling and chemical testing of soils on the Site, excavated soil was screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection. Excavation at the Site commenced with the removal of non-hazardous soil from the south half of the Site (Lot 10), followed by excavation and disposal of hazardous (D008 - lead) soil from the south half of the Site down to the bedrock surface and excavation and disposal of non-hazardous soil down to the bedrock surface on the north half of the Site (Lot 55). No physical or olfactory evidence of a spill was observed during excavation of the south half of the Site. However, petroleum contaminated soil (grey stained with odor) was observed below/around a 300-gallon waste oil underground

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storage tank removed from the north half of the Site (northeast corner of Lot 55). All soil on the north half of the Site was excavated to the bedrock surface and approximately 4-6 feet of bedrock was removed from the spill area to install a heal block for a raker.

Stockpile Management

Historic fill material classified as hazardous (D008 - lead) excavated from the south half of the Site was fed through a mechanical screener to remove cobbles/bricks and minimize the quantity of hazardous soil that required disposal. The soil and the bricks/cobbles segregated by the screener were stockpiled and covered with 6-mil poly-sheeting to prevent dust. Stockpile covers were inspected by the EBC QEP. The remainder of soil excavated at the Site was live loaded into trucks to eliminate the need for stockpiling.

Truck Inspection

Truck loading areas were established on both the West 48th Street and West 49th Street sides of the Site. Sidewalk and street closing permits allowed trucks to park on the sidewalk and/or street to be loaded. After the trucks were loaded, any soil that was spilled on the closed portion of the sidewalk/street was swept up and put back on the Site.

Site Security

An 8-ft high construction fence was constructed around the perimeter of the property. The fence was locked with a chain and padlock during non-working hours/days.

Nuisance Controls

No petroleum or other odors were detected during soil screening and no complaints were reported. Dust was minimized by excavating and live-loading directly into trucks, and covering stockpiles with 6-mil poly sheeting overnight during off-work hours.

Reporting

Daily status reports were prepared and forwarded to the OER project manager for construction days in which soil disturbance activities were performed (soil excavation/loading). A copy of each of the daily status reports is included in Appendix D. Digital photographs of the remedial action are included in Appendix B.

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4.3 Materials Excavation and Removal

The waste characterization results collected from the south half of the Site (Lot 10) indicated the top 1.5 feet of soil was non-hazardous, and all soil from 1.5 feet to bedrock was hazardous (D008 - lead). The top 1.5 feet of non-hazardous soil on the south half of the Site commenced on March 1, 2013. The non-hazardous soil was transported to Clean Earth of Carteret (880.37 tons) and Clean Earth of New Castle (321.04 tons).

A mechanical screener was utilized to separate the bricks and cobbles from the hazardous soil from the south half of the Site in March and June of 2013. A total of approximately 1,572.1 tons of hazardous (D008 - lead) soil segregated from the fill material was transported to Clean Earth of North Jersey, and approximately 68 loads of brick and cobbles segregated from the fill material were transported to Alloco Recycling Inc., a NYSDEC active/registered construction and demolition debris processing facility.

Waste characterization soil samples collected from the soil below the former parking garage building and auto repair building on the north half of the Site was approved for transport to Malanka Landfill. From April to July 2013, all soil from the north half of the Site was excavated to bedrock. Most of the non-hazardous soil was loaded into trucks for transport to Malanka Landfill (4,415.24 tons). However, petroleum contaminated soil associated with a leaking 300 gallon waste oil underground storage tank required the collection and laboratory analysis of an additional waste characterization soil sample to obtain soil disposal approval at Clean Earth of Carteret. A total of 1,274.74 tons of petroleum contaminated soil transported to Clean Earth of Carteret.

From June 2013 to September 2014, bedrock was broken up across the Site using augers and pneumatic hammers to get to the depth required for construction of the two towers' cellar levels and rear cellar level courtyard. A total of 178 loads of bedrock were removed and transported to Tilcon.

A map showing the location where excavations were performed is shown in Figure 6.

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4.3.1 Tank Removals

On April 8, 2013, a 300 gallon waste oil underground storage tank was uncovered in the northeast corner of Lot 55. The tank was located below the cellar slab of the former parking garage building. The tank was removed from the ground on April 9, 2013. ABC Tank Cleaning & Repairing, Inc. removed 275 gallons of waste oil and sludge from the tank and cut and cleaned the UST. Petroleum contaminated soil (grey stained with odor) was observed immediately around the UST so EBC contacted NYSDEC, and NYSDEC spill number 13-000285 was assigned. The approximate location of the underground storage tank is shown on Figure 5. A copy of the NYFD Tank Removal Affidavits filed by ABC Tank Cleaning & Repairing, Inc. is attached in Appendix N.

Three additional 550-gallon gasoline underground storage tanks were uncovered on April 15, 2013. The three 550-gallon gasoline underground storage tanks were located immediately east of the 300-gallon waste oil underground storage tank, and were found to be encased in concrete. The three tanks were removed from the ground on April 17, 2013, and petroleum contaminated soil (grey stained with odor) was observed below the tank's concrete encasement. All Borough Tank Testing, LLC cut and cleaned the three gasoline tanks. The approximate location of each of the three 550-gallon gasoline tanks is shown on Figure 5. A copy of the NYFD Tank Removal Affidavits filed by All Borough Tank Testing, LLC is attached in Appendix N.

Closure of the NYSDEC Spill Number 13-000285 associated with four underground storage tanks was completed independent of OER approved RAP and under NYSDEC authority.

End Point Sample Results

The entire Site was excavated to bedrock and additional excavation into the bedrock was performed to get to the depth required for construction of the two towers' cellar levels and rear cellar level courtyard. Therefore, no endpoint soil samples were collected.

4.4 Materials Disposal

4.4.1 South Half of Site (Lot 10)

Waste characterization soil sampling for the south half of the Site (Lot 10) was performed on December 18, 2012. Eight test pits were excavated across the south half of the Site. The top 1.5

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to 2 feet consisted of historic fill material on top of an old asphalt layer. Soil below the old asphalt layer down to the bedrock surface (approximately 4 to 8 feet below grade) consisted of soil, ash, brick and cobbles. EBC formed one 8-pt composite soil sample representing the interval 0 to 2 feet below grade, one 8-pt composite soil sample representing the interval 2 feet to 4 feet below grade and one 5-point composite soil sample representing the interval 4 feet to bedrock. The laboratory results indicated the top 2 feet of soil was non-hazardous, but all soil from 2 feet to bedrock was hazardous (D008 - lead) due to a TCLP lead concentration greater than 5.0 mg/L.

The laboratory results, profile form and a formal letter describing the sampling process and material type, was forwarded to Clean Earth, Inc. to obtain soil disposal approval for the top 1.5 feet across the south half of the Site at Clean Earth of Carteret. A copy of the soil disposal request letter prepared for Clean Earth of Carteret, which included the test pit sampling plan and laboratory results is attached in Appendix E. A copy of the soil disposal acceptance letter issued by Clean Earth of Carteret is attached in Appendix F.

From March 1, 2013 to March 11, 2013, a total of approximately 1,201.11 tons of soil was excavated across the entire south half of the Site to a depth of approximately 1.5 feet and loaded into 10-wheel dump trucks for transport to Clean Earth of Carteret (880.07 tons) and Clean Earth of New Castle (321.04 tons). Clean Earth of New Castle was used as the designated soil disposal facility on March 11, 2013 by Clean Earth, Inc. because Clean Earth of Carteret did not have the capacity that day. Copies of each of the non-hazardous manifests and associated scale tickets for the soil transported to Clean Earth of Carteret are included in Appendix I, and copies of each of the non-hazardous manifests and associated scale tickets for the soil transported to Clean Earth of New Castle are included in Appendix J.

In accordance with Section 3010 of Subtitle C of Resource Conservation and Recovery Act (RCRA), EPA was notified of hazardous waste generation (D008 hazardous lead soil) by submitting Notification of RCRA Subtitle C Activity, EPA Form 8700-12. EPA assigned Generator ID number NYR000199463. The laboratory results, profile form with the EPA Generator ID Number and a formal letter describing the sampling process and material type, was forwarded to Clean Earth, Inc. to obtain soil disposal approval for the D008 hazardous lead soil

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at Clean Earth of North Jersey. Clean Earth of North Jersey is located at 115 Jacobus Avenue, Kearny, NJ 07032. The facility is a RCRA Part B permitted transfer, storage and disposal facility (TSDF) that accepts hazardous and industrial waste under New Jersey Permit No. NJD991291105. A copy of the soil disposal request letter prepared for Clean Earth of North Jersey, which included the test pit sampling plan and laboratory results is attached in Appendix E. A copy of the soil disposal acceptance letter issued by Clean Earth of North Jersey is attached in Appendix F.

To minimize the amount of material that required disposal as D008 hazardous soil, a mechanical screener was utilized to segregate the bricks and cobbles from the soil/ash in March and June of 2013. A total of approximately 1,572.1 tons of hazardous (D008 - lead) soil segregated from the fill material was transported to Clean Earth of North Jersey, and approximately 68 loads of brick and cobbles segregated from the fill material were transported to Alloco Recycling, Inc. Copies of each of the non-hazardous manifests and associated scale tickets for the soil transported to Clean Earth of North Jersey are included in Appendix H, and copies of each of the truck tickets for the brick and cobbles screened from the soil are included in Appendix G.

4.4.2 North Half of Site (Lot 55)

Waste characterization soil sampling for the north half of the Site (Lot 55) was performed on March 1, 2013. Five test pits were excavated below the concrete basement slab of the former parking garage building and five test pits were excavated from grade to bedrock within the area of the former automotive repair building. Soil below both buildings consisted of a native brown silty sand. EBC formed one 5-pt composite soil sample representing all soil to bedrock below the former parking garage building and one 5-pt composite soil sample representing all soil down to bedrock below the automotive repair building.

The laboratory results, profile form and a formal letter describing the sampling process and material type was forwarded to Clean Earth, Inc to obtain soil disposal for all soil below the former parking garage building and automotive repair building at Malanka Landfill. A copy of the soil disposal request letter prepared for Clean Earth, Inc. which included the test pit sampling plan and laboratory results is attached in Appendix E. A copy of the soil disposal acceptance

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letter issued by Secaucus Brownfields Redevelopment LLC (third party engineering certification) is attached in Appendix F.

From April to July 2013, all soil from the north half of the Site was excavated to bedrock. Most of the non-hazardous soil was loaded into trucks for transport to Malanka Landfill (4,415.24 tons). However, petroleum contaminated soil associated with a leaking 300 gallon waste oil underground storage tank required the collection and laboratory analysis of an additional waste characterization soil sample to obtain soil disposal approval at Clean Earth of Carteret. A total of 1,274.74 tons of petroleum contaminated soil transported to Clean Earth of Carteret. Copies of each of the non-hazardous manifests and associated scale tickets for the soil transported to Clean Earth of Carteret are included in Appendix I, and copies of each of the non-hazardous manifests and associated scale tickets for the soil transported to Malanka Landfill are included in Appendix K.

From June 2013 to September 2014, bedrock was broken up across the entire Site using augers and pneumatic hammers to get to the depth required for construction of the two towers' cellar levels and rear cellar level courtyard. A total of 178 loads of bedrock were removed and transported to Tilcon. Copies of each of the truck tickets for the bedrock/stone are included in Appendix L.

The volume/tonnage and destination of material removed and disposed off-Site is presented below:

Table 5 - Disposal Quantities and Disposal Facilities

Destination	Type of Material	Quantity
Clean Earth of Carteret Carteret, NJ	Lot 55 Petroleum Contaminated Soil	1,274.47 tons
Clean Earth of Carteret Carteret, NJ	Lot 10 Historic Fill	880.07 tons
Clean Earth of New Castle New Castle, DE	Lot 10 Historic Fill	321.04 tons
Clean Earth of North Jersey Kearny, NJ	Lot 10 D008 Hazardous Lead Soil	1,572.05 tons

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Malanka Landfill Secaucus, NJ	Lot 55 Clean Soil	4,415.24 tons
Tilcon 540 Kingsland Avenue, Brooklyn, NY	Lot 10 and Lot 55 Bedrock	6,230 yd^3
Alloco 540 Kingsland Avenue, Brooklyn, NY	Lot 10 Brick and Cobbles	2,380 yd^3

4.5 Monitoring Well Installation

Following excavation of all soil down to the bedrock surface, two 2-inch diameter monitoring wells (MW2 and MW3) were cored into the bedrock to a depth of approximately 10 feet using a 2-inch diameter core drill. Monitoring well MW2 was installed in the spill area at the request of the NYSDEC and OER, and MW3 was installed in the northeast corner of Lot 10. The approximate installation location of the two monitoring wells are shown on Figure 5. Both monitoring wells were sampled on January 9, 2014 using a peristaltic pump with disposable polyethylene tubing. Groundwater samples were collected in pre-cleaned, laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix for laboratory analysis. MW3 was analyzed for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, pesticides/PCBs by EPA Methods 8081/8082 and TAL metals, and MW2 was analyzed for VOCs by EPA Method 8260, SVOCs by EPA Method 8270. Groundwater sample results are summarized and compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS) in Tables 1 through 4 and a copy of the laboratory report is included in Appendix P.

The VOCs methyl ethyl ketone (130 µg/L), tetrahydrofuran (300 µg/L), and trichloroethene (7.5 µg/L) and the SVOCs benzo(a)anthracene (0.03 µg/L), benzo(b)fluroanthene (0.02 µg/L), and chrysene (0.02 µg/L) were detected above GQS in MW3. Gasoline related VOCs, including 1,2,4-trimethylbenzene (1,600 µg/L), 1,3,5-trimethylbenzene (430 µg/L), benzene (79 µg/L), ethylbenzene (1,100 µg/L), isopropylbenzene (130 µg/L), m&p-xylenes (1,700 µg/L), naphthalene (390 µg/L), n-butylbenzene (27 µg/L), n-propylbenzene (240 µg/L), o-xylene (160 µg/L), and toluene (79 µg/L) were detected above GQS in MW-2 which was installed in the bedrock within the leaking tank area. The total VOC concentration for MW-2 in January was 1,882.9 µg/L.

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Site-wide dewatering was conducted during bedrock removal and foundation construction which removed a large quantity of groundwater. A copy of the dewatering permit is included in Appendix O. Subsequent groundwater samples were collected from MW-2 in February of 2014, April of 2014 and November of 2014. Groundwater sample results are summarized and compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS) in Tables 1 through 4 and a copy of each of the laboratory reports is included in Appendix P. The total VOC concentration in April 2012 (1,907 µg/L) was similar to the concentration report in January 2014, but the total VOC concentration in November 2014 (653.8 µg/L) showed a significant reduction.

4.6 Backfill Import

A total of 315 cubic yards (9 truck loads) of crushed 1/2" crushed dolomite was imported to the Site from the Tilcon Clinton Point facility for use as backfill below the Tower A and Tower B building slabs. The Tilcon Clinton Point facility provides 100% virgin dolomite that is quarried and processed to finished sizes. A copy of each truck ticket is attached in Appendix J, and photos of the 1/2 inch crushed dolomite used as backfill is included in Appendix B.

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5.0 ENGINEERING CONTROLS

A Track 1 Remedial Action was achieved and Engineering Controls are not required. However, as part of construction, several protective systems were installed. These are:

Composite Cover System

The Composite Cover System consists of the following:

- Building Slab - 6 inch thick concrete cellar slab (Tower A and Tower B) over a 4 inch layer of crushed dolomite; and
- Courtyard Paver System - 4 inch layer of crushed dolomite below a 4 inch thick concrete slab followed by a layer of concrete/stone pavers.

Photographs of construction of the Composite Cover System are included in Appendix B. The composite cover system was installed by Sampogna Contracting Corp. and KLG Contracting, Inc.

Waterproofing Membrane/Vapor Barrier System

Migration of soil vapor is mitigated with a combination of building slab and waterproofing membraen/vapor barrier system. The waterproofing membrane/vapor barrier system consists of Preprufe 300R and Bituthene 4000 as manufacturing by Grace. Preprufe 300 is a 1.2 mm (0.046in) thick HDPE film with a pressure sensitive adhesive that bonds to the poured concrete. Preprufe 300R was installed below the entirety of the each buildings' cellar slab. Bituthene 4000 is a flexible preformed waterproof membrane combining a cross laminated HDPE carrier film with a rubber bitumen compound. Bituthene 4000 or Preprufe 300R was installed behind all exterior foundation walls to grade. All seams and perforations in the waterproofing membrane were sealed using tape as supplied by the manufacturer and a liquid membrane sealer. Photos of the waterproofing membrane/vapor barrier system being installed are included in Appendix B and the approximate layout is shown on Figure 7. The waterproofing membrane/vapor barrier system was installed by the second foundation contractor, KLG Contracting, Inc.

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6.0 INSTITUTIONAL CONTROLS

A Track 1 Remedial Action was achieved, therefore Institutional Controls are not required for this project.

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7.0 SITE MANAGEMENT PLAN

A Track 1 Remedial Action was achieved and Site Management is not required.

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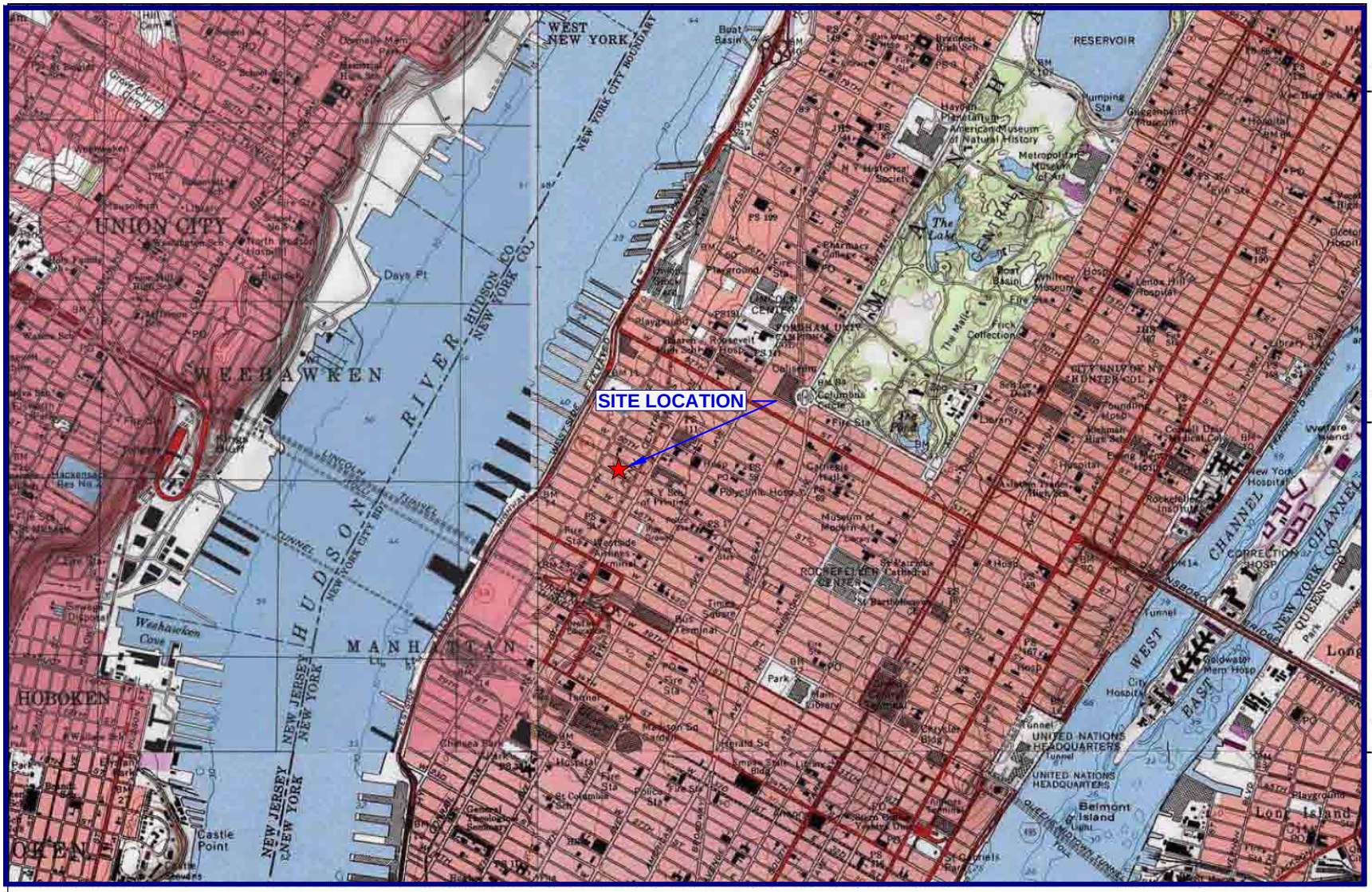
FIGURES



USGS Central Park Quadrangle 1995, Contour Interval = 10 feet

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545-551 W. 48TH STREET AND 534-542 W. 49TH STREET
NEW YORK, NY 10036

FIGURE 1 SITE LOCATION MAP

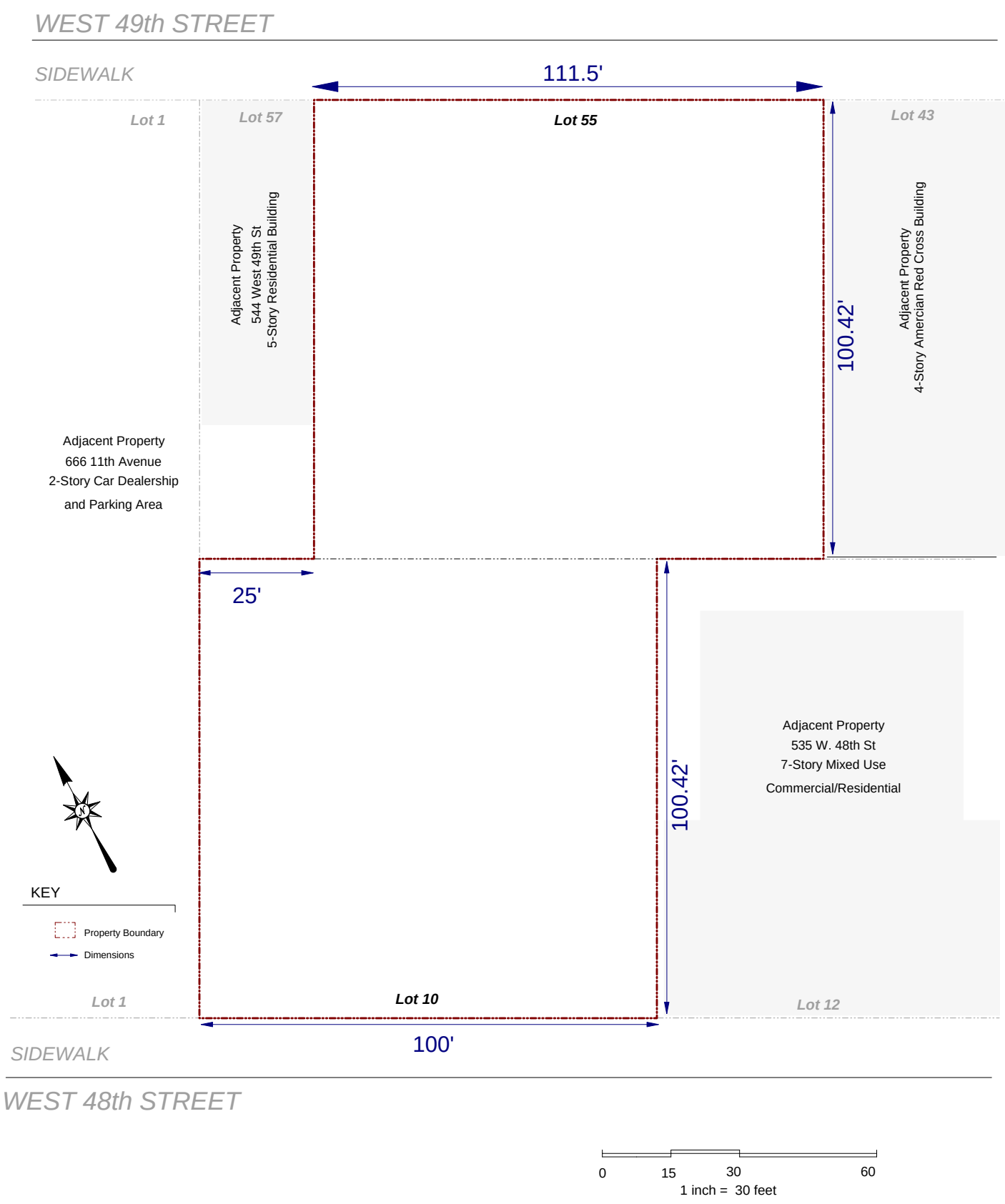

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Figure No. 2

Site Address:	545-551 West 48th Street, Manhattan, NY 534-542 West 49th Street, Manhattan, NY
Drawing Title:	Site Boundary Map

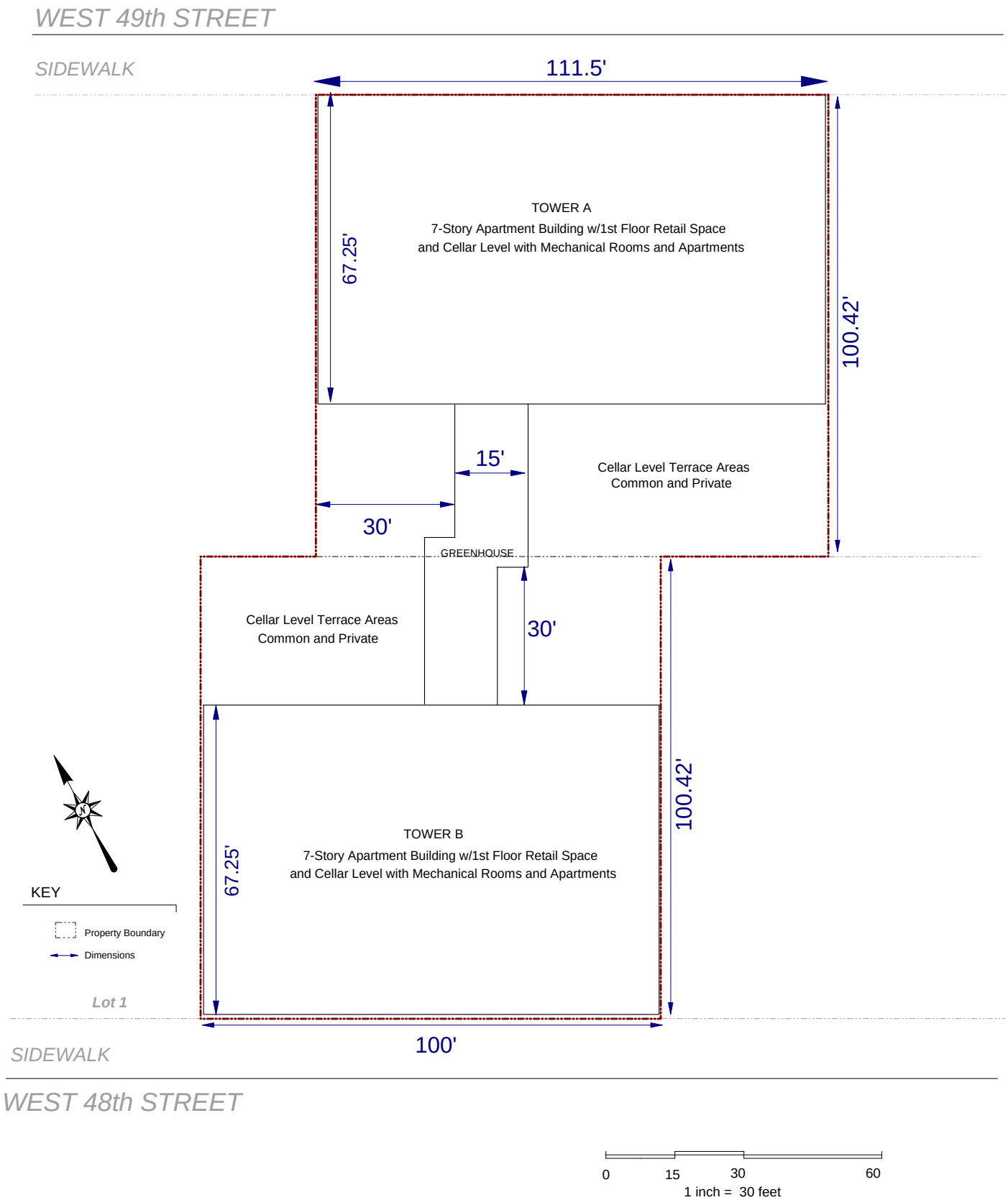

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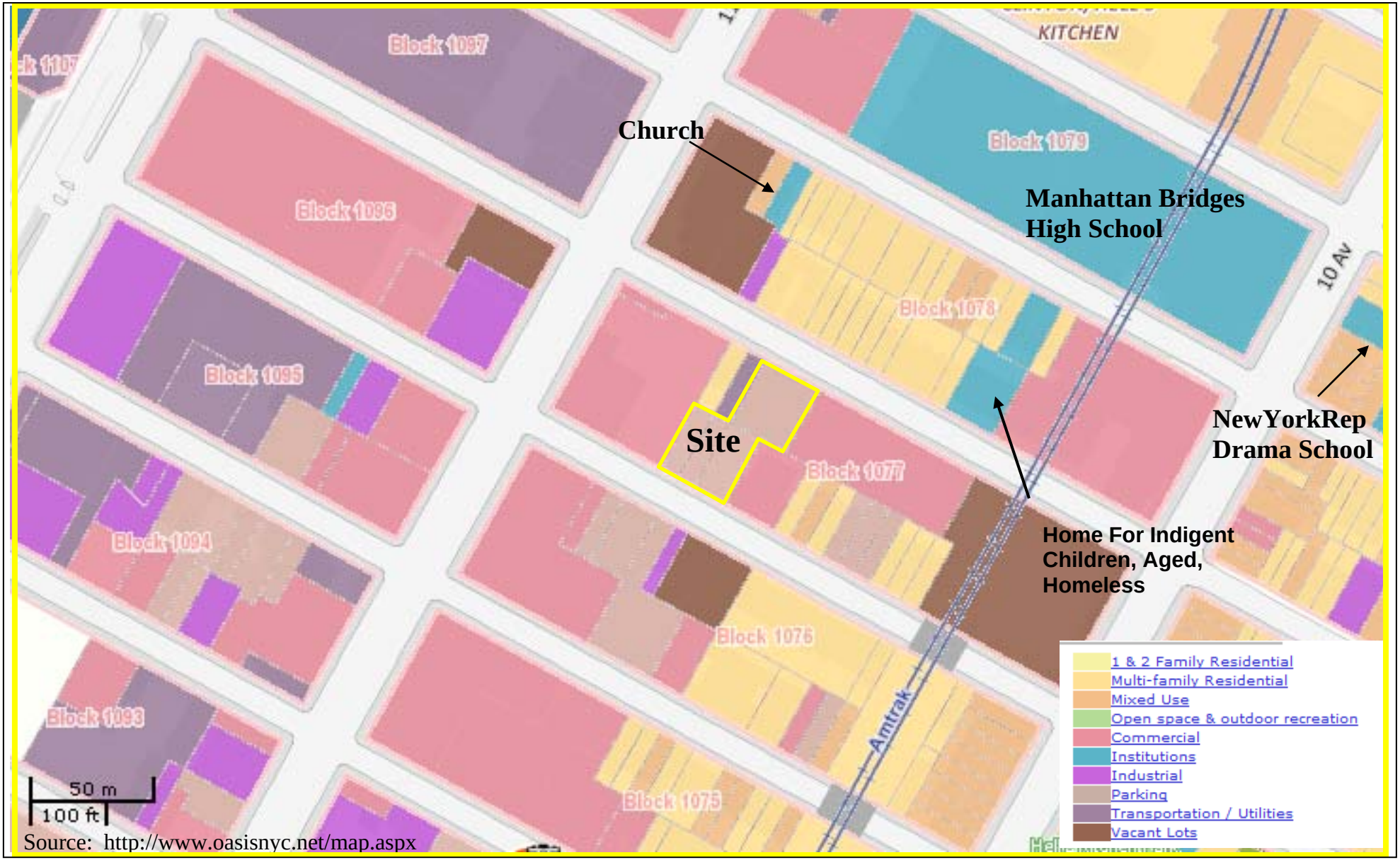
Figure No. 3

Site Address:	545-551 West 48th Street, Manhattan, NY 534-542 West 49th Street, Manhattan, NY
Drawing Title:	Redevelopment Plan



Source: http://www.oasisnyc.net/map.aspx

FIGURE 4
SURROUNDING LAND USE MAP

545-551 W. 48TH ST & 534-542 W. 49TH ST, NEW YORK, NY

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1808 MIDDLE COUNTRY ROAD, RIDGE, NEW YORK 11961
PHONE: (631) 504-6000 FAX: (631) 924-2870

WEST 49th STREET

SIDEWALK

Lot 1

Lot 57

Lot 55

Lot 43

VOCs	1/9/2014	2/18/2014	4/23/2014	11/25/2014
1,2,4-Trimethylbenzene	1,600	330	580	230
1,3,5-Trimethylbenzene	430	110	120	58
Benzene	79	20	50	4.2
Ethylbenzene	1,100	180	310	89
Isopropylbenzene	130	26	54	22
m&p-Xylene	1,700	270	460	110
Naphthalene	390	74	130	63
n-Butylbenzene	27	13	13	10
n-Propylbenzene	240	62	120	38
o-Xylene	160	74	31	14
sec-Butylbenzene	ND	5.9	8.3	7.2
Toluene	79	18	26	2.9

MW2

Three 550-gal gasoline USTs

300-gal Waste Oil UST

Adjacent Property
544 West 49th St
5-Story Residential Building

Adjacent Property
666 11th Avenue
2-Story Car Dealership
and Parking Area

MW3

1/9/2014

VOCs	
Methyl Ethyl Ketone	120
Tetrahydrofuran	300
Trichloroethene	7.5
SVOC	
Benzo(a)anthracene	0.03
Benzo(b)fluoranthene	0.02
Chrysene	0.02

Adjacent Property
535 W. 48th St
7-Story Mixed Use
Commercial/Residential

MW1

6/4/2012

SVOC	
Benzo(a)anthracene	0.12
Benzo(b)fluoranthene	0.14
Benzo(k)fluoranthene	0.07
Chrysene	0.12
Indeno(1,2,3-cd)pyrene	0.08
Pesticide	
Dieldrin	0.017

KEY:

Property Boundary

Groundwater Sampling Location

Lot 1

Lot 10

Lot 12

SIDEWALK

WEST 48th STREET

0 15 30 60

1 inch = 30 feet

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Figure No. 5

Site Address: 545-551 West 48th Street, Manhattan, NY
534-542 West 49th Street, Manhattan, NY

Drawing Title: UST Locations & Posted GW Results

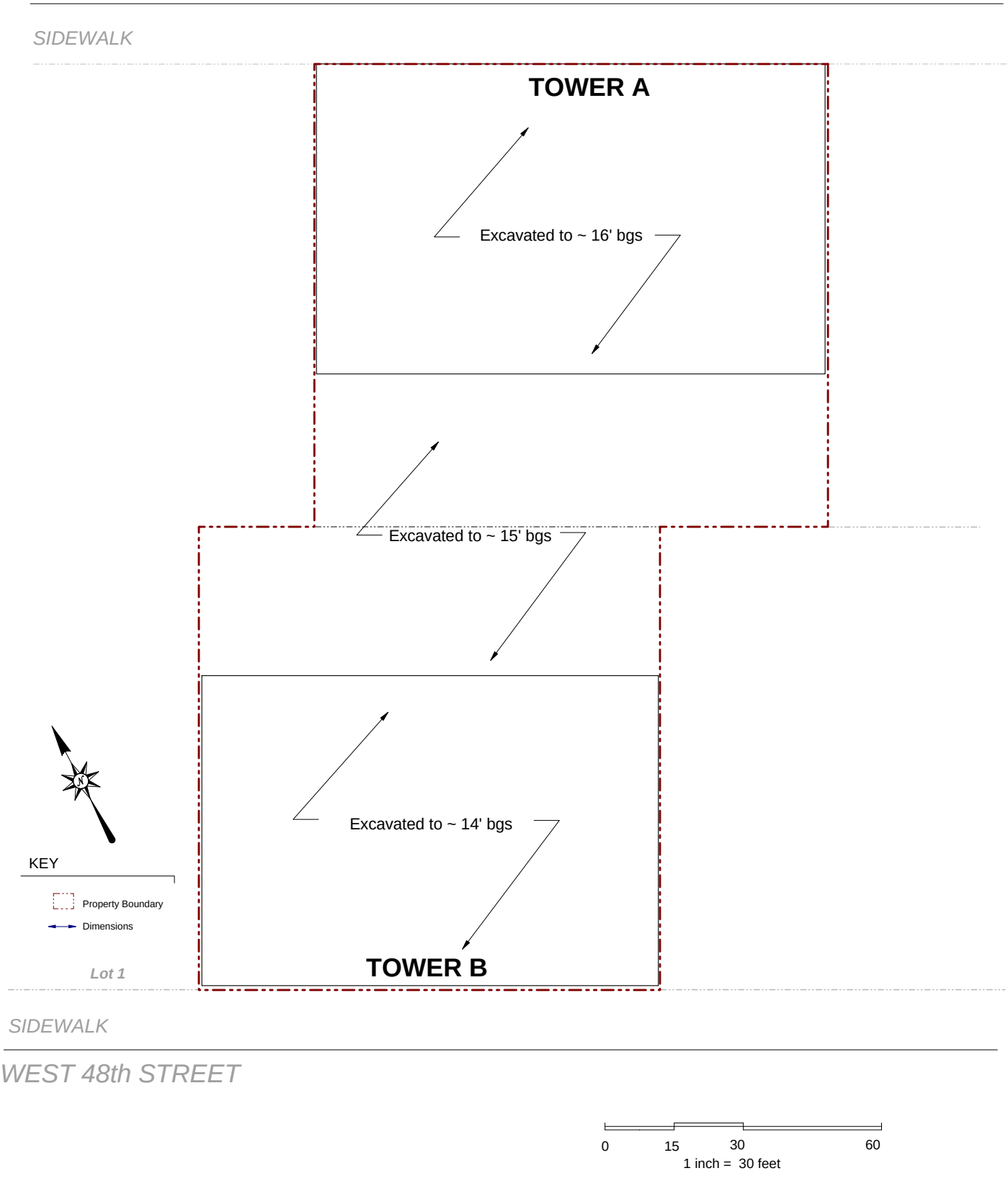

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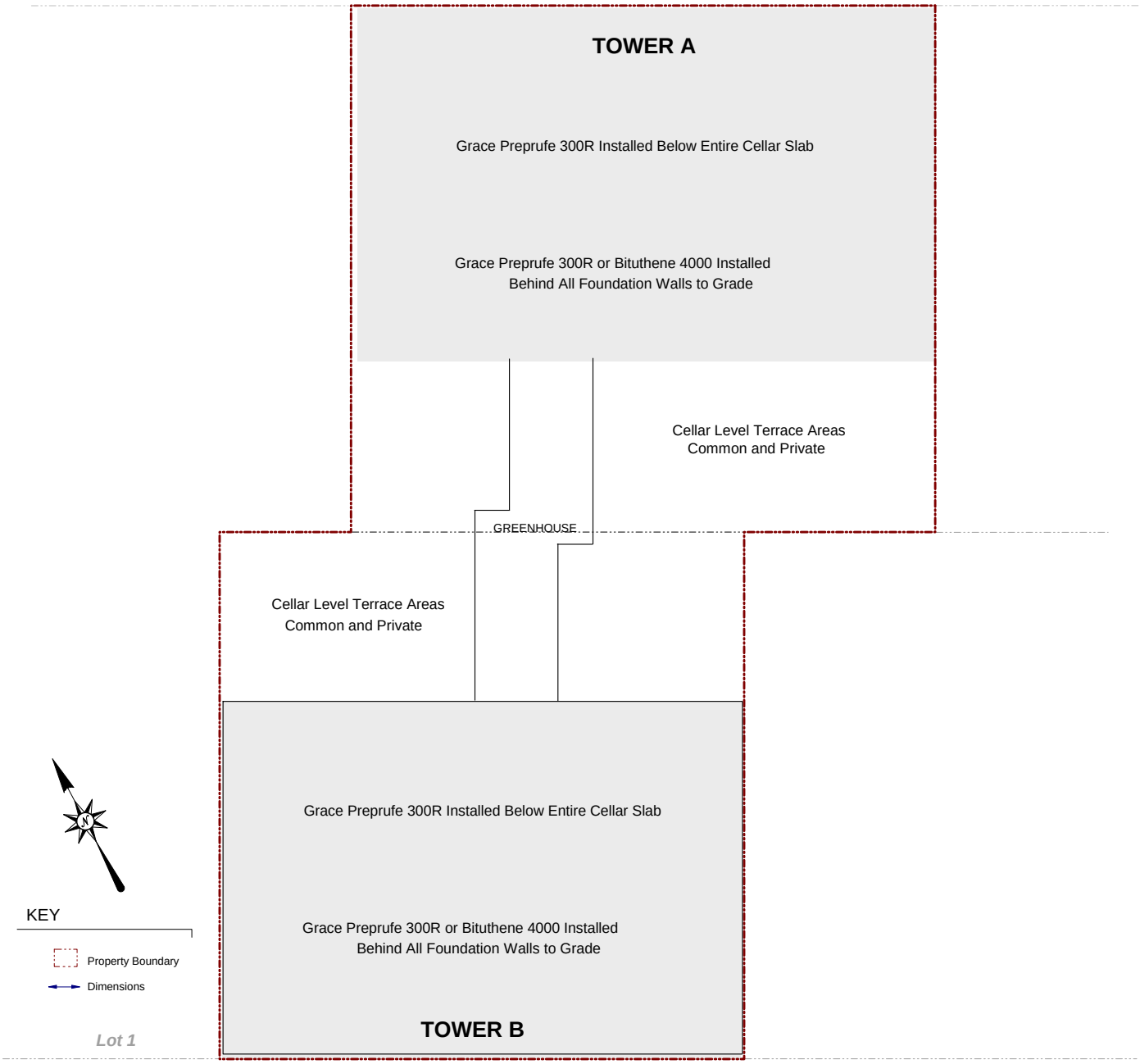
Figure No. 6

Site Address:	545-551 West 48th Street, Manhattan, NY 534-542 West 49th Street, Manhattan, NY
Drawing Title:	Excavation Areas

WEST 49th STREET

SIDEWALK



SIDEWALK

WEST 48th STREET

0 15 30 60

1 inch = 30 feet

EBC
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Figure No. 7

Site Address: 545-551 West 48th Street, Manhattan, NY
534-542 West 49th Street, Manhattan, NY

Drawing Title: Waterproofing Membrane Layout

TABLES

TABLE 1
545-551 W. 48th Street and
534-542 W. 49th Street
New York, NY 10036
Groundwater Analytical Results
Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 6/4/2012 µg/L		MW2 1/9/2014 µg/L		MW2 2/18/2014 µg/L		MW2 4/23/2014 µg/L		MW2 11/25/2014 µg/L		MW3 1/9/2014 µg/L	
1,1,1,2-Tetrachlorothane	5	ND		< 5	5	-		-		-		< 1.0	1
1,1,1-Trichloroethane	5	ND		< 5	5	-		-		-		< 1.0	1
1,1,2,2-Tetrachloroethane	5	ND		< 5.0	5	-		-		-		< 0.50	0.5
1,1,2-Trichloroethane	1	ND		< 5	5	-		-		-		< 1.0	1
1,1-Dichloroethane	5	ND		< 5	5	-		-		-		< 1.0	1
1,1-Dichloroethene	5	ND		< 5	5	-		-		-		< 1.0	1
1,1-Dichloropropene		ND		< 5	5	-		-		-		< 1.0	1
1,2,3-Trichlorobenzene		ND		< 10	10	-		-		-		< 1.0	1
1,2,3-Trichloropropane	0.04	ND		< 5	5	-		-		-		< 1.0	1
1,2,4-Trichlorobenzene		ND		< 10	10	-		-		-		< 1.0	1
1,2,4-Trimethylbenzene	5	ND		**1,600**	100	**330**		**580**		**230**		**1.9**	1
1,2-Dibromo-3-chloropropane	0.04	ND		< 5	5	-		-		-		< 1.0	1
1,2-Dichlorobenzene	5	ND		< 5	5	-		-		-		< 1.0	1
1,2-Dichloroethane	0.6	ND		< 4	4	-		-		-		< 1.0	1
1,2-Dichloropropane	0.94	ND		< 5	5	-		-		-		< 0.60	0.6
1,3,5-Trimethylbenzene	5	ND		< 5	5	-		-		-		< 1.0	1
1,2-Dibromoethane		ND		**430**	50	**110**		**120**		**58**		< 1.0	1
1,3-Dichlorobenzene	5	ND		< 5	5	-		-		-		< 1.0	1
1,3-Dichloropropane	5	ND		< 5	5	-		-		-		< 1.0	1
1,4-Dichlorobenzene	5	ND		< 5	5	-		-		-		< 1.0	1
2,2-Dichloropropane	5	ND		< 5	5	-		-		-		< 1.0	1
2-Chlorotoluene	5	ND		< 5	5	-		-		-		< 1.0	1
2-Hexanone (Methyl Butyl Ketone)		ND		< 50	50	-		-		-		< 5.0	5
2-Isopropyltoluene	5	ND		< 5	5	-		-		-		< 1.0	1
4-Chlorotoluene	5	ND		< 5	5	-		-		-		< 1.0	1
4-Methyl-2-Pentanone		ND		< 50	50	-		-		-		< 5.0	5
Acetone		ND		< 50	50	ND		ND		ND		**57**	50
Acrylonitrile	5	ND		< 5	5	-		-		-		< 5.0	5
Benzene	1	ND		**79**	7	**720**		**50**		**4.2**		< 0.70	0.7
Bromobenzene	5	ND		< 5	5	-		-		-		< 1.0	1
Bromochloromethane	5	ND		< 5	5	-		-		-		< 1.0	1
Bromodichloromethane		ND		< 5.0	5	-		-		-		< 0.50	0.5
Bromoform		ND		< 10	10	-		-		-		< 1.0	1
Bromomethane	5	ND		< 5	5	-		-		-		< 1.0	1
Carbon Disulfide	60	ND		< 50	50	-		-		-		< 5.0	5
Carbon tetrachloride	5	ND		< 5	5	-		-		-		< 1.0	1
Chlorobenzene	5	ND		< 5	5	-		-		-		< 1.0	1
Chloroethane	5	ND		< 5	5	-		-		-		< 1.0	1
Chloroform	7	ND		< 5	5	-		-		-		< 1.0	1
Chloromethane	60	ND		< 5	5	-		-		-		< 1.0	1
cis-1,2-Dichloroethene	5	ND		< 5	5	-		-		-		**2.7**	1
cis-1,3-Dichloropropene		ND		< 4.0	4	-		-		-		< 0.40	0.4
Dibromochloromethane		ND		< 5.0	5	-		-		-		< 0.50	0.5
Dibromomethane	5	ND		< 5	5	-		-		-		< 1.0	1
Dichlorodifluoromethane	5	ND		< 5	5	-		-		-		< 1.0	1
Ethylbenzene	5	ND		**1,100**	50	**180**		**310**		**89**		< 1.0	1
Hexachlorobutadiene	0.5	ND		< 4.0	4	-		-		-		< 0.40	0.4
Isopropylbenzene	5	ND		**130**	10	**26**		**54**		**22**		< 1.0	1
m&p-Xylenes	5	ND		**1,700**	100	**270**		**460**		**110**		< 1.0	1
Methyl Ethyl Ketone (2-Butanone)		ND		< 50	50	-		-		-		**130**	50
Methyl t-butyl ether (MTBE)	10	ND		< 10	10	ND		ND		ND		< 1.0	1
Methylene chloride	5	ND		< 5	5	-		-		-		< 1.0	1
Naphthalene	10	ND		**390**	100	**74**		**130**		**63**		< 1.0	1
n-Butylbenzene	5	ND		**27**	5	**13**		**13**		**10**		< 1.0	1
n-Propylbenzene	5	ND		**240**	10	**62**		**120**		**38**		< 1.0	1
o-Xylene	5	ND		**160**	10	**74**		**31**		**14**		**2.5**	1
p-Isopropyltoluene		ND		**11**	5	ND		**3.8**		**4.2**		< 1.0	1
sec-Butylbenzene	5	ND		< 5	5	**5.9**		**8.3**		**7.2**		< 1.0	1
Styrene	5	ND		< 5	5	-		-		-		< 1.0	1
tert-Butylbenzene	5	ND		< 5	5	ND		**1.3**		**1.3**		< 1.0	1
Tetrachloroethene	5	ND		< 5	5	-		-		-		< 1.0	1
Tetrahydrofuran (THF)		ND		< 25	25	-		-		-		**300**	25
Toluene	5	ND		**79**	10	**18**		**26**		**2.9**		< 1.0	1
Total Xylenes	5	ND		**1,860**	200	-		-		-		3	2
trans-1,2-Dichloroethene	5	ND		< 5	5	-		-		-		< 1.0	1
trans-1,3-Dichloropropene	0.4	ND		< 4.0	4	-		-		-		< 0.40	0.4
trans-1,4-dichloro-2-butene	5	ND		< 5	5	-		-		-		< 5.0	5
Trichloroethene	5	ND		< 5	5	-		-		-		**7.5**	1
Trichlorofluoromethane	5	ND		< 5	5	-		-		-		< 1.0	1
Trichlorotrifluoroethane		ND		< 5	5	-		-		-		< 1.0	1
Vinyl Chloride	2	ND		< 2	2	-		-		-		< 1.0	1
Total VOCs		**0**		**7806**		**1882.9**		**1907.4**		**653.8**		**497.1**	

Notes:
- Not Analyzed
ND - Not detected
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 2
545-551 W. 48th Street and
534-542 W. 49th Street
New York, NY 10036
Groundwater Analytical Results
Semi-Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 6/4/2012 µg/L		MW2 1/9/2014 µg/L		MW3 1/9/2014 µg/L	
1,2,4-Trichlorobenzene		ND		-		< 5.0	5
1,2-Dichlorobenzene	3	ND		-		< 3	3
1,3-Dichlorobenzene	3	ND		-		< 5.0	5
1,4-Dichlorobenzene	3	ND		-		< 3	3
2,4,5-Trichlorophenol		ND		-		< 3	3
2,4,6-Trichlorophenol		ND		-		< 1	1
2,4-Dichlorophenol	1	ND		-		< 1	1
2,4-Dimethylphenol	1	ND		-		< 1	1
2,4-Dinitrophenol	1	ND		-		< 1	1
2,4-Dinitrotoluene	5	ND		-		< 1	1
2,6-Dinitrotoluene	5	ND		-		< 5.0	5
2-Chloronaphthalene		ND		-		< 5.0	5
2-Chlorophenol		ND		-		< 5.0	5
2-Methylnaphthalene		ND		100	20	< 1	1
2-Methylphenol (o-cresol)	1	ND		-		< 5.0	5
2-Nitroaniline	5	ND		-		< 1	1
2-Nitrophenol	1	ND		-		< 5	5
3&4-Methylphenol (m&p-cresol)	1	ND		-		< 1	1
3,3'-Dichlorobenzidine	5	ND		-		< 10	10
3-Nitroaniline	5	ND		-		< 5	5
4,6-Dinitro-2-methylphenol	1	ND		-		< 5	5
4-Bromophenyl phenyl ether		ND		-		< 1	1
4-Chloro-3-methylphenol	1	ND		-		< 5.0	5
4-Chloroaniline	5	ND		-		< 1	1
4-Chlorophenyl phenyl ether		ND		-		< 5	5
4-Nitroaniline	5	ND		-		< 5.0	5
4-Nitrophenol	1	ND		-		< 5	5
Acetophenone		ND		-		< 1	1
Aniline	5	ND		-		< 5.0	5
Anthracene	50	ND		< 20	20	< 5	5
Azobenzene	5	ND		-		< 5.0	5
Benzidine	5	ND		-		< 5	5
Benzoic acid		ND		-		< 50	50
Benzyl butyl phthalate		ND		-		< 5.0	5
Bis(2-chloroethoxy)methane	5	ND		-		< 5.0	5
Bis(2-chloroethyl)ether	1	ND		-		< 1	1
Bis(2-chloroisopropyl)ether		ND		-		< 5.0	5
Carbazole		ND		-		< 5.0	5
Dibenzofuran	7×10^{-7}	ND		-		< 5.0	5
Diethyl phthalate	50	ND		-		< 5.0	5
Dimethylphthalate	50	ND		-		< 5.0	5
Di-n-butylphthalate	50	ND		-		< 5.0	5
Di-n-octylphthalate	50	ND		-		< 5.0	5
Fluoranthene	50	ND		< 20	20	< 5.0	5
Fluorene	50	ND		< 20	20	< 5.0	5
Hexachlorobutadiene	0.5	ND		-		< 0.5	0.5
Hexachlorocyclopentadiene	5	ND		-		< 5.0	5
Isophorone	50	ND		-		< 5.0	5
Naphthalene	10	ND		< 20	20	< 5.0	5
Nitrobenzene	0.4	ND		-		< 0.4	0.4
N-Nitrosodimethylamine		ND		-		< 5.0	5
N-Nitrosodi-n-propylamine		ND		-		< 5.0	5
N-Nitrosodiphenylamine		ND		-		< 5.0	5
Phenol	1	ND		-		< 1	1
Pyrene	50	ND		< 20	20	< 5.0	5
1,2,4,5-Tetrachlorobenzene	5	ND		-		< 1.6	1.6
Acenaphthene	20	ND		< 20	20	< 0.05	0.05
Acenaphthylene		ND		< 20	20	< 0.05	0.05
Benzo(a)anthracene	0.002	**0.12**		< 20	20	**0.03**	0.02
Benzo(a)pyrene		**0.1**		< 20	20	< 0.02	0.02
Benzo(b)fluoranthene	0.002	**0.14**		< 20	20	**0.02**	0.02
Benzo(ghi)perylene		ND		< 20	20	< 3.0	3
Benzo(k)fluoranthene	0.002	**0.07**		< 20	20	< 0.02	0.02
Bis(2-ethylhexyl)phthalate		ND		-		< 1.6	1.6
Chrysene	0.002	**0.12**		< 20	20	**0.02**	0.02
Dibenz(a,h)anthracene		**0.03**		< 20	20	< 0.02	0.02
Hexachlorobenzene	0.4	ND		-		< 0.04	0.04
Hexachloroethane	5	ND		-		< 2.4	2.4
Indeno(1,2,3-cd)pyrene	0.002	**0.08**		< 20	20	< 0.02	0.02
Pentachloronitrobenzene	ND	ND		-		< 0.10	0.1
Pentachlorophenol	1	ND		-		< 0.80	0.8
Phenanthrene	50	**0.08**		< 20	20	< 0.05	0.05
Pyridine		ND		-		< 0.50	0.5

Notes:
- Not Analyzed
ND - Not detected
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 3
545-551 W. 48th Street and
534-542 W. 49th Street
New York, NY 10036
Groundwater Analytical Results
Pesticides/PCBs

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 6/4/2012 µg/L		MW3 1/9/2014 µg/L	
PCB-1016	0.09	ND		< 0.05	
PCB-1221	0.09	ND		< 0.05	
PCB-1232	0.09	ND		< 0.05	
PCB-1242	0.09	ND		< 0.05	
PCB-1248	0.09	ND		< 0.05	
PCB-1254	0.09	ND		< 0.05	
PCB-1260	0.09	ND		< 0.05	
PCB-1262	0.09	ND		< 0.05	
PCB-1268	0.09	ND		< 0.05	
4,4-DDD	0.3	ND		< 0.010	
4,4-DDE	0.2	ND		< 0.010	
4,4-DDT	0.11	**0.11**		< 0.010	
a-BHC	0.94	ND		< 0.010	
Alachlor		ND		< 0.075	
Aldrin		ND		< 0.002	
b-BHC	0.04	ND		< 0.005	
Chlordane	0.05	ND		< 0.050	
d-BHC	0.04	ND		< 0.025	
Dieldrin	0.004	**0.017**		< 0.002	
Endosulfan I		ND		< 0.050	
Endosulfan II		ND		< 0.050	
Endosulfan Sulfate		ND		< 0.050	
Endrin		ND		< 0.010	
Endrin aldehyde	5	ND		< 0.050	
Endrin ketone		ND		< 0.050	
gamma-BHC	0.05	ND		< 0.025	
Heptachlor	0.04	ND		< 0.010	
Heptachlor epoxide	0.03	ND		< 0.010	
Methoxychlor	35	ND		< 0.10	
Toxaphene		ND		< 0.25	

Notes:
ND - Non-detect
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 4
545-551 W. 48th Street and
534-542 W. 49th Street
New York, NY 10036
Groundwater Analytical Results
TAL Filtered Metals

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 6/4/2012 µg/L		MW3 1/9/2014 µg/L	
Aluminum	NS	1,110		5,010	0.005
Antimony	3	BRL		BRL	0.001
Arsenic	25	BRL		BRL	0.004
Barium	1000	51		129	0.002
Beryllium	3	BRL		BRL	0.001
Cadmium	5	BRL		BRL	0.01
Calcium	NS	373,000		66,500	0.001
Chromium	50	2		4	0.001
Cobalt	NS	BRL		51	0.001
Copper	200	6		21	0.005
Iron	500	114		8,230	0.011
Lead	25	10		18	0.011
Magnesium	35000	19,700		18,100	0.001
Manganese	300	27		1,100	0.0002
Mercury	0.7	BRL		BRL	0.002
Nickel	100	2		12	0.1
Potassium	NS	14,600		13,000	0.01
Selenium	10	BRL		BRL	1.1
Silver	50	BRL		BRL	0.01
Sodium	2000	106,000		95,400	0.001
Thallium	0.5	BRL		BRL	0.002
Vanadium	NS	3		15	0.002
Zinc	2000	37		53	0.002

Notes:
ND - ND
NS - No Standard
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard