605/615 West 42nd Street Site

NEW YORK, NEW YORK

Final Engineering Report

NYSDEC Site Number: C231051

Prepared for:

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605 West 42nd Owner LLC,
605 West 42nd Administrative Member LLC,
CUIP 605 West 42nd LLC
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DECEMBER 2010

CERTIFICATIONS

I, Arnold F. Fleming, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program activities, and I certify that the Remedial Action Work Plan was implemented and that all construction activities were completed in substantial conformance with the Department-approved Remedial Action Work Plan.

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Action Work Plan and in all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in for the remedy.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Arnold F. Fleming, of 158 West 29th Street, 9th Floor, New York, New York 10001, am certifying as Owner's Designated Site Representative for the site.

050411	12/13/10	Arnold F. Fleming
NYS Professional Engineer #	Date	Signature

STATE OF NEW YORK ARNOLD F FLEMING 050411 PROFESSIONAL ENGINEER

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LIST OF ACRONYMS

Acronym	Definition
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CAMP	Community Air Monitoring Plan
COC	Certificate of Completion
ECs	Engineering Controls
EPA	Environmental Protection Agency
FER	Final Engineering Report
FLS	Fleming-Lee Shue, Inc.
ft-bg	feet below grade
HASP	Health and Safety Plan
ICs	Institutional Controls
NYCDEP	New York City Department of Environmental Protection
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ppb	parts per billion
ppm	parts per million
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RSCOs	Recommended Soil Cleanup Objectives
SoMP	Soil Management Plan
SVOCs	Semi-volatile organic compounds
TAL	Target Analyte List
TCL	Target Compound List
USTs	underground storage tanks
VOCs	Volatile organic compounds

FINAL ENGINEERING REPORT

1.0 BACKGROUND AND SITE DESCRIPTION

605 West 42nd LLC, 605 West 42nd Owner LLC, 605 West 42nd Administrative Member LLC, and CUIP 605 West 42nd LLC (collectively referred to as "The Volunteer") entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) in November 2006, to investigate and remediate a 0.346-acre property (the Site) located in Manhattan, New York, as shown on Figure 1. The property was remediated to unrestricted use and will be used for a mixture of residential and commercial uses. The Site is a portion of a redevelopment project that will include a 57-story residential building containing 1,169 rental units (including 20% affordable units), parking and retail. The redevelopment will also encompass adjacent portions of land that are not part of the Site.

The site is located in the County of New York and is identified as a portion of Block 1090 and Lot 23 on the New York City Tax Map. The site is situated on an approximately 0.346-acre area bounded by the centerline of the block (the northern adjacent area is also part of Lot 23, formerly Lots 36 and 42) to the north, West 42nd Street to the south, Lot 29 to the east and Lot 20 to the west (see Figure 2). The boundaries of the site are fully described in Appendix A: Survey Map, Metes and Bounds. The Site does not encompass the entire tax Lot 23, as recorded with the New York City Department of Finance on August 24, 2008. The southwest corner of the Site is located at the intersection of West 42nd Street and the western adjoining building on Lot 20. The southern border extends 150 feet along West 42nd Street to the intersection with the eastern adjoining Lot 29, which is part of the same redevelopment project. At this time, there is no development on Lot 29. The eastern border extends 100 feet, 5 inches from West 42nd Street to the centerline of the block; at this time, there is no development on the northern adjoining property (also part of Lot 23) and it is part of the same redevelopment activity. The northern border extends 150 feet along the centerline of the block from the eastern adjoining Lot 29 to the western adjoining Lot 20. The western border extends 100 feet, 5 inches along Lot 20, which is mainly developed with a building.

Active spill number NYSDEC Spill # 91-05888 is associated with the Site. A review of available records completed by EnviroTrac found that Lot 23 is listed with an active spill

(NYSDEC Spill # 91-05888), which was assigned on August 30, 1991 due to a reported gasoline spill associated with the on-site USTs. Further subsurface investigations have found that closed-in-place USTs and former gasoline dispenser areas have petroleum associated VOCs impacts. The investigations were performed in accordance with NYSDEC Spills Program requirements. A request for spill number closure for the Site will be submitted to the NYSDEC at a later date.

An electronic copy of this FER with all supporting documentation is included as Appendix B.

2.0 SUMMARY OF SITE REMEDY

2.1 REMEDIAL ACTION OBJECTIVES

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) were identified for this site.

2.1.1 Groundwater Remedial Action Objectives

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer, to the extent practicable, to pre-disposal/pre-release conditions.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

2.1.2 Soil Remedial Action Objectives

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

2.2 DESCRIPTION OF SELECTED REMEDY

The site was remediated in accordance with the remedy selected by the NYSDEC in the RAWP dated June 2007 and the Final Stipulations List dated October 2007, Soil Vapor Monitoring Work Plan (December 2007) and Proposed Remedial Excavations letter (June 2008) (collectively, the "RAWP".).

The factors considered during the selection of the remedy are those listed in 6NYCRR 375-1.8. The following are the components of the selected remedy:

1. Excavation of all soil/fill exceeding unrestricted SCOs listed in Table 1;
2. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
3. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport and disposal;
4. Removal and treatment of contaminated groundwater by way of construction dewatering at the site.
5. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 1 SCOs;

6. Establishment of a baseline for soil vapor along the southern off-Site boundary of the Site, and post-remedial monitoring of groundwater and soil vapor along the southern (downgradient) Site boundary, with concurrent on-Site soil vapor sampling to evaluate the effectiveness of the remedy as it pertains to these media.
7. Import of materials to be used for backfill in compliance with: (1) chemical limits and other specifications and (2) all Federal, State and local rules and regulations for handling and transport of material;
8. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

3.0 INTERIM REMEDIAL MEASURES, OPERABLE UNITS AND REMEDIAL CONTRACTS

The remedy for this site was performed as a single project, and no interim remedial measures, operable units or separate construction contracts were performed.

4.0 DESCRIPTION OF REMEDIAL ACTIONS PERFORMED

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved RAWP for the 605/615 West 42nd Street site. There were no deviations from the RAWP other than as listed in Section 4.10.

4.1 GOVERNING DOCUMENTS

4.1.1 Site Specific Health & Safety Plan (HASP)

The Site Specific HASP was included as Appendix E of the RAWP and outlined the procedures to be followed to protect on-Site personnel and others during remedial activities at the Site.

All remedial work performed under this Remedial Action was in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

The Health and Safety Plan (HASP) was complied with for all remedial and invasive work performed at the Site.

The Site Safety Coordinator was Matthew Carroll of FLS. Confined space entry was not required to perform the remedial work.

4.1.2 Quality Assurance Project Plan (QAPP)

The QAPP was included as Appendix F of the RAWP approved by the NYSDEC. The QAPP describes the specific policies, objectives, organization, functional activities and quality assurance/quality control activities designed to achieve the project data quality objectives.

The QAPP was followed during pre- and post-remedial sampling, including soil vapor sampling (as described in the Soil Vapor Monitoring Work Plan dated December 2007), soil sampling (end-point sampling) and groundwater sampling (monitoring well sampling).

4.1.3 Construction Quality Assurance Plan (CQAP)

The Construction Quality Assurance Plan(s) (CQAPs) managed performance of the Remedial Action tasks through designed and documented QA/QC methodologies applied in the field and in the lab. The CQAP provided a detailed description of the observation and testing activities that were used to monitor construction quality and confirm that remedial construction was in conformance with the remediation objectives and specifications. The CQAP was included as Appendix G of the RAWP.

FLS will inspect the vapor barrier and concrete slab. These items, which are not part of the remedy, will be installed as part of the construction of the proposed building.

4.1.4 Soil/Materials Management Plan (S/MMP)

The S/MMP provided detailed plans for managing all soils/materials that were disturbed at the Site and addresses excavation, handling, storage, transport and disposal. It also included all of the controls that were applied to these efforts to assure performance in compliance with all applicable Federal, State and local laws and regulations. The S/MMP was included as Appendix H of the RAWP. These controls included management of vehicles coming onto the Site to prevent queuing and screening and manifesting all soils leaving the Site. Although stockpiling was limited, any stockpiled materials were staged on plastic and covered prior to removal from the Site. The S/MMP was fully complied with during all remedial activities.

4.1.5 Storm-Water Pollution Prevention Plan (SWPPP)

The SWPPP was included as Appendix I of the RAWP. The erosion and sediment controls for all remedial construction were performed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control and the site-specific Storm Water Pollution Prevention Plan in effect at the time. These controls were implemented in accordance with the New York City Department of Environmental Protection (NYCDEP) Groundwater Discharge approvals dated May 9, 2008 and June 22, 2009.

The SWPPP addressed requirements of the New York State Storm-Water Management Regulations including physical methods to control and/or divert surface water flows and to limit the potential for erosion and migration of Site soils via wind or water. These

controls included security fencing, construction entrances, dust control and groundwater treatment.

4.1.6 Community Air Monitoring Plan (CAMP)

The CAMP was included in Section 5.4.12 of the RAWP. The CAMP was designed to protect off-Site receptors, including residences and businesses, and on-Site workers. Real-time air monitoring for particulates and volatile organic compounds (VOCs) was conducted on a continuous basis at upwind and downwind stations and along the Site boundaries. Results of the air monitoring were used to determine the appropriate response action, if needed. Upwind and downwind locations were established based on prevailing wind direction and background was established on a daily basis.

A photoionization detector (PID) was used to perform air monitoring of volatile organic compounds during all activities. The PID calculated 15-minute running average concentrations, which were compared to the levels specified below.

- When the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeded 5 parts per million (ppm) above background for the 15-minute average, work was temporarily halted and monitoring continued. If the total organic vapor level readily decreased (per instantaneous readings) below 5 ppm over background, work resumed with continued monitoring.
- When the ambient air concentration of total organic vapor levels at the downwind perimeter of the work area or exclusion zone persisted at levels in excess of 5 ppm above background but less than 25 ppm, work was halted, the source of vapors identified, corrective actions taken to abate emissions and monitoring continued. After these steps, work resumed after documenting that the total organic vapor level 200 feet downwind of the exclusion zone and half the distance to the nearest residential/commercial structure, was below 5 ppm over background for the 15-minute average.
- When the ambient air concentration of total organic vapor levels was above 25 ppm at the perimeter of the work area, work was ceased.

The particulate monitoring was performed using real-time monitoring equipment, a DusTrak, which measured particulate matter less than 10 micrometers in size (PM-10)

and integrated the concentrations over a period of 15 minutes for comparison to the airborne particulate action level. Particulate concentrations were monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary monitoring stations. In addition, fugitive dust migration was visually assessed during all work. The 15-minute average was compared to the levels specified below.

- When the downwind PM-10 particulate level was 100 micrograms per cubic meter (µg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust was observed leaving the work area, then dust suppression techniques were employed. Work was permitted to continue with dust suppression techniques when downwind PM-10 particulate levels did not exceed 150 µg/m3 above the upwind background level and no visible dust was migrating from the work area.

A summary of the CAMP results is included in Section 4.2.5.

4.1.7 Contractors Site Operations Plans (SOPs)

The Remediation Engineer reviewed all plans and submittals for this remedial project (i.e. those listed above plus contractor and subcontractor submittals) and confirmed that they were in compliance with the RAWP. All remedial documents were submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.8 Community Participation Plan (CPP)

The CPP was included as Appendix J of the RAWP. Certificates of mailing, dated May 2007, July 2007 and December 2007, were sent by FLS to the NYSDEC project manager following the distribution of all Fact Sheets. These Certificates included: (1) a certification that the Fact Sheets were mailed and the date of mailing; (2) a copy of the Fact Sheet; and (3) a list of recipients (contact list).

No changes were made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC.

Document repositories have been established at the following locations for the duration of the project and contain all applicable project documents:

New York Public Library Science, Industry and Business Library 188 Madison Avenue @ East 34th Street New York, NY 10016-4314 Attn: John R. Balow Phone: (212) 930-0907 Hours: Monday, Friday, Saturday: 11am to 6pm Tuesday, Wednesday, Thursday: 10am to 8pm Sunday: Closed	NYSDEC Region 2 47-20 21st St. Long Island City, NY 11101-5407 Attn: Jane H. O'Connell, Division of Environmental Remediation New York State Department of Environmental Conservation Phone: (718) 482-4995

4.1.9 Soil Vapor Monitoring Work Plan

In accordance with the October 2007 Stipulation List, a Soil Vapor Monitoring Work Plan dated December 3, 2007 was submitted to the NYSDEC and approved December 13, 2007 (Appendix C). The objective of the plan was to assess the performance of the proposed remedy as it pertains to soil vapor. The proposed soil vapor-monitoring program had both on-Site and off-Site components. The intent of the on-Site portion of the program was to demonstrate that remedy implementation (removal of source material and groundwater treatment) will preclude the presence of soil vapor on the Site; however, due to groundwater being present above development depth, on-Site post-remedial soil vapor samples were not collected. Off-Site baseline (BL) and post-remedial (PR) soil vapor samples were collected from two monitoring points (BL-SV1, BL-SV2, PR-SV1 and PR-SV2) in the West 42nd Street sidewalk, adjacent to the southern boundary of the Site, as shown on Figure 12. Ambient air samples were collected during both sampling events. A discussion of the findings is included in Section 4.4.3, Soil Vapor Sampling.

4.2 REMEDIAL PROGRAM ELEMENTS

Remediation of the Site consisted of excavation of the contaminated fill and petroleum-impacted soils. Groundwater was removed and treated via construction dewatering.

4.2.1 Contractors and Consultants

- The Remedial Engineer is Arnold F. Fleming, P.E and environmental consulting activities were performed by FLS.
- Between December 2007 and September 2008, excavation and foundation activities were performed by Interstate Industrial Corporation (Interstate) of Clifton, New Jersey.
- Excavation activities in November and December 2009 were preformed by Recine Materials (Recine) of Mineola, New York.
- Excavation activities in May 2010 were performed by Hydro Tech Environmental, Inc. (Hydro Tech) of Commack, New York.
- Excavation activities in June 2010 were performed by FMC Construction Services (FMC) of New York, New York.
- The dewatering system was designed and installed by Moretrench American Corporation (Moretrench) of New York, New York. During dewatering, the system was operated by Moretrench prior to May 2010, after which it was operated by FMC.
- HRH Construction LLC (HRH) of White Plains, New York was the general construction contractor through September 2008. Westside Builders of New York, New York has been the general contractor since that time.
- S&H Security Company of New York, New York has provided security services throughout the project.

4.2.2 Site Preparation

FLS mobilized to the site on December 4, 2007 and began CAMP activities.

A secure fence was erected along the perimeter of the entire development project including the Site. Fencing was constructed along West 42nd Street, West 43rd Street and 11th Avenue, with egress points on 11th Avenue and West 43rd St.

The Site elevation was approximately one to five feet below grade prior to mobilization and a truck wash was constructed on the West 43rd Street entrance, as further described in Section 4.2.3.

On January 30, 2008, a pre-construction meeting was held with NYSDEC, a representative of the Volunteer, the Remedial Engineer, FLS, the general contractor and the excavation contractor.

Dewatering points were installed by Moretrench beginning on January 24, 2008, and the dewatering system was activated on March 3, 2008. The dewatering system employed a dewatering pump designed to operate at 200 gallons per minute (gpm). The water was settled in a 3,000-gallon tank. The dewatering system discharged into a combined city sewer outfall and was monitored daily to ensure its operation and for evidence of a petroleum sheen or other indications of contamination. The dewatering approvals are included in Appendix C.

Documentation of agency approvals required by the RAWP is included in Appendix C.

A NYSDEC-approved project sign was erected along the Site's southern boundary (West 42nd Street) in January 2008 and remained in place during all phases of the Remedial Action. A photograph of the sign is included in the photo log included in Appendix D.

4.2.3 General Site Controls

Security measures were in place at the start of the remediation in December 2007. A secure fence was erected along the perimeter of the Site to prevent any unauthorized access and/or disturbance to the Site. Security personnel monitored and controlled access to the Site during non-work hours and Interstate monitored the Site during hours of operation. Both security personnel and Interstate were positioned at the West 43rd Street entrance and were able to monitor all entrances from this location.

In accordance with the SWPPP, erosion and sedimentation controls were employed during construction to minimize runoff, reduce pollutants in discharges, and establish compliance with terms and conditions of the NYCDEP groundwater discharge approval. The Site grade was lowered (between one to five feet below street level), which prevented significant amount of stormwater and sediment from leaving the Site. A truck wash pad was installed at the Site in January 2008 prior to the commencement of trucking activities and used to clean the tires of all vehicles leaving the Site. These

controls prevented any significant amounts of stormwater and/or sediment from leaving the Site.

Water was used to implement any necessary dust control.

Contractor equipment was decontaminated by washing all heavy equipment leaving the Site on the truck wash pad and decontaminating hand tools as necessary.

The excavation limits, including the excavation base and sidewalls, were field screened with a PID and visual and olfactory methods as they were exposed to determine the possible presence of VOCs in soils being transported off-Site. Petroleum impacted soils were located in the areas of the underground storage tanks (USTs) in Grids D4 and C4; and in C3 and C4 along the border of adjacent Lot 29. Soils with identified petroleum impacts were separated and temporarily stockpiled or direct loaded for transportation to a facility permitted to accept non-hazardous petroleum-contaminated soil. In addition, a portable x-ray fluorescence (XRF) analyzer was used from April 2008 to June 2008 to delineate arsenic in the excavation base and sidewalls and in soils transported off-Site. Soils with elevated arsenic concentrations were identified in the grids C3 and D3 along the northwestern portion of the Site. These arsenic-impacted soils were separated and temporarily stockpiled or direct loaded for transportion to a facility permitted to accept the soil.

Stockpiling on site was limited; any stockpiles were inspected daily, at a minimum, and after every storm event. Stockpiles were kept covered at all times with plastic.

On several occasions early in the project, soil was observed off-Site, past the truck wash station. In each case, the area was swept clean and the soil brought back to the Site and appropriately managed. Following these events, truck wash procedures were reviewed.

4.2.4 Nuisance Controls

Odors

As detailed in Section 4.2.3, several measures were employed to reduce dust, sediment and erosion related to excavation activities. Odors were controlled by limiting excavation areas; however, on a few occasions, odors were encountered and were controlled by covering odorous soil with plastic until the soil was removed from the Site. Foam or other odor suppressants were not required.

Noise

The project was conducted in accordance with New York City Department of Buildings (NYCDOB) building permits, codes, and plans governing noise.

Traffic

All truck routes, detailed below, were in accordance with the New York City Department of Transportation's (NYCDOT) current Truck Route Map. The NYCDOT 2007 Truck Route Map was presented as Figure 16 of the RAWP, and included in Appendix C. No updates to the truck routes in the area of the Site were noted on the 2010 NYCDOT Truck Route Map. Eleventh Avenue is a truck through-route and West 43rd Street, north of the Site, is a local truck route. Trucks entering the Site generally travelled from the Lincoln Tunnel north on 10th Avenue to West 43rd Street and entered the Site on either West 43rd Street or 11th Avenue. Most trucks leaving the Site went directly to Route 9A (West Side Highway) if leaving from West 43rd Street and turned south to the Lincoln Tunnel. Trucks leaving from 11th Avenue, turned south and continued to the Lincoln Tunnel.

No odor, noise, or traffic complaints were received during remedial activities.

4.2.5 Community Air Monitoring Program (CAMP) Results

Air monitoring was implemented in accordance with the NYSDEC-approved CAMP to avoid or minimize exposure of field personnel and the public to potential environmental hazards in the soil and groundwater. A calibrated DusTrak Model 8520 particle monitor and a calibrated MiniRAE 2000 PID were placed in both upwind and downwind locations on-Site for the entirety of the project and continuously monitored, as required by the CAMP.

Air monitoring stations were located on upwind/exclusion zone and downwind locations of the Site daily, based on work location and wind direction. Monitoring equipment was set up, calibrated and checked by a representative of the RE. Background levels for each day were established prior to the start of work. The final measurement for the day was performed after the end of work.

The basis for action was the monitoring data collected by a representative of the RE at 15-minute intervals throughout the day at upwind and downwind stations. Both the upwind and downwind stations were set up to provide time-weighted 15-minute average concentrations. The monitor display is updated every second, and the reading displayed is

the average reading over the last 15-minute interval. The 15-minute interval concentrations were recorded in the field book. The average was also logged every 15 minutes and later downloaded from the equipment and was provided to NYSDEC and NYSDOH. Real-time monitoring of worker zones was also conducted using a PID. Any exceedances of the CAMP action levels during the remedial activities at the Site were noted and are discussed below.

There were several exceedances of particulate matter and VOC action levels noted in the downloaded data, as set forth in the monthly reports and included in Appendix E. In letters to the NYSDOH dated July 1 and July 28, 2008, the particulate and VOC exceedances were reviewed and the sources and actions taken were outlined. The review letters to NYSDOH and copies of all field data sheets relating to the CAMP are provided in electronic format in Appendix E.

4.2.6 Reporting

Daily and Monthly reports were submitted to the NYSDEC and NYSDOH by FLS. All daily and monthly reports are included in electronic format in Appendix F.

The digital photo log required by the RAWP is included in electronic format in Appendix D.

4.3 CONTAMINATED MATERIAL REMOVAL

A list of the Track 1 soil cleanup objectives (SCOs) for the contaminants of concern for this project is provided in Table 1.

A figure of the location of original sources and areas where excavations were performed is shown in Figure 3. The entire Site was excavated to a minimum development depth of 20 ft-bg with some areas extended based on end-point sample results, as detailed in Section 4.4.1.

The remediation at the Site consisted of the removal of former buildings, excavation and off-Site disposal of soil, dewatering and the removal of several USTs. These activities are discussed in the following sections.

4.3.1 Removal of Petroleum-Impacted Soil and Urban Fill

The entire Site was excavated to a minimum development depth of 20 ft-bg with some areas extended to bedrock based on the chemical analysis of end-point samples. The extent of excavation for each grid is shown on Figure 3. Contour maps of estimated cut and fill thicknesses for remedial activities at the site are included in Figure 4.

Excavation activities were completed in two phases. The excavation to development depth commenced January 16, 2008 and continued through May 21, 2008. Remedial activities continued through mid-June 2008 and, subsequently, the foundation contractor terminated their presence at the Site. The second phase of excavation activities, consisting predominantly of the remedial excavations below development depth, commenced November 17, 2009 and continued, intermittently, to June 16, 2010.

Based on the end-point sampling detailed in Section 4.4.1, FLS conducted remedial excavations below development depth in the limited areas as shown on Figure 4. The remedial excavations were conducted to bedrock in the areas with exceedances of the Unrestricted Use SCOs (in the area of samples C3 II, C3 III, D3 I, D3 III, D4 I, D4 III, E3/4 II and E3/4 III). The excavations below development depth were conducted in accordance with FLS' letter dated June 6, 2008, submitted to NYSDEC. The proposed excavations were approved by NYSDEC in an email dated June 13, 2008. Both the June 6, 2008 letter and the approval are included in Appendix C.

All soil was determined to be either non-hazardous urban fill or non-hazardous petroleum-impacted urban fill. Approximately 13,732 cubic yards (CY) of soil were removed from the Site. Approximately 520 cubic yards of concrete from previous building foundations were removed from the Site. Approximately 330 cubic yards of bedrock were removed from the Site. Table 2 shows the total quantities of each category of material removed from the site and the disposal locations. A summary of the samples collected to characterize the waste, and associated analytical results are summarized in Section 4.3.2.1.

The excavated materials were sent to the facilities described below.

Type	Facility	Location	Treatment Type	Tonnage / CYs Disposed
Soil	Clean Earth of Philadelphia	Philadelphia, Pennsylvania	Thermal	499 / 374
	SLRD Company	Mullica Hill, New Jersey	Land Placement	15,353 / 10,582

Type	Facility	Location	Treatment Type	Tonnage / CYs Disposed
	Walter Earle Corporation (aka Pure Soil)	Jackson, New Jersey	Thermal	485 / 306
	Clean Earth of Carteret	Carteret, New Jersey	Bioremediation	3,125 / 2,244
	Bellmawr Waterfront Development (BWD)	Bellmawr, New Jersey	Land Placement	277 / 176
Bedrock	SLRD Company	Mullica Hill, New Jersey	Land Placement	421 / 286
	Stony Creek Industries	Oceanside, New York	Recycling	278 / 220

Letters from Applicants to disposal facility owners and acceptance letters from disposal facility owners are attached in Appendix G.

4.3.1.1 Disposal Details

Initial waste characterization was conducted by Interstate, the foundation contractor, and Technion Incorporated (Technion) of Nutley, New Jersey between December 4 and December 5, 2007. The initial waste characterization samples were collected to address soil above development depth (20 ft-bg). One waste characterization sample was collected from each of six grids at the Site (TP-8 thru TP-13). One composite sample per grid was submitted to Technion for analysis. The locations of the test pits are presented on Figure 5. A summary of the waste characterization and associated analytical results are summarized in the Technion Analytical Reports presented in Appendix G. The disposal facilities accepted the soils based on the results of the initial waste characterization.

The results from end-point and additional delineation samples collected in grids C3, D3, D4 and E4 showed contaminants at levels above the Unrestricted Use SCOs (as detailed in Section 4.4.1, End-Point Sampling from Base of Excavation).

Over-excavation of these grids was required to meet Track 1 Unrestricted Use SCOs. In a letter to the Clean Earth dated June 25, 2008, the results of the end-point samples collected in grids C3, D3 and D4 were submitted as waste characterization samples. Based on the number of full scan samples collected, the homogeneity of the soils with

respect to most analytes and the soil type (coarse- to medium-grained sand), the end-point sample results were accepted as adequate waste characterization samples by Clean Earth. The locations of the end-point samples are presented on Figure 6 and the 2008 letter to Clean Earth is presented in Appendix G.

Between January 16, 2007, and June 8, 2010, 19,739 tons of soil and 699 tons of bedrock were removed during remediation, as shown on Table 2. Tabulated daily load summaries are provided in Appendix G. The area of excavation is shown on Figure 3.

Manifests and bills of lading are included in electronic format in Appendix G. The transportation contractors were RRZ Trucking of Newark, New Jersey; Muñoz Trucking of Belleville, New Jersey; Leticia Trucking of Hillside, New Jersey; and Rainbow Trucking of Ledgewood, New Jersey. The transporter names and license numbers are included in Appendix G.

All soil was determined appropriate for disposal and transported to the appropriate disposal facilities.

4.3.1.2 On-Site Reuse

No soil was re-used on-Site. All excavated soil was transported off-Site for proper disposal.

4.3.2 Removal of Dewatering Fluids

4.3.2.1 Disposal Details

Dewatering points were installed by Moretrench beginning on January 24, 2007; the dewatering system was activated on March 3, 2007. The dewatering system employed a dewatering pump designed to operate at 200 gallons per minute (gpm) or 288,000 gallons per day (gpd). The water was pumped to a 3,000-gallon settling tank with a weir. The water was then pumped though an 8-inch diameter pipe to an existing 48" x 28" combined sewer located on West 42nd Street, south of the Site. In June 2009, approval from the NYCDEP was given to tie the dewatering system into the existing 48" x 28" combined sewer located on West 43rd Street, north of the Site.

4.3.3 Removal of Underground Storage Tanks

4.3.3.1 Disposal Details

On January 18, 2008, three 550-gallon capacity USTs, were discovered beneath a concrete pad in grid C4 in the southeastern portion of the Site. Two of the USTs appeared to be filled with water and the third appeared to contain a mixture of water and gasoline. The USTs were pumped out on January 30, 2008, and cleaned, cut and disposed of properly in March 2008 by AARCO Environmental Services Corporation (AARCO) of Lindenhurst, New York in conjunction with Mercury Tank & Pump, Incorporated (Mercury) of Brooklyn, New York.

On January 31, 2008, the three known USTs in grid D4 in the southwest corner of the Site were encountered. The USTs appeared to be filled with oily water. The USTs were pumped out on February 1, 2008 and cleaned, cut and disposed of properly in March 2008 by AARCO Environmental of Lindenhurst, NY.

A location map of the removed UST locations is presented in Figure 7. A digital copy of the UST removal documents, including an affidavit submitted to the Fire Department, City of New York (FDNY) by Mercury Tank and Pump Inc of Brooklyn, NY, oil/water disposal manifests and scrap tickets, are presented in Appendix H. A Petroleum Bulk Storage (PBS) Application documenting the closure of the six USTs and the NYSDEC Facility Information Report noting the same are also included in Appendix H.

4.4 REMEDIAL PERFORMANCE / DOCUMENTATION SAMPLING

Bottom and sidewall end-point soil samples, arsenic delineation soil samples, soil vapor samples and groundwater samples were collected in accordance with the RAWP and the requirements of the NYSDEC Division of Environmental Remediation *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (DER-10) dated December 2002.

Data Usability Summary Reports (DUSRs) were prepared for all soil end-point samples generated in this remedial performance evaluation program. These DUSRs are included in Appendix I, and the associated raw data is provided electronically in Appendix J. The DUSR for the bottom and sidewall end-point sample data was prepared by Chemworld Environmental, Inc. (Chemworld) of Rockville, Maryland. The DUSR was completed for the following analytical reports associated with the Site: J88747, J88747T, J89232, J9100, J88975, J91976 and JA47699. Tables 3 through 8 reflect the updated qualifiers detailed in the DUSR. The DUSR indicates that all data results for these samples are

usable.

4.4.1 End-Point Sampling from Base of Excavation

Post-excavation end-point sampling from the base of the excavation was performed to confirm that all soils left on-Site met the Unrestricted Use SCOs. In areas where soil was left on Site, the bottom end-point samples were collected at a frequency of one grab sample per 900 square feet (SF), as shown on Figure 6 and described below.

For the base end-point samples, each alphanumeric grid was divided into three sections, designated by roman numerals I through III. Within each section, one grab end-point sample was collected from development depth (generally 20 to 22 ft-bg) with an additional sample collected two to four feet below development depth (generally 24 to 26 ft-bg). The additional end-point samples were collected for possible delineation of exceedances of the Unrestricted Use SCOs. No evidence of suspected contamination was detected in the base of the excavation and, therefore, samples were collected from the approximate center of each 900 SF area. End-point soil samples were not collected from areas of exposed bedrock.

Between April 17, 2008 and May 16, 2008, fourteen end-point grab samples were collected from the base of the excavation at development depth and eleven on-hold additional delineation end-point samples were collected two feet below the first interval. In grid C3, the grade had been lowered to approximately 22 ft-bg in preparation for a large foundation element. Soil samples were collected, immediately stored on wet ice, and transported to Accutest Laboratories (Accutest) of Dayton, New Jersey, a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-approved laboratory. All soil samples were analyzed for the full suite of analyses, which includes VOCs by Environmental Protection Agency (EPA) Method 8260, SVOCs by EPA Method 8270, pesticides by EPA Method 8081A, PCBs by EPA Method 8082, Target Analyte List (TAL) metals by EPA Method 6010B, mercury by EPA Method 7491A, and cyanide by EPA Method 335.4. The results of the post excavation end-point samples are presented in Tables 3 through 7 and Figures 8 through 10 and are discussed below.

Quality Assurance/Quality Control (QA/QC) was conducted in accordance with the *Quality Assurance/Quality Control Plan* included as Appendix F of the RAWP. As outlined in the QA/QC Plan, four (4) trip blanks (for VOC analysis); two (2) field blanks

and two (2) duplicate samples for full suite analysis were submitted. The QA/QC samples are included in Tables 3 through 6 as TB041808, TB042308, TB042508, Trip Blank, FB041808, FB042208, EP- D4 IV (20-22) and EP- D3 IV (20-22).

The following compounds were detected at concentrations above the Unrestricted Use SCOs: arsenic (As); trivalent chromium (Cr III); copper (Cu); 4,4'-DDT and zinc (Zn). A combination of these compounds at levels above the Unrestricted Use SCOs in end-point samples EP-E3/4 III, EP-E3/4 II, EP-D3 I, EP-D3 III, EP-D4 I, EP-D4 IV (duplicate of EP-D4 III), EP-C3 II and EP-C3 III. Therefore, the additional deeper delineation end-point samples collected from 24 to 26 ft-bg were analyzed for grids EP-D4 I (metals), EP-D4 III (pesticides), EP-C3 II (pesticides and metals) and EP-C3 III (metals). The results of the additional delineation end-point samples, where analyzed, are presented in Tables 3 through 7 and Figures 8 through 10 and are discussed below.

The base of the remaining grids EP-E3/4 II, EP-E3/4 III and EP-D3 I (20 – 22 ft-bg) was at bedrock and no further sampling was necessary. No exceedances of the additional analysis for the additional delineation end-point samples were found in samples EP-D4 I (metals) and EP-D4 III (pesticides). Exceedances of arsenic were found in samples EP-C3 II (20.9 ppm) and EP-C3 III (16.3 and 19.9 ppm). The results of end-point sampling were submitted to the NYSDEC in the Proposed Remedial Investigations letter dated June 6, 2008. The Proposed Remedial Investigations letter and the June 13, 2008 email approval are presented in Appendix C.

Elevated levels of arsenic above the Unrestricted Use SCO were detected in the delineation end-point samples collected from C3 II and C3 III. Based on these results, vertical delineation of arsenic was conducted in grid C3. On May 30, 2008, two borings were installed by geoprobe to collect vertical delineation samples for arsenic approximately every two vertical feet from 24 ft-bg to bedrock (encountered at approximately 31.5 ft-bg). Iron was also analyzed to determine whether the arsenic was naturally occurring. Concentrations of arsenic above the Unrestricted Use SCO were detected in the borings installed in C3 II and C3 III to 30 ft-bg. The results are presented in Table 8 and Figure 11. The analysis of the arsenic and iron results to determine if the arsenic was naturally occurring was inconclusive. Following NYSDEC approval additional remedial excavation to bedrock was completed in grids C3, D3, D4 and E4 between November 2009 to June 2010.

4.4.2 End-Point Sampling from Sidewall of Excavation

On April 18 and 19, 2008, and on May 27, 2010, six off-Site sidewall soil samples were collected along the southern Site boundary (West 42nd Street) behind the sheeting line to document off-Site contaminant concentrations. Based on the guidance provided in DER-10, sidewall samples were collected at a frequency of one grab sample per 30 linear feet at the interval of highest suspected contamination. The sidewall soil sample locations are shown on Figure 6 and the results are included in Tables 3 through 6 and on Figures 8 through 10. The only compound detected above the Unrestricted Use SCOs was benzene in samples SW-30 (14-16 ft bgs) and SW-60 (14-16 ft bgs).

4.4.3 Soil Vapor Sampling

A soil vapor monitoring report is included as Appendix M.

Off-Site baseline and post-remedial samples were collected from two monitoring points in the West 42nd Street sidewalk, adjacent to the southern boundary of the Site, for laboratory analysis of VOCs by EPA Method TO-15. Ambient air samples were also collected during both events. Excavation at the Site has extended below the natural groundwater table; as a result, post-remedial on-Site soil vapor points were not installed. The sample locations are shown on Figure 12.

PID readings collected from each location prior to purging ranged from 0.0 to 0.3 ppm. All samples were submitted to Accutest for analysis.

Both baseline and post-remedial off-Site soil vapor samples contained total VOCs at concentrations much lower than those detected in the remedial investigation soil vapor sampling. No standards, criteria or guidance (SCGs) for the soil gas concentrations have been set forth by NYSDEC or NYSDOH. In the absence of SCGs for soil gas, the results have been compared to guidance values and background levels for indoor air. Analytical results for soil vapor samples were compared to the NYSDOH Air Guideline Values (AGVs) and to background levels of VOCs in indoor air presented in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). No VOCs were detected at a concentration above the NYSDOH AGVs. Two compounds, acetone and trichlorofluoromethane, were detected in the post-remedial sampling at concentrations above NYSDOH-referenced indoor air values.

Based on an analysis of the results, as included in the soil vapor monitoring report, FLS

concludes that there is no source for potential soil vapor intrusion in the proposed building. The following items were used to support this conclusion:

- the detected off-Site soil vapor VOC concentrations are present below the NYSDOH AGVs for indoor air;
- some exceedances of background indoor air levels were detected in the off-Site soil samples. However, these compounds are a likely laboratory artifact and a refrigerant not previously encountered at the Site;
- similar compounds were detected in the on-Site remedial investigation soil gas samples as compared to the baseline and post-remedial off-Site soil gas samples. However, the concentrations in the baseline and post-remedial off-Site samples are orders of magnitude lower which indicates that on-Site sources have not affected the off-Site soil gas;
- all on-Site soil end-point results meet the Part 375-6.8(a) unrestricted use soil cleanup objectives (SCOs), and
- the building foundation – consisting of a concrete slab and waterproofing – will be present below the groundwater table, thereby eliminating the potential for vapor generation below the slab.

FLS recommends that indoor air sampling not be required in the to-be-constructed building.

4.4.4 Groundwater Sampling

An off-Site monitoring well, MW-6, that was installed prior to the Site redevelopment was damaged and could not be sampled following the completion of remedial activities. Therefore, on May 23, 2010, FLS' drilling subcontractor, Aquifer Drilling & Testing Inc. (ADT) of New Hyde Park, New York installed off-Site groundwater monitoring well MW-6R to replace the damaged well, MW-6. The location of MW-6R is to the west of MW-6 due to the location of marked utilities. The monitoring well was installed to a depth 18 ft-bg (to bedrock) and the well was screened in two zones to account for both de-watered and non-dewatered conditions. Zone 1 is screened from 5 to 12 ft-bg and Zone 2 is screened from 15 to 18 ft-bg.

On June 22, 2010, a post-remedial off-Site groundwater sample was collected from Zone

2, and analyzed for VOCs, SVOCs, Total Metals and Dissolved Metals. The sample location is shown on Figure 13. Analytical results are presented in Tables 9 through 11 and the analytical laboratory report is included in Appendix J.

- No VOCs were detected at a concentration above the Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards (AWQS) and Guidance Values for Class GA Groundwater (Class GA Standard). Only one VOC, Methyl Tert Butyl Ether (MTBE), was detected at an estimated value of 0.57 parts per billion (ppb), which is below the Class GA Standard of 10 ppb.
- One SVOC compound class was detected at a concentration above the Class GA Standard. The Class GA Standard for total phenolic compounds is 1 ppb. One phenolic compound, 3&4-Methylphenol, was detected at a concentration of 11.7 ppb. No other phenolic compounds were detected. The presence of this compound may be related to fill material beneath the sidewalk.
- Metal compounds were detected at concentrations above the Class GA Standards. Exceedances of iron (855 & 12,000 ppb), magnesium (89,500 & 89,700 ppb), manganese (1,140 & 1,220 ppb) and sodium (593,000 & 584,000 ppb) were found in dissolved (filtered) and total metals (unfiltered) samples. All of these metals are common earth materials and are likely not related to on-site contaminants.

4.5 IMPORTED MATERIALS

In accordance with the RAWP, a representative of the RE observed all materials brought to the Site. These materials, which included washed, recycled concrete aggregate, were managed in accordance with the scope of work presented in FLS' letter to NYSDEC dated April 30, 2008, pertaining to Base Material for Mud Slab. Copies of the letter and the subsequent NYSDEC approval, dated May 8, 2008, are presented in Appendix K.

On May 20, 2008, prior to concrete pouring for footings, approximately one load of clean recycled concrete aggregate was brought to the Site to be used as a base for the portion of the mud slab poured in grid C4. An FLS representative inspected the material visually and screened the recycled concrete aggregate with a PID. The material was determined appropriate for use on the Site.

No other materials were imported as part of this remedial action.

4.6 CONTAMINATION REMAINING AT THE SITE

A contour map of the subgrade topography showing the base of the excavation is presented in Figures 4 and 14 and Appendix L. All contaminated soil was removed to development depth or bedrock. No contaminated soil remains at the Site.

4.7 SOIL COVER SYSTEM

Exposure to contamination is not expected as all contaminated soil has been removed. No soil cover or cap is required on the Site.

4.8 OTHER ENGINEERING CONTROLS

The remedy for the site did not require the construction of any other engineering control systems.

4.9 INSTITUTIONAL CONTROLS

The remedy for the site did not require the construction of any institutional controls.

4.10 DEVIATIONS FROM THE REMEDIAL ACTION WORK PLAN

As detailed in Section 4.4.3, post-remedial, on-site soil vapor sampling was not completed; however, FLS concluded that there is no potential for soil vapor intrusion. Therefore, this deviation does not affect the conclusions of the FER.

There were no other deviations from the RAWP during the implementation of remedial activities.

4.11 ESTIMATED REMEDIAL COSTS

The estimated remediation costs are $7,129,519 and the estimated development costs are $17,135,480.